An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 76 53 Fax : +91 431 252 00 31 Email : skaruna@bheltry.co.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two Parts	Enquiry Number: 2851400003	Enquiry Date: 04.01.2014	Due date for submission of quotation: 12.02.2014

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	**Supply of Substations, CSS and High Tension (HT) Equipment for establishing the Substation and Allied Works on Turn Key basis** as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	**01 Set**

Important points to be taken care during submission of offer:-

1. **The Technical Documents for the above item has been split in to Two Portions. Hence, please download both the Portions i.e. Portion 1 and Portion 2 for the details of complete specification.**
2. **The above item may be split into individual line items at the time of finalizing the scope and subsequent ordering. Hence, the payment shall be made against completion of supplies and commissioning of each line item.**
3. **However, payment for such items will be made for 80% of the supply value after receipt of items and the balance 20% supply including the Erection & Commissioning value will be made after commissioning and prove-out of the respective line item and submission of 10% PBG.**
4. **In case of any quantity over & above the tolerance limit (of +10%) during the commissioning period (not exceeding 6 months), the vendor may confirm their willingness to supply the same at the original rate mentioned in the offer.**
5. **Compliance No. IND 01A and Annexure-II (Details of Company Performance) as applicable to the vendor to be filled in and enclosed along with the offer failing which, their offer will not be considered for evaluation.**
6. **EMD for this Tender will be Rs. 2,00,000/-**

BHEL's General guidelines / instructions (refer MM/CE/GENL/001-EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under above Enquiry reference.

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For **BHARAT HEAVY ELECTRICALS LIMITED** C. SARANYA Engineer/ Capital Equipment / MM

TECHNICAL DOCUMENT AGAISNT ENQUIRY NO:2851400003

PORTION 1

Contents

PREAMBLE

PROJECT INFORMATION:

BHEL is proposed to install a Power Equipment Fabrication Plant at Sakoli Tehsil, district Bhandara of Maharashtra State in the land area of about 475 acres. It is proposed to arrange the Main Receiving substation (MRS), other distribution substation and allied works in the factory area.

Site information:

Location: Tehsil Sakoli (Villages covered: Mundipur, Bamhani and Khairi)

Dist: Bhandara

State: Maharastra

Latitude: 21° 05’ 00” N

Longitude: 79° 59’ 00” E

Nearest Railway Station : Soundad- 10 Kms away from Sakoli

Nearest Village : Sakoli

Nearest Seaport : Mumbai

Nearest Airport : Nagpur (around 99 kms from Sakoli)

Access Road : Sakoli is located on Hazira-Kolkata NH-6. Sakoli is well connected to the major and minor cities. The National Highway 6 mainly connects Nagpur and Kolkata (via Bhandara, Deori, Jabalpur etc).

CLIMATIC CONDITIONS:

Temperature: Maximum: 47 Deg. Celsius and Minimum: 11.6 Deg. Celsius

Humidity: 52.3 %

Rainfall: In South West monsoon (June-Sep): 50 days.

Average total rainfall: 1250 - 1500 mm.

Seismic data:

Seismic Intensity : As per IS: 1893-2002 - Zone II.

Qualification Criteria for executing the HT Contract at PEFP Bhandara		
Sl. No	**Description**	**Vendor to confirm**
1	Only those vendors, who have designed, engineered, supplied and commissioned at least one Substation of same (Voltage rating-33kV & transformer capacity-5 MVA) or higher rating for similar applications in the past three years and such substation is presently working satisfactorily for more than one year after commissioning, should quote.	
2	The vendor should be Original Equipment Manufacturer (OEM) of HT Transformer/ HT Switchgear/ LT switchgear.	
3	List of the customers / companies to which similar/higher rated substation is supplied & commissioned by the vendor.	
4	Performance certificate from minimum one customer, regarding satisfactory performance of the equipments for a minimum period of one year supplied to them in last five years on the customer letter head.	
5	Vendor/Firm should submit the audited copy of last three years (2010-11,2011-12 & 2012-13) balance sheet and Profit & Loss account.	
6	Vendors should quote for supply, erection, testing and commissioning of the substations and allied equipments as per BOQ.	
7	Vendor/firm should have a valid Electrical ESA licence - issued by the respective licencing board.	
8	Vendor should have the PAN card and Service tax documemts for their staff. Vendor should produce the registration/ certification copies along with the offer..	

Note: Vendor/bidder should conform all the above said points without which the offer will not be technically considered.

Supply, installation, erection, testing and commissioning of Main Receiving Substations & CSS at PEFP Bhandara on Turnkey basis

Item: 10 Supply Items			
S.No.	**DESCRIPTION**	**QTY.**	**UNIT**
1	33/11KV 5 MVA Power transformer as per the technical specifications of Annexure-II.	2	No.
2	Outdoor Plinth mounted type 1000 KVA, 11KV/415 Volts, Compact Substation (CSS) with Cast resin Transformer. Technical specifications for the CSS as Per Annexure-X.	10	No.
3	24 Volts/ 100AH DC maintenance free Battery and Battery charger as per Annexure-IIIA & IIIB respectively.	6	No.
4	50x6 mm size Hot dipped GI flat .MS flat shall conform to IS2062 &Galvanisation shall conform to IS4759.The thickness of the ZINC coating shall be min 80 microns with test certificate .	3000	Meters
5	33 KV grade, 3 core 300 Sq.mm XLPE Cable with specification as per Annexure-IV.	500	Meters
6	11 KV grade, 3 core 240 Sq.mm XLPE Cable with specification as per Annexure-V.	4000	Meters
7	Heat Shrinkable Indoor end Termination Kit with suitable for 240sq mm 3 Core 11KV XLPE un earthed system cable indoor application. Cable Jointing kit should confirm to IS 13573-1982 and the offered joints should have been type tested by CPRI / ERDI.	12	No.
8	Heat Shrinkable indoor/outdoor end Termination Kit suitable for 300sq mm 3 Core 33KV XLPE un earthed system cable. Cable Jointing kit should confirm to IS 13573-1982/relevent IS and the offered joints should have been type tested by CPRI / ERDI. Indoor--------- 10 nos Outdoor-------2 nos	12	No.
9	Heat Shrinkable Straight through joint Kit with copper ferrule suitable for 240 Sq.mm 3 Core 11KV XLPE un earthed system cable. Cable Jointing kit should confirm to IS 13573-1982 and the offered joints should have been type tested by CPRI / ERDI.	10	No.
10	Floor mounting cubicle type MV Switch gear panel (PCC) consisting of 19 nos of ACB breakers with technical specifications as per Annexure-VI	5	No.
11	Floor mounting detuned 300 KVAr APFC panels with technical specifications as per Annexure: VII	10	No.
12	25 X 3 mm pure copper earth flat for earhing of lightning arrester to the earth pit.	500	Meters
13	4 core 1.5 sqmm FRLS ISI marked copper conductor armoured cable for connecting auxillary relays and battery in SS.(200 m/ SS).	1000	Meters
14	1100V 3.5C 185 Sqmm XLPE Armoured copper cable with technical specification as per Annexure-IX.	2000	Meters
15	1100V 3.5 core 185sq.mm XLPE AA cable (for APFC panels) with technical specifications as per Annexure: VIII	1000	Meters
16	Synthetic insulating mat as per IS: 15652-2006 as per the Annexure-XI. Note:- 1) The Synthetic insulating mat IS approved mark CPRI/ERDI tested should be supplied by contractor with TC 2)Size of mat required: a) 2.0mm Thick mat (for 415V) - 75 meters b) 2.5mm Thick mat (for 11kV) - 15 meters c) 3.0 mm thick mat (for 33kV) - 10 meters	100	M2
17	33kV indoor cubicle floor mounting type metering box confirming to MSEDCL norms equipped with 3 nos 33000/110V cast resin type PT and 200/5A cast resin type CT with suitable bus bar, connectors as per the Annexure-XII.	2	No.

18	Supply of copper lightning arrester spike with complete set of 4 feet height copper tube of thickness/as per IS , one number bowl, one number copper base plate for earthing shopfloor and buildings.	10	No
19	Supplying of the required substation tool & tackles and safety equipment as per Annexure-XIII.	2	Sets

Item: 20 Service Work

S.No.	DESCRIPTION	QTY.	UNIT
1	Suppy & erection of 10 m long 152x152mm RSJ double pole structure consisting of 33 KV,600 A double breaking isolators along with Earth switch, 33 KV disc insulators, support insulators , 33 KV lightning arrestors, mechanical interlocks for OPEN/CLOSE of main poles (R Y B) and earthing , jumpering, angle iron supports, 2 nos. stay wires with guy insulators , painting ,earthing, bus conductors,stringing, steel member, fastners, clamps, etc as per the model drawing as per Annexure-I. Note: 1) The operation of the isolator with earth switch for trouble free operation for opening/closing should be ensured.	1	Lot
2	Assembling ,Erection,testing and commissioning of BHEL make ,HT,33KV, Model VM36 VCB panel size 1300mm width x 1831mm Length x 2712mm Height and weight 1000kg (appx) at Main Receiving sub station on the RCC floor with supply of suitable foundation bolts, mounting on the floor/cable trench, grouting etc. The VCB panel interlinking bus bar/earth connections should be done after properly matching all the VCB's on the floor/cable trench. The Breakers shall be completely checked up for its wiring as per the supplier drawing, tightness, working of the spring closing mechanism as per the instruction of the Electrical incharge during the time of erection. Interlocking arrangement between the incoming breaker and the Isolator switch at douvle pole structure in MRSS to be done by the contractor. Note: VCB panel with trunking panel, interlinking bus bars only will be issued by BHEL at the site stores.	6	Sets
3	Assembling ,Erection,testing and commissioning of BHEL make ,HT,11KV, Model VM12 VCB panel size 820mm width x 1831mm Length x 2712mm Height and weight 1000kg (appx) at Main Receiving sub station on the RCC floor with supply of suitable foundation bolts, mounting on the floor/cable trench, grouting etc. The VCB panel interlinking bus bar/earth connections should be done after properly matching all the VCB's on the floor/cable trench. The Breakers shall be completely checked up for its wiring as per the supplier drawing, tightness, working of the spring closing mechanism as per the instruction of the Electrical incharge during the time of erection. Interlocking arrangement between the 33kV transformer breaker and the transformer 11kV breaker in MRSS to be done by the contractor. Note: VCB panel with trunking panel, interlinking bus bars only will be issued by BHEL at the site stores.	12	Sets
4	Erection, testing & commissioning of 33/11KV, 5 MVA Power transformer . The erection of the traformer includes providing suitable concrete plinth . Note: Contractor should engage suitable mobile crane during erection	2	Nos.
5	Foundation preparation and erection of chain link mesh of size 3 inch x 3 inch to a height of 2.4 mtr with supporting pole span of 3 meter using suitable ISI angle 50x50x6mm around the power transformer yard and double pole structure yard including painting, earthing etc. Suitable weld mesh door with frame work for transformer yard and double pole structure yard should be provided. The supporting angle should be grouted with suitable concrete mixture. 1)Chain link mesh to be earthed as per the IS standards. 2)Corners should be properly supported by suitable angles.	60	Meter

6	Supply & spreading of 40mm size blue metal jelly in the transformer yard and double pole structure yard to a height of 150mm.	100	Sq. metre
7	Construction of brick wall (fire wall) of dimensions 5m height x 5 m length x 0.3m width with necessary concrete foundation, masonry, finishing, whitewashing, painting,etc along with suitable RCC column & beam.	2	Lot
8	Excavation of earth and construction of burnt oil pit of size 2mx2mx2m, 150mm thick with RCC mix and connection should be made between TR-1 & TR-2 to Burnt oil pit with 6 inch PVC pipe to a length of 35 meters appx. including required bends and fixing on the ground with required slope to burnt oil pit. The pit should be covered with RCC slab and man hole to be provided	1	Set
9	Erection, testing and commissioning of outdoor type 1000 KVA, 11KV/415 Volts, Compact Substation (CSS) with suitably positioning on the concrete foundation. Making end termination using the screened seperable termination kit (4 nos/SS). Note: 1)Crane facility to be provided by contractor.	10	Sets
10	Erection,testing and commissioning of 24 Volts/ 100AH DC maintenance free Battery and Battery charger with supply of necessary angle iron frame works, etc on the floor/cable trench.	6	Sets
11	Supply & Providing earth electrodes as per IS standards as follows: Excavation of earth, supply and installation of earth electrode generally conforming to IS: 3043-1987. The electrode should be of 100 mm dia. C.I. pipe with suitable welded earth flat connecting arrangments, having wall thickness of 13 mm and height 2750 mm with supply and filling of alternate layers of Bentonite, river sand and charcoal around the electrode, construction of masonry chamber size of inner size 600mm x 600mm and RCC slab cover etc., with supply of masonry materials.Earth resistance value (to be measured using earth megger), earth electrode No. and date of inspection are to be painted inside the chamber wall and on the top of the cover. Earth electrode Locations: MRSS - 8 Nos SS1to5 - 50 Nos Metering point - 4 Nos Lightining Arrestors - 10 Nos **Total - 72 Nos** SPECIAL INSTRUCTIONS for making earth pits: a) Before commencement of work, contractor should discuss with Electrical in charge and finalise the location plan for the installation of earth electrodes. b) Contractor should fill earthing materials like bentonite, river sand, charcoal around electrode. c) Unique earth pit number should be allotted for every earth pit and same is to be painted with black colour paint on the inside wall of masonry chamber and cover. d) After erection of earth pit, the ohmic value to be measured and final report to be submitted. e) All the earthing works should be carried out in the presence of BHEL electrical staff.	72	No.
12	Laying of 50 mm x 6 mm GI earth flat in formed/excavated trench/wall between the earth pit and the PCC. After laying,the earth flat should be connected with Earth electrode on one side and PCC on other side. All sub-items are under the contractor's scope.	3000	Meters
13	Excavation of earth (ordinary soil) up to a depth of 1mtr, width 0.6mtr and with supply & laying of quality bricks (box type arrangement) , supply & filling with quality sand and closing the trench with excavated earth to make it good ,to facilitate cable laying. Note: Sand filling to be done with 0.075 m below the cable then cable laying,and then again sand filling to be done for 0.075m, arrangement of bricks in box type and then to be closed with the excavated earth.	6000	Meters

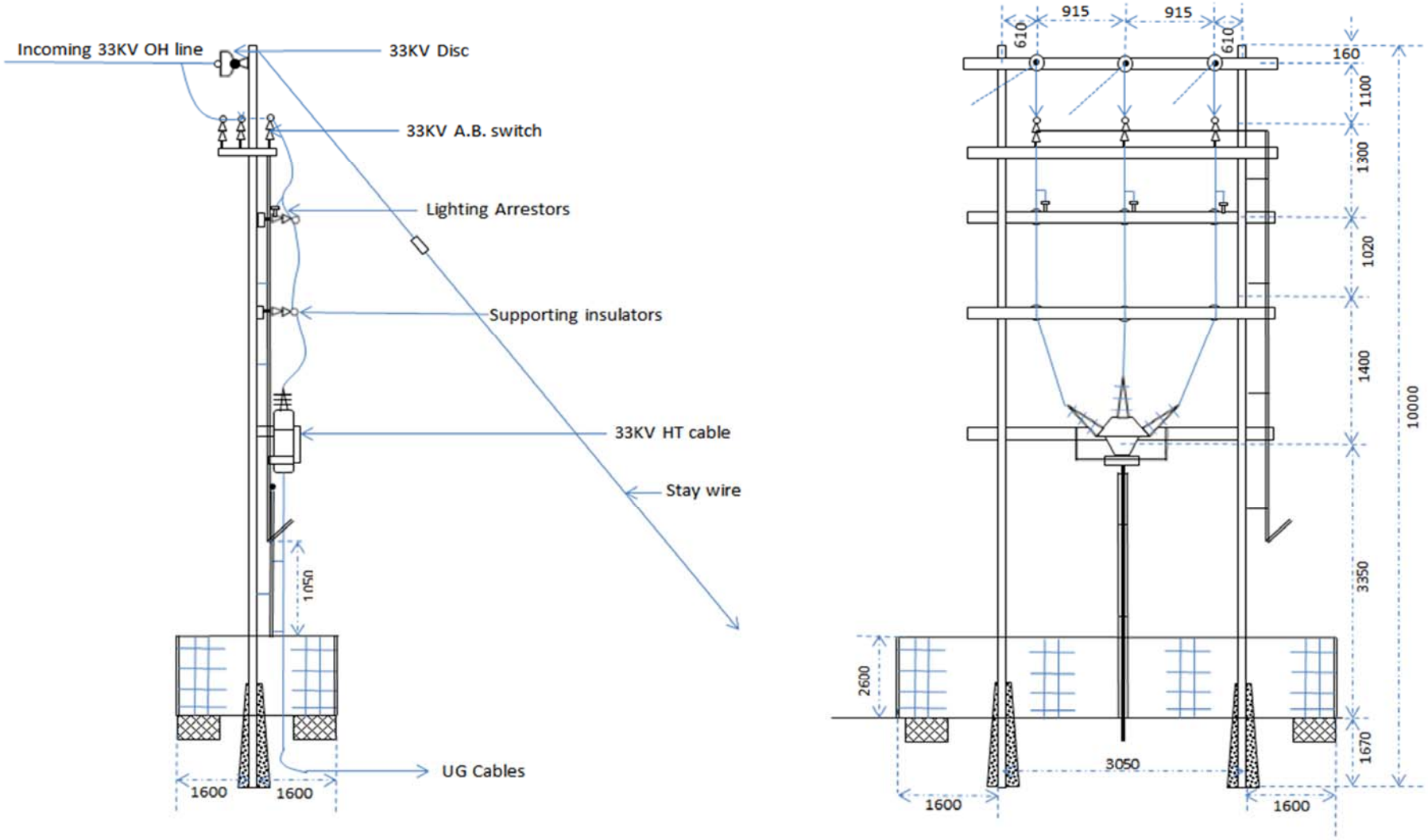
14	Removing and replacing back the RCC/ MS slabs/ plates over the formed cable trenches of width 0.3 to 1 meter, to facilitate laying or removal of 240 sq.mm HT XLPE cable.	3500	Meters
15	Laying of Single runs of 33 KV, 3 core 300 Sq.mm XLPE Cable in already excavated trench/ open trench/ pipe.	500	Meters
16	Laying of single run of 11 KV, 3 core 240 Sq.mm XLPE Cable in already excavated trench/ open trench/ pipe.	4000	Meters
17	Making Indoor Cable End Termination for 11KV, 3 core 240 sq.mm XLPE cable using Heat shrinkable cable jointing Kit.	12	No.
18	Making indoor/outdoor Cable End Termination for 33KV, 3 core 300 sq.mm XLPE cable using Indoor--------- 10 nos Outdoor-------2 nos Heat shrinkable cable jointing Kit.	12	No.
19	Making Straight thru joint of 11KV, 3core 240 sq mm. XLPE cable using heat shrinkable straight through joint kit.	10	No.
20	Erection, testing and commissioning of floor mounting cubicle type MV Switch gear (PCC) panel with supply of required foundation bolts ,grouting, earthing, mansionary works etc. During erection all the panel inner wirings should be checked up as per the drawings and other required interlocks and proper tightning, coupling the panel comparments bus bars. Minor touching up of panel painting, writing of the cables sizes of incomer & outgoings and feeder names etc should be carried out as per Engineer instructions at the time of commissioning.	5	Sets
21	Erection, testing and commissioning of floor mounting detuned 300 KVAr APFC panels with supply of suitable foundation bolts, grouting, earthing, mansionary works etc.	10	No.
22	Fixing of copper lightning arrester spike with complete set of 4 feet copper tube, one number bowl, one number copper base plate on the top of the building of height approx 15 M (for earthing shopfloor and buildings).	10	No.
23	Laying of 25 X 3 mm electrical grade copper earth flat from the lightning arrester to the earth electrode with necessary support clamps (with porcelain bush insulator) on the truss / wall including terminating rigidly at both ends. 25 mtrs per lightning arrester (approximately). Total length = 250 metres. NOTE: - 1. Earth flat jointing with suitable size cadmium bolts is under the scope of contractor. 2. Skilled electricians with valid license and high roof level work experience should only be involved in this work. Before starting the work contractor should get safety clearance from the Electrical incharge 3. Earth pit value to be maintained and proved to be less than 1 ohm.	250	Meters
24	Laying of 4 core 1.5 sqmm copper conductor armoured cable in the cellar room for connecting auxillary relays and battery in SS. 200 m/ SS approximately .	1000	Meters
25	Supply & making end termination of 4 core 1.5 sqmm insulated copper conductor cable with supply of glands ,lugs , earthing etc. 40 Nos / SS approximately . Total : 200 Nos	200	No.
26	Laying of 5 runs of medium voltage 3.5 Core 185 Sqmm XLPE Armoured copper cable between the CSS outgoing and MV switchgear incomer in the ground/formed trench. Total length:(5 runs of 80 mtr length for each SS) = 2000 meter	2000	Meters
27	Supply of double compression brass cable gland, necessary cable termination copper lugs and making end termination of 3.5 Core 185 Sqmm XLPE Armoured copper cable at the CSS outgoing side and MV switchgear incomer side.	120	No.

28	Supply of steel materials, fabrication and erection of necessary cable racks and supports in the cable cellar room using 100 X 50 mm M.S channel for vertical support, 50 X 50 X 6 mm angle, 25 X 3 mm M.S. Flat and 100 X 100 X 6 mm M.S. plate as per the instruction of electrical incharge. Cable rack drawing to be submitted by the contractor for the approval by BHEL. Cable tray should be in the dimension of 300mm and 600 width. Note: All sub-items including necessary MS Channel/ angle/ flat/base plate are under the scope of the contractor.	2000	Kg.
29	Laying of single runs of 3.5 core 185sq.mm XLPE AA cable in the excavated trench/formed trench /wall(for APFC panels).	1000	Meters
30	Supply of double compression brass cable gland, necessary cable termination aluminium lugs and making end termination of 3.5 Core 185 Sqmm XLPE Armoured alluminium cable at the MV switchgear outgoing end and APFC side.	70	No.
31	Laying and pasting of Synthetic insulating mat in front of newly commissioned HT switch gear and MV Panel in RSS ,SS 1 to SS 5. The insulating mat should be cut to the required length of the HT switch gear and MV Panel as per the insruction of the electrical incharge. Cleaning the surface of the floor by cleaning agent ,cutting the required size of the synthetic insulating mat and applying PEDILITE make SR998 / 998FW resin and pasting neatly on the floor in front of HT switch gear and MV Panels. Note:- 1)All other required materials including required qty. of cleaning agent ,PEDILITE make SR998 / 998FW resin and other materials are under the scope of the contractor.	100	Sq. Meter
32	Installation of 33kV metering box at the identified location with required civil grouting.	2	No.
	Special Instructions: Preparation of equipments layout drawings /single line diagrams incorporating all the supplied and installed equipments in this order and obtain necessary approval as per IE rules 1956/ Electricity Act 2003 and Safety Act 2010. The safety certificate from the Central Electrical authority for energising the equipments has to be obtained. Scope includes submission of application, completion certificate, valid ESA licence and coordination with the inspection of officials of CEA or any other statutory requirements applicable for the approval of all substations and allied installations.		

	1. The contractor should supply necessary civil materials for grouting, floor concreting etc. 2. Cable tags should be provided for all power and control cables. 3. Letter painting work in all panels mentioning the cable size, bus bar arrangement identification of the breaker etc should be done by the contractor as per the instruction of Electrical in charge. 4. Electric Power for welding and other erection purpose in contractor scope. 5. All the tools including Welding m/c, welding consumables, gas cutting set, regulator, etc., are under contractors scope.. 6. Any clarification & modification of the work should be directly discussed with the Electrical In charge. 7. Minor paint touching should be done in the panel for damages caused during transport are under contractors scope. 8.Storing, unloading, transportation of the electrical equipment/materials to specified location are in the contractor scope. 9.The contractor should get proper registration/permission from the security Gate/ personnel while taking their supply materials inside and outside the site. They should maintain an invoivce register ,which is liable for inspection by the BHEL authorities 10. Crane facility required for Unloading/movement of the equipment are in contractor scope. 11. Any other misellanious items necessary for the erection, tesing and commissioning is in the scope of contractor. 12. All the cable glands should be earthed with suitable copper bare conductor	Vendor to confirm
	General instructions to the Tenderers: 1. All the equipment supplied like power transformer, switchgear, cables are required along with the routine test certificates for obtaining the Statutory approvals. 2. Pre-despatch Inspection should be offered for the equipment like power transformer, CSS, cables, MV switchgear, APFC panels, etc. 4. Contractor should clearly mention the point to point confirmation of the specifications mentioned in the Annexures for all the items. 5. Quoted electrical equipments like power transformer, MV switchgear, APFC panel, battery and battery chargher should be supported with the performance certificate from the earlier customers for its satisfactory performance for a minmum period of 2 years of similar or higher capacity/size items. 6. Necessary drawing/GTP approval should be obtained from BHEL Engineer In-charge for quoted items like Power transformer, CSS, MV switchgear, APFC panels, battery chargers, cables etc. 7. All the electrical substation works should be carried out as per MSEDCL/Indian electricity rules & regulations/all applicab;e Indian Standards, guides, quotes etc. 8. Complete postal address of the customer along with the year of commissioning where similar kind of work is carried out. 9. Name, designation and contact details of the customers where similar kind of work is carried out. 10. For the safety of the working personnel/staffs using of the Personal Protective Equipment (PPE) is to be strictly followed by the contractor. Necessary exclusive safety officer has to be deputed by the contractor to ensure the safe working environment. 11. For the erection of the items, quantity on Pro-Rata basis to be considered.	Vendor to confirm
	<u>Note:</u> **Incase of any quantity over & above the tolerance limit (of +10%) during the commissioning period (not exceeding 6 months), the vendor may confirm their willingness to supply the same at the original rate mentioned in the offer.**	Vendor to confirm

ANNEXURE-I

DOUBLE POLE STRUCTURE MODEL DIAGRAM



ANNEXURE-II

TECHNICAL SPECIFICATIONS FOR 5 MVA 33/11KV OIL IMMERESED TRANSFORMER

Sl. No	Description/Specifications	Vendor to confirm	Deviations
1.0	Supply of 33/11kV 5MVA oil immersed transformer with OLTC confirming to Specification: IS 2026-1977 (Part I to V) and below specifications:	Vendor to confirm	
1.1	Type	: Two winding Transformer	
1.2	Primary Voltage	: 33kV (Delta)	
1.3	Secondary Voltage	: 11kV (Star)	
1.4	No. of Phases	: 3	
1.5	Frequency	: 50 Hz	
1.6	Power Rating	: 5 MVA	
1.7	Transformer Connection	: Dyn 11	
1.8	Winding	: Copper	
1.9	Type of cooling	: ONAN	
1.10	Tap Changer	: On load tap changer +5% to -15% in steps of 1.25 % (17 Taps) with RTCC panel. -Outside main tank mounted type OLTC	
1.11	Make & model of the OLTC	Vendor to confirm	
1.12	Performance certificate from the OLTC manufacturer		
1.13	Application	: Outdoor application	
1.14	Cooling Equipment	: Radiators	
1.15	Primary Terminals Type	: Cable Adapter Box	
1.16	Secondary Terminal	: Cable Adapter Box	
1.17	Suitability	: To suit Parallel operation	
1.18	Max. ambient temperature	: 50 deg. C	
1.19	% Impedance at rated current	Vendor to confirm	
1.20	Value of load and no load loss	Vendor to confirm	
1.21	Details of aux. Power supply	Vendor to confirm	
1.22	Insulation level for each winding (Power frequency & Impulse)	Vendor to confirm	
2.00	**Protection Devices and accessories:**	Vendor to confirm	
2.1	Oil surge relay / Buchholz relay	Vendor to confirm	
2.2	Pressure relief valve/ Explosion vent	Vendor to confirm	

2.3	Dehydrating Breather	Vendor to confirm	
2.4	Temperature Indicator to indicate oil and winding temperature and to operate an alarm/ trip circuit at preset temperatures.	Vendor to confirm	
2.5	Oil level indicators	Vendor to confirm	
2.6	Insulating silicon oil as per IS:335-1993.	Vendor to confirm	
2.7	Conservator tank	Vendor to confirm	
2.8	Oil drain Valve	Vendor to confirm	
2.9	Air release device	Vendor to confirm	
2.10	Oil filling hole with cover	Vendor to confirm	
2.11	Filter Valve	Vendor to confirm	
2.12	Lifting lugs	Vendor to confirm	
2.13	Jacking lugs	Vendor to confirm	
2.14	Rollers/skids	Vendor to confirm	
2.15	Inspection cover	Vendor to confirm	
2.16	Rating Plate	Vendor to confirm	
2.17	Terminal Marking Plate	Vendor to confirm	
2.18	Two Earthing Terminals	Vendor to confirm	
2.19	Nitrogen Fire fighting system for the transformer	Vendor to confirm	
2.20	Tests and Measurements	: As per IS:2026	
2.21	3 sets of operation and maintenance manual should be submitted along with a copy of the routine test certificate for the BOI.	Vendor to confirm	
3	Preferred Makes	EMCO Limited, Kanohar Electricals Ltd., KRYFS Power Components Ltd., Marsons Limited, Southern Power Equipment Company Pvt Ltd., Schneider Electric Infrastructure Limited, Transformers and Rectifiers (India) Ltd., Technical Assosiates Ltd., Universal Power Transformers Pvt Ltd., Voltamp Transformers Ltd. ABB India Ltd, , SIEMENS, General Electric.	

ANNEXURE-IIIA

TECHNICAL SPECIFICATIONS FOR 24 V MAINTENANCE FREE BATTERIES

Sl. No	Description/Specifications	Vendor to confirm	Deviations
1.0	**Battery Particulars:**		
1.1	Battery Type	Maintenance free Valve Regulated Lead Acid (MF-VRLA).	
1.2	Battery Rating	24V-100Ah to 1.75 ECV C10 at 27°C.	
1.3	Manufacturers cell Designation.	Vendor to specify	
1.4	No of Cells	12	
1.5	Cell Dimensions	(82.0X170.0X215.0) mm Approx.	
1.6	Single cell Weight	6.5Kg Approx.	
1.7	Battery bank dimensions	(746X350X495) mm Approx.	
1.8	Battery bank weight	95 kg Approx.	
2.0	**Charge Regime**		
2.1	Float charging Voltage	2.23-2.25 volts per cell	
2.2	Boost charging voltage	2.30 volts per cell	
2.3	Current limit	Minimum 10 Amps to Max 20 Amps.	
3.0	**Battery Details:**		
3.1	AH efficiency	Above 90%	
3.2	WH efficiency	Above 80%	
3.3	Self Discharge/Week	<1% of rated capacity	
3.4	Max allowable Ambient Temp. at which cell can safely operate.	55°C continuous & 70°C short time	
3.5	Recommended max period of storage.	Vendor to specify	
3.6	Material of container	polypropylene co-polymer.	
3.7	Type of separator	Highly absorbent Micro porous spun glass matrix(AGM).	
3.8	Type of +ve & -ve plates	Flat pasted	
3.9	Material of tray	Mild steel coated with acid resistance paint.	
3.10	Method of connection between cells	Bolted	
3.11	Voltage ripple allowable	<2% of the RMS value	
3.12	Type of connectors	Lead coated Heavy duty copper strips	
3.13	cycle life of Battery at 27°C	2000 cycles for 50% Depth of Discharge(DOD) (or) 1200 cycles for 81% Depth of Discharge.	

3.14	Suitable rack assembly with provision for vertical stacking to be provided.	Vendor to confirm	
3.15	Safety valve	Pressure regulated, self re-sealing, explosion proof.	
3.16	Battery Terminals	Lead terminal with highly conductive copper inserts for high current discharge.	
3.17	Container	Hermatically sealed	
3.18	Status of supply	Supply in charged condition and ready to use.	
3.19	Battery to be Eco friendly with no emission of corrosive fumes or gases in normal operating conditions.	Vendor to confirm	
4.0	Technical leaflet indicting the features, dimensions, Model number to be enclosed with the offer.	Vendor to confirm	
5.0	3 sets of Operation, Maintenance manual in English Required with each battery set	Vendor to confirm	
6.0	Note: Point by point confirmation is required from the supplier otherwise the offer will not be considered	Vendor to confirm	
7	Preferred makes of Battery	Exide Industries Ltd, HBL Power Systems Ltd, Hoppecke Batterien GMBH & CO.KG, Amara Raja batteries.	

Annexure-IIIB			
Technical Specification for 24 V Battery Charger			
Sl. No	**Description/Specifications**	**Vendor to confirm**	**Deviations**
1.0	Charger Type	Float cum Boost charger	
2.0	Charger Rating.	Suitable for 24V,100AH battery.	
3.0	**AC Input Supply Details.**		
3.1	Voltage	230V +/- 10%	
3.2	Frequency	50HZ +/- 5%	
3.3	Phase	Single phase	
4.0	**DC Output details.**		
4.1	Nominal Voltage	24v, DC	
4.2	Float Voltage	Vendor to specify	
4.3	Boost Voltage	Vendor to specify	
4.4	Ripple Content.	3% RMS or better	
5.0	**Meters :**		
5.1	DC Voltmeter with charger / Battey selector switch.	Vendor to confirm	
5.2	Charger output Ammeter.	Vendor to confirm	
6.0	**Indication Lamps :**		
6.1	Lamp for input mains availability(LED)	Vendor to confirm	
6.2	LED indications for charger ON, Float ON, Boost ON, Over Voltage.	Vendor to confirm	
7.0	**Circuit Protections** :		
7.1	AC Input Circuit Breakers(MCB of reputed make acceptable to BHEL).	Vendor to confirm	
7.2	Semi Conductor fuses for bridge circuit.	Vendor to confirm	
7.3	DC overload protection.	Vendor to confirm	
7.4	DC Output Circuit Breaker.(MCB of reputed make acceptable to BHEL)	Vendor to confirm	
8.0	**Controls.**		
8.1	Float Voltage adjust potentiometer	Vendor to confirm	
8.2	Boost Voltage adjust potentiometer.	Vendor to confirm	
8.3	Float / Boost selector switch.	Vendor to confirm	
9.0	Free standing steel cabinet with provision for bottom cable entry and enamel painting or powder coating.(500mm stand to support the cabinet).	Vendor to confirm	
10.0	Technical leaflet indicating the features, dimensions, Model number to be enclosed with the offer.	Vendor to confirm	

11.0	3 sets of Operation,Maintenance manual in English.wiring diagram& circuit details to be supplied along with the charger Required with each panel. Single copy of make,rating details,technical details and catalogue of all the bought out items used in the panel.	Vendor to confirm	
12.0	Note: Point by point confirmation is required from the supplier otherwise the offer will not be considered.	Vendor to confirm	
13	Preferred makes:	Amara Raja Power systems limited, Chhabi Electricals pvt.ltd., Chloride power systems & solutions limited, Dubas Engg pvt ltd, HBL Power systems ltd, Mass-Tech controls pvt.ltd., Statcon Power controls ltd, ICD	

ANNEXURE-IV

TECHNICAL SPECIFICATIONS FOR THE 33kV, 3Cx300 Sqmm XLPE CABLE

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of High Voltage, 33 KV- XLPE insulated PVC inner / outer sheathed Aluminium armoured Power Cable conforming to the specification given below.		
1	**High Voltage Power Cable :**		
1.1	Normal area of conductor	300sq.mm	
1.2	Number of cores	3core	
1.3	Voltage Rating	33KV, 50Hz. A.C.	
1.4	Type of system	unearthed	
1.5	**Conductor:**		
1.5.1	Material	Strandard circular Aluminium conductor as per IS:8130-1984	
1.5.2	Conductor Screen Material	Non- metallic semiconducting tape or extruded semiconducting material.	
1.5.3	Min number of Strands	30	
1.6	**Insulation:**		
1.6.1	Material & Type	XLPE as per IS:7098-Part-2 of 1985.	
1.6.2	Nominal thickness of Insulation in mm.	8.8	
1.6.3	Core Identification	Coloured strips applied on the core.	
1.6.4	Insulation Screen	Extruded semiconducting material.	
1.6.5	Metallic Copper Tape	Vendor to specify	
1.7	**Innersheath:**		
1.7.1	Material	Extruded PVC type ST-2 as per IS:5381	
1.7.2	Nominal thickness of inner sheath in mm.	0.7mm	
1.8	**Armour :**		
1.8.1	Material	Galavanished steel flat strip as per IS: 3975	
1.8.2	Normal strip size in mm	4X0.8	
1.9	**Outersheath:**		
1.9.1	Material.	PVC compound type -ST2of IS:5831/1984	
1.9.2	Minimum thickness in mm	3.00 mm (Min.)	
1.10	Conformance to Indian Standard Specification	IS:7098(Part-2)-1985	
2	Technical leaflet of the cable indicating the approx diameter, weight, thickness of insulation / sheathing / armour wire, current rating etc. to be enclosed with the offer.	Vendor to furnish	
3	General Features of the H V Cable:		

3.1	Cable shall have the manufacturer name embossed / printed / idented on the outer sheath at regular intervels.	Vendor to confirm	
3.2	Cable shall have voltage grade, cable size embossed on the outer sheath.	Vendor to confirm	
3.3	Routine tests shall be conducted on the cables as per IS and test certificate shall be produced against supply.	Vendor to confirm	
3.4	CPRI/ERDA test certificates for 33KV XLPE cables of IS 7098 Part II 1988: shall be attached along with the offer.	Vendor to confirm	
3.5	Length variation in the quantity of supply if any.	Vendor to specify	
3.6	Cable length shall be of 500Mtrs per Drum	Vendor to confirm	
4	3 copy of make,rating,details,technical details along with the materials required.		
5	Special Note:Point to point confirmation is required from the supplier technical suitability, otherwise the offer will not be considered.	Vendor to confirm	
6	Preferred makes:	APAR industries limited, Cable corporation of india ltd., Diamond power infrastructure ltd, Hindusthan vidyut products ltd., Havells india limited, kei industries ltd., Krishna electrical industries ltd., KEC International limited, Nicco corporation ltd., Paramount communications ltd., Polycab wires pvt. ltd., Ravin cables limited, Sriram cables pvt. ltd., Torrent cables ltd., Universal cables ltd.	