PACKAGE-II

HT SUBSTATION EQUIPMENT SUPPLY, ERECTION AND COMMISSIONING

PART – A

Qualification Criteria for executing the HT Substation Equipment Supply and Erection Contract at PEFP Bhandara

Sl. No	Description	bidder to confirm
1	The lead bidder/ agency i.e. PEB (Package-1 bidder) can tie up with an agency 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 on EPC/JV basis and such substation is presently working satisfactorily for more than one year after commissioning.	
2	List of the customers / companies to which similar/higher rated substation is supplied & commissioned by the bidder.	
3	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 as per the suggestive format given in Annexure-XIV.	
4	Bidder for Package-2 (substation) should submit the audited copy of last three years (2010-11,2011-12 & 2012-13) balance sheet and Profit & Loss account.	
5	Bidders should quote for supply, erection, testing, commissioning and obtaining all statutory approvals for the substations and allied equipments as per BOQ.	
6	Bidder should have a valid Electrical ESA licence - issued by the respective licencing board.	
7	Bidder should have the TIN, PAN card and Service tax documemts for their firm. bidder should produce the registration/ certification copies along with the offer.	

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

PART B

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

Item: A Supply Items

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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.		

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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	Sq. Metre		
	b) 2.5mm Thick mat (for 11kV)	15	Sq. Metre		
	c) 3.0 mm thick mat (for 33kV)	10	Sq. Metre		
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		
			TOTAL		

Item: B Service Work					
S.No.	**DESCRIPTION**	**QTY.**	**UNIT**	**RATE**	**AMOUNT**
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		

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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. 2)Foundation required for the CSS will be done by BHEL.	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		

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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		

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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.	250	Meters		

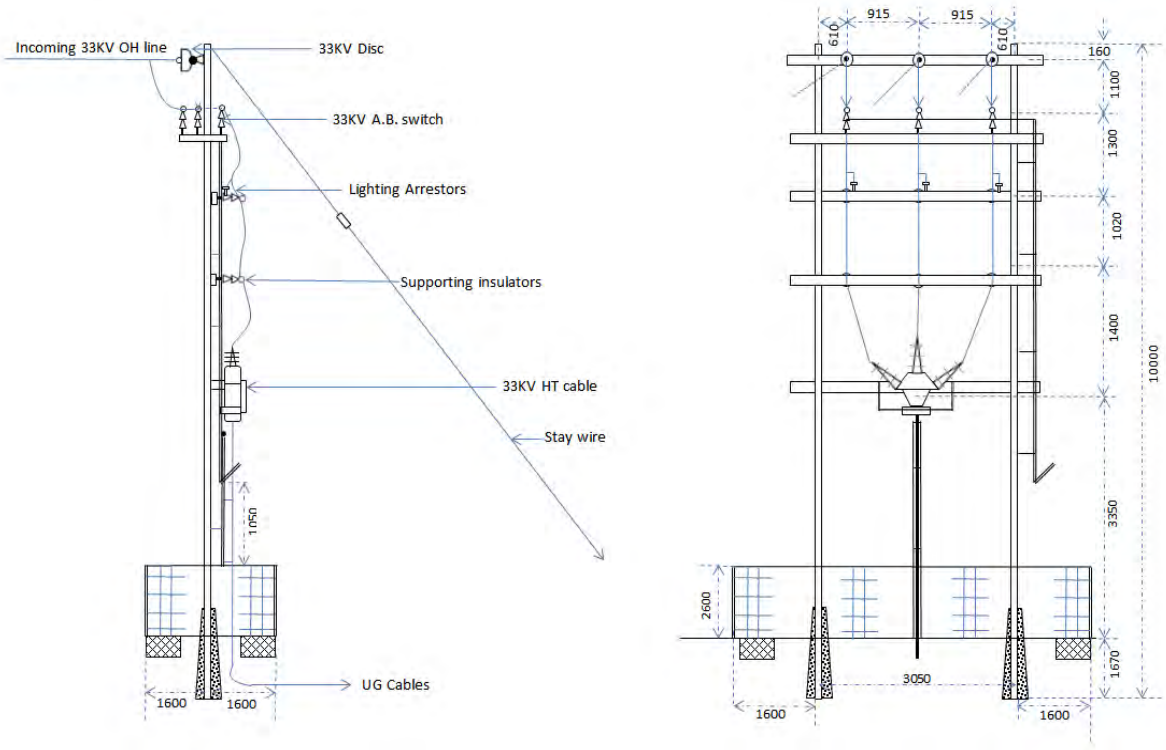
S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
	2. Skilled electricians with valid license and high roof level work experience should only be involved in this work. Before starting the work contractor should get safety clearance from the Electrical incharge 3. Earth pit value to be maintained and proved to be less than 1 ohm.				
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.		

S.No.	DESCRIPTION	QTY.	UNIT	RATE	AMOUNT
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.	Vendor to confirm			
	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				

	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.	Vendor to confirm		
	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.			
	12.With regard to civil works what ever explicitly mentioned in the specifications should be carried out and as well as over and above if it is required for system completion it should be in the bidder scope.			
	<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	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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.	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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.)	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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.	

ANNEXURE-V
TECHNICAL SPECIFICATIONS FOR THE 11kV, 3Cx240 Sqmm XLPE CABLE

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of High Voltage,11 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	240sq.mm	
1.2	Number of cores	3core	
1.3	Voltage Rating	11KV, 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.	5.5	
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	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
1.9	**Outersheath:**		
1.9.1	Material.	PVC compound type - ST2of IS:5831/1984	
1.9.2	Minimum thickness in mm	2.84 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 11KV 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.	

ANNEXURE-VI
TECHNICAL SPECIFICATION FOR MV SWITCH GEAR PANEL

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Design., manufacture and supply of Medium Voltage, floor mounting, free standing, indoor, cubicle type switchgear panel comprising Air Circuit Breaker feeder and conforming to the specification and features given below.		
1.0	Air Circuit Breaker Make : L & T or GE or SIEMENS or SCHNIEDER or ABB.	Vendor to confirm	
2.0	**Incomer Breaker** : 2000A, 415V, Three Phase and neutral, draw-out type, true, trip free, electrically operated spring closing type, Air Circuit Breakers having 24 V DC shunt trip, emergency hand trip, 4No + 4NC auxiliary contacts, ON / OFF mechanical indication, Integral self powered current release, current transformers of required quantity, burden and accuracy for metering and for protection and confirming to IEC 60947 /2 / IS 13947 (Part 2). **Quantity - 2 Nos**.	Vendor to confirm	
3.0	**Outgoing Breaker** : 1000A, 415V, Three Phase and neutral, draw-out type, true, trip free, electrically operated spring closing type, Air Circuit Breakers having 24V DC shunt trip, emergency hand trip, 4No + 4NC auxiliary contacts, ON / OFF mechanical indication, Integral self powered current release, current transformers of required quantity, burden and accuracy for metering and for Protection and confirming to IEC 60947 /2 / IS 13947 (Part 2). **Quantity - 16 Nos**.	Vendor to confirm	
3.1	**Bus coupler Breaker (ACB):** 2000A, 415V, Three Phase and neutral, draw-out type, true, trip free, electrically operated spring closing type, Air Circuit Breakers having 24V DC shunt trip, emergency hand trip, 4No + 4NC auxiliary contacts, ON / OFF mechanical indication and confirming to IEC 60947 /2 / IS 13947 (Part 2) **Quantity - 1 No.**		

Sl. No	Description/Specifications	Vendor to confirm	Deviations
4.0	**Bubars 2000A, TPN aluminium busbars.**(Size -2 runs of 100mmx10mm for phase & 1 run of 100mmx10mm for neutral.)		
5.0	**INCOMER BREAKER PANEL SPECIFICATIONS.**		
5.1	Air Circuit Breaker rated current, Voltage, short circuit breaking capcity.	2000A,415V,75KA	
5.2	Current Transformer Ratio	2000/5A for incomer & main bus bar CT.	
5.3	C T Make(reputed make accepted by BHEL)	Vendor to specify	
5.4	Digital multifunction meter of class 1.0 to show the readings of Voltage, Current, Power,PF, frequency and %THD of voltage & current.Required makes of CONSERV,L&T,AE, SECURE , ELmeasure, RISHAB along with RS 485 communication port.	Vendor to specify	
5.5	Digital multi function meter make:	Vendor to specify	
5.6	Voltmeter detail(reputed make accepted by BHEL).	Analog type, 0-500V, 96mm square, accuracy class 1.0	
5.7	Voltmeter Selector switch make.	Vendor to specify	
5.8	Digital type Three Phase Over Current & Earth fault Relays with High set Communication and breaker control. (L&T, ABB, C&S, SIEMENS, SCHNEIDER or other reputed make accepted by BHEL).	Vendor to specify the make & model no with cataloque.	
5.9	Energy Meter 3 phase, 4 wire, 5A, Class 1.0 Digital meter of reputed make acceptable to BHEL with RS 485 communication port- (L&T, ABB, C&S, SIEMENS, SCHNEIDER or other reputed make accepted by BHEL).	Vendor to specify the make & model no with cataloque.	
5.10	Indication lamp for panel (R,Y,B, ON, OFF & TRIP)	LED type	
5.11	Cable Entry (Detachable type)	Aluminium, PVC armoured cables, bottom entry.	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
6	**OUT GOING BREAKER PANEL SPECIFICATIONS**		
6.1	Air Circuit Breaker rated current, Voltage, short circuit breaking capcity.	1000A, 415V, 50KA as specified.	
6.2	Current Transformer Ratio	1000 /5A	
6.3	C T Make(reputed make accepted by BHEL)	Vendor to specify	
6.4	Digital multifunction meter of class 1.0 to show the readings of Voltage, Current, Power,PF, frequency and %THD of voltage & current.Required makes of CONSERV,L&T,AE, SECURE , ELmeasure, RISHAB along with RS 485 communication port.	Vendor to specify	
6.5	Energy Meter 3 phase, 4 wire, 5A, Class 1.0 Digital meter of reputed make acceptable to BHEL with RS 485 communication port- (L&T, ABB, C&S, SIEMENS, SCHNEIDER or other reputed make accepted by BHEL).	Vendor to specify the make & model no with cataloque	
6.6	Digital type Three Phase Over Current & Earth fault Relays with High set Communication and breaker control. (L&T, ABB, C&S, SIEMENS, SCHNEIDER or other reputed make accepted by BHEL).	Vendor to specify	
6.7	Indication lamp for panel (ON, OFF & TRIP)	LED type	
6.8	Cable Entry (Detachable type)	PVCAA - PVC Aluminium armoured cables, bottom entry.	
7.0	BUS COUPLER BREAKER PANEL SPECIFICATIONS		
7.1	Air Circuit Breaker rated current, Voltage, short circuit breaking capcity.	2000A, 415V, 50KA as specified.	
7.2	Indication lamp for panel (ON, OFF & TRIP)	LED type	
8.0	Specification for MV Switchgear Panel.	Vendor to specify	
8.1	Approx. overall dimensions of the Panel(Max-7000mm length, 1500mm depth & 2200mm height acceptable).	Vendor to specify	
8.2	Make of the accessories in the panel, type, no of ACB, technical leaflet of the ACB and protection release, copy of the type test report of the ACB to be furnished in the offer.	Vendor to confirm	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
9.0	3 sets of O & M manual for each panel including spare parts list for the breakers and panel, general arrangement, drawing, power schematic drawing wiring diagram shall be supplied along with the panel.	Vendor to confirm	
10.0	General Features.		
10.1	The panel shall be of modular construction, Incomer feeder & bus coupler panels shall house one ACB whereas outgoing feeder panels shall house two Air Circuit Breakers in two-tier formation along with busbars, metering and other accessories. Sufficient space for maintenance shall be provided in the panel.	Vendor to confirm	
10.2	Bus bars shall be made of high conductivity alluminium alloy with adequate cross section to operate at low operating temperatures. Busbars including neutral and earth bars shall be short circuit tested as per IS: 8623 for a fault withstand level of 75 KA for one second and CPRI/ERDA/Govt.approved Test centre test certificate should be enclosed.	Vendor to confirm	
10.3	The neutral busbars shall have a continuous current rating of 50% of the phase busbars. All busbars shall be insulated with heat shrinkable insulating sleeve, colour coded for easy identification of individual phases and neutral.	Vendor to confirm	
10.4	The earth busbar of size 50x6 mm copper shall run through out the length of the switch board and be terminated at the two ends with cable eyes.	Vendor to confirm	
10.5	High tensile bolts and spring washers shall be provided on all busbars and connection joints.	Vendor to confirm	
10.6	All sheet steel work used in the panels shall undergo a rigorous metal treatment process involving alkaline degreasing descaling in dilute sulphuric acid, phaspating and painting.	Vendor to confirm	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
10.7	The panel shall have cable chamber housing with cable suitable supports, end connections and power / control cable terminations. Adequate safety shall be provided for working in one vertical section without accidental contact with the live parts in an adjacent section.	Vendor to confirm	
10.8	Adequate number of cable riser supports shall be provided to withstand rated short circuit current.	Vendor to confirm	
10.9	Front and rear doors shall be fitted with dust excluded neoprene gaskets with vermin proof.(protection of IP20)	Vendor to confirm	
10.10	External aperture for ventilation shall be covered with a perforated sheet to prevent entry of vermin.	Vendor to confirm	
10.11	The ACBs shall have three distinct positions i.e. service, test and isolated with position indicators. (Mech/elec)	Vendor to confirm	
10.12	Automatic shutters shall be provided to screen the live parts when the breaker is drawn out of the cubicle.	Vendor to confirm	
10.13	The ACB shall be equipped with an integral self powered microprocessor based current release, which works on true RMS values for ensuring accurate protection, Overload, selective short circuit, instantaneous circuit and earth fault protections shall be provided along with the LED indication/LCD screen. The protection unit should confirm to the EMI / EMC requirement.	Vendor to confirm	
10.14	The min. setting range of protection release should be as follows. (a) Over load protection shall have adjustable setting from 50% to 100% of the circuit breaker rated current in steps of 5% preferably. (b) Short time delayed short circuit protection shall have adjustable current setting from 200% to 1000% of the overload setting and adjustable time setting for time discrimination from 20ms to 400ms.		

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	(c) Instantaneous short circuit protection shall be adjustable from 2 to 15 times rated current. (d) Earth fault protection shall have current setting from 20% to 60% of rated current and adjustable time setting from 100ms to 400ms.	Vendor to confirm	
10.15	Trip indication shall be provided to display the exact nature of fault(LED/LCD screen) like OL/EF/SC. Test facility to test the healthiness of the release and the trip circuit of the breaker shall be provided.	Vendor to confirm	
10.16	The ACB shall be provided with mechanical anti-pumping feature to prevent auto reclosing of the breaker on fault and necessary safety interlocks for closing the ACB.	Vendor to confirm	
10.17	The control panel of ACB along with its operating device shall project through the cutout in the door which is provided with suitable gasket (without any air gap).	Vendor to confirm	
10.18	The ACB shall be suitable and should be able to carry the rated current for an ambient temperature of not less than 45 degree C without any derating and suitable for working in Indian condition.	Vendor to confirm	
10.19	The Ultimate breaking capacity (Icu) should be equal to service breaking capacity (Ics) and short time withstand capacity (Icw) for 1 sec.	Vendor to confirm	
10.20	Provision should be available for the following. (a) to swtich "ON" and switch "OFF" ACB from a PLC/SCADA using the closing coil and shunt trip. (b) to monitor the ON / OFF status of the breaker through a PLC/SCADA (c) to monitor and acquire the data regarding parameters like current, voltage, power, energy through the communication port of the digital/energy meter.	Vendor to confirm	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
10.21	The cassette and the breaker shall be provided with standard interlocks related to the opening / closing of the doors and the positions of the breaker.	Vendor to confirm	
10.22	All control wiring shall be carried out with 1100 V single core PVC cable having standard FRLS copper conductors of min. 1.5 sq.mm. section for potential circuits and 2.5 sq.mm. section for current transformer circuit wires shall be identified with number ferrules at either end.	Vendor to confirm	
10.23	Removable gland plates shall be provided at the bottom of panel for cable termination.	Vendor to confirm	
10.24	The construction of the panel shall generally confirm to the Indian Electricity Rules/CEA regulations.	Vendor to confirm	
10.25	Technical catalogue furnishing the features of the controller (ACBs,Meters etc.,) and panel shall be enclosed with the offer Required.	Vendor to confirm	
11	Note : 1) GA drawings and bill of materials to be submitted for approval before manufacturing of the panels. 2) Final inspection to be offered at supplier works before despatch. 3) During commissioning the MV panel in the substation, programming of the ACB,Protection relays and Energy meters to be supported by the supplier / firm and necessary training to our staffs should be given. 4) 3 sets of Operation,Maintenance & programming manual in English . Circuit/ wiring diagram to be supplied along with the each panel Required. Single copy of make,rating,technical details and catalogue of all the bought out items used in each panel. 5) Point by point confirmation is required from the supplier otherwise the offer will not be considered.		

ANNEXURE VII

TECHNICAL SPECIFICATION FOR Detuned APFC PANEL OF 300KVAR

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply and commissioning of Automatic Power Factor Improvement Capacitor Panel as per below Specification for Automatic PF Improvement Capacitor Panel		
1.0	Capacitor Bank Rating	300 KVAR.	
1.1	No. and rating of capacitor stages, type (min 10 stages)	50KVAR/ 3Nos., 25 KVAR / 5Nos., 12.5 KVAR / 2 Nos.	
1.2	Model of capacitor	MD Heavy Duty capacitor, MDXL Super Heavy Duty capacitor.	
1.3	Make of the capacitors	L&T/EPCOS/Neptune/ABB/ Electronicon/ Ducati	
1.4	Rated Voltage	415 Volts +/-10%	
1.5	Rated Frequency	50 HZ.+/-5%	
1.6	Current measurement CT ratio	600/5.	
1.7	System	3 Phase, 4 wire system.	
2.0	Type of service	Continuous, indoor operation.	
3.0	Automatic PF control should be Intelligent Microprocessor based power factor controller.-	Make Electronican/ L&T/ABB/ICD /Schnider /Ducati	
4.0	Switching Time	Variable and selectable.	
5.0	Protection.	Over voltage	
6.0	Detection and display.	Over voltage, over current, harmonics (%THD)	
7.0	Manual operation.	Selectable option	
8.0	Contactors for capacitor switching and MCB of suitable capacity as incomer 630 Amps.Capacitor duty contactors-63Amps contactor for 25KVAR,100A contcator for 50KVAR,and 32A contactor for 12.5KVAR.	Capacitor duty contactors of make Schnider/Telemecanique/ ABB/ GE/ Seimens/ L&T	
9.0	Digital indicating meters for current ,voltage and power factor , %THD should be to be provided in the panel front	Vendor to confirm	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
10.0	No volt release in the event of power failure Required.	Vendor to confirm	
11.0	Necessary switchgear, contactors, HRC fuses Required.	Vendor to confirm	
12.0	Dimension- Appr. H1500 X W1200 X D 500 mm and weight App.600 Kg. .(Panel should be CRCA sheet with thickness of 3mm).	Vendor to confirm	
13.0	Panel ventilation 2 nos. of 510 CFM exhaust fan to be provided.	Vendor to confirm	
14.0	Max. temperature range Ambient .	+/- 50 deg. C	
15.0	Panel shall conform to IE Rules with provision for earthing, fully wired, painted Required.	Vendor to confirm	
16.0	3 sets of Operation,Maintenance and Programming manual in English for Micro Processor, with circuit/ wiring diagram to be supplied along with the panel Required. Single copy of make,rating details,technical details and catalogue of all the bought out items used in the panel.	Vendor to confirm	
17.0	Technical catalogue furnishing the features of the controller and panel shall be enclosed with the offer Required.	Vendor to confirm	
17.1	The capacitor, APFC controller and contactors/switch gears offered should be reputed make acceptable to BHEL.	Vendor to confirm	
18.0	Detuned harmonic suppression filters rated for 5.67% of capacitive reactance for individual capacitor controls has to be provided.--	Vendor to confirm	
	Note : 1)GA drawings and bill of materials to be submitted for approval before manufacturing of the panels. 2)Final inspection to be offered at site before despatch. 3)During commissioning the APFC panel in the substation, programming of the capacitors to suit the reactive compensation to be supported by the firm and necessary training to our staffs should be given. 4)3 sets of Operation,Maintenance manual in English . Circuit/ wiring diagram to be supplied along with the panel Required. Single copy of make,rating details,technical details and catalogue of all the bought out items used in the panel. 5)Point by point confirmation is required from the supplier otherwise the offer will not be considered.	Vendor to confirm	

ANNEXURE-VIII TECHNICAL SPECIFICATIONS FOR THE 1.1kV, 3.5Cx185 Sqmm XLPE ALLUMINIUM CABLE			
Sl. No	**Description/Specifications**	**Vendor to confirm**	**Deviations**
	Supply of High Voltage,1.1 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	185 sq.mm	
1.2	Number of cores	3.5 core	
1.3	Voltage Rating	1.1KV, 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-1 of 1985.	
1.6.2	Nominal thickness of Insulation in mm.	1.1 (min)	
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.	0.5 mm min.	
1.8	Armour :		
1.8.1	Material	Galavanished steel flat strip as per IS: 3975	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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	1.88 mm (Min.)	
1.10	Conformance to Indian Standard Specification	IS:7098(Part-1)-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 test certificates for 1.1KV 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	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
6	Preferred Makes	RPG,KEI, Gloster, Universal, Mansfield, , 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.	

ANNEXURE-IX TECHNICAL SPECIFICATIONS FOR THE 1.1kV, 3.5Cx185 Sqmm XLPE COPPER CABLE			
Sl. No	**Description/Specifications**	**Vendor to confirm**	**Deviations**
	Supply of High Voltage,1.1 KV- XLPE insulated PVC inner / outer sheathed Copper armoured Power Cable conforming to the specification given below.		
1	**High Voltage Power Cable :**		
1.1	Normal area of conductor	185 sq.mm	
1.2	Number of cores	3.5 core	
1.3	Voltage Rating	1.1KV, 50Hz. A.C.	
1.4	Type of system	unearthed	
1.5	**Conductor:**		
1.5.1	Material	Strandard circular Copper 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-1 of 1985.	
1.6.2	Nominal thickness of Insulation in mm.	1.6mm min.	
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.**	0.5mm min.	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
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	2.04 mm (Min.)	
1.10	Conformance to Indian Standard Specification	IS:7098(Part-1)-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 test certificates for 1.1KV 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	

Sl. No	Description/Specifications	Vendor to confirm	Deviations

6	Preferred Makes	RPG,KEI, Gloster, Universal, Mansfield, , 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.	

ANNEURE-X

TECHNICAL SPECIFICATIONS FOR THE 1000KVA, 11KV/415V COMPACT SUBSTATION

Specification and Scope of supply:

Design, manufacture and supply of Compact Substation of 11KV/415 Volts, equipped with 1000kVA Cast Resin Transformer, 3 way 11kV Ring Main Unit consisting of 2 nos. 630A at 11kV fault making load breaking switch with one no tee-off as SF6 Circuit Breaker for the primary side controls & with MV 2000A Air Circuit Breaker as secondary side control as detailed below. The detail bill of material for each Compact Substation shall be as under:

S.No	Description	Specification / Confirmation	Deviation
1.0	**HT Switchgear:** Three way 11kV Non-Extensible Ring Main Unit Compact switchgear consisting of two nos. 630A at 11KV fault making/ load breaking switch and one number Fixed manual / auto Vaccum Circuit breaker(VCB) in SF6 insulated enclosure with self- powered relay having over current and earth fault protection. Interconnection between RMU and transformer shall be using suitable size Aluminum/copper unarmored XLPE Cable. Incomer and outgoing LBS of HT Switchgear should be suitable for termination of 1 run x 3C x 240 sq. mm aluminum armoured XLPE Cable (along with the supply of necessary termination boots).	Vendor to confirm	
1.1	Make of the HT Ring Main Unit (RMU) shall be ABB/ Siemens/ Areva / Alstom make only.	Vendor to specify	
2.0	**Transformer:** 1000 KVA, 11KV / 415V, DYn11, Air Natural cooling Cast Resin Dry Type Transformer with off circuit tap links 5% to -5% @ 2.5% on HT side of transformer with WTI Scanner with Alarm and tripcontact Qty: 1 no	Vendor to confirm	
2.1	Make of the transformer. BHEL/ ABB/ Volt Amp/ Ames Impex/ Siemens/ Areva make only.	Vendor to specify	
2.2	Impedance, no-load/ load losses, efficiency, temperature rise above ambient of winding of the transformer	Vendor to specify	

S.No	Description	Specification / Confirmation	Deviation
3.0	**MV Switchgear:** 415V indoor MV panel with Aluminum Bus bars, fabricated using 1.5/2 MM CRCA sheet steel, Ingress protection IP4X, complete with internal wiring consisting of following. **Incomer: 2000** A, 415V, 3P, 50Hz, 50KA, Fixed manual / autotype ACB with Microprocessor based release. Qty: 1 set	Vendor to confirm	
3.1	Make and type number of the ACB. Siemens/ ABB/ GE/ L&T/ Areva / Alsthom make only.	Vendor to specify	
4.0	**Enclosure:** Outdoor type enclosure having modular construction of Galvanised Sheet Steel. The degree of protection for HT & LT switchgear compartment & transformer compartment of the enclosure shall be minimum IP23. The enclosure exterior shall be painted with polyurethene paint/ powder coated and tropicalised to Indian weather conditions. Each compartment will be provided with the door and pad locking arrangement. The Compartment illumination lamp with door-operated switch shall be provided for each compartment. Qty: 1 set	Vendor to specify the actual degree of protection.	
5.0	Interconnection between HT switchgear & Transformer using XLPE cable & Interconnection between Transformer & LT switchgear using copper busbars. Internal earthing connections by GI strips. Qty: 1 set	Vendor to confirm	
6.0	Dimension of the compact substation (approx.)	Vendor to specify	
7.0	1.Packge Sub-Station shall be outdoor plinth mounted type. 2. Erection, Commissioning and Civil work for package substation is in the scope of BHEL. However the bidder shall furnish the foundation details clearly. 3.Package sub-station will be complete with the internal interconnections & earthing (GI) and extending of earth bar of Neutral and body terminals to the frame of the CSS for connecting to the earth pits.	Vendor to confirm	

S.No	Description	Specification / Confirmation	Deviation
	4. Vendor shall assemble the Compact substation at site if the same is dispatched in disassembled condition. 5. Vendor shall make necessary supervision at site free of cost during the time of commissioning CSS. 6. Required technical data sheet of the transformer, HV/ MV switchgear, relay etc. should be furnished with the offer. 7. Colour of paint to be mentioned in the offer and to be decided mutually. 8. The equipments should be SCADA compatible. 9. Metering on HV side required and details to be furnished.		
8.0	Pre-fabricated CSS shall be type tested for internal arc, temperature rise test in approved laboratory like CPRI, ERDA and reports should be furnished along with the offer. Degree of protection IP54 for HT and LT switch gear and IP 23 for transformer compartment should be ensured as per IEC 61330 - 1995 &/ IEC 62271-202 . Routine test to be conducted and original test certificate to be submitted at the time of supply.	Vendor to confirm	

Annexure 1

Technical Specifications for the Compact Substation

1.0.0 **CODES & STANDARDS**:

1.1.0 All equipment and material shall be designed manufactured and tested in accordance with the latest applicable IEC standards. The 11KV Package Substation Design must be as per IEC 61330.

1.2.0 The Package Sub-station offered shall in general comply with the latest issues including amendments of the following standards.

Title	Standards
High Voltage Low Voltage Pre-Fabricated Substation	**IEC:61330**
High Voltage Switches	**IEC 60265**
Metal Enclosed High Voltage Switchgear	**IEC 60298**
High Voltage Switchgear	**IEC 60694**
Low Voltage Switchgear and Control gear	**IEC 60439**
Power Transformers	**IEC 60076**

2.0.0 **DESIGN CRITERIA**

2.1.0 Package Sub-station consisting of 3 way 11KV SF6 insulated Switchgear with 630A at 11kV fault making, Load breaking switch with tee-off as 11kV SF6 Circuit Breaker + 11kV/415V, 1000KVA, DYn11 Transformer + LT 415V, 2000A ACB incoming with all connection, accessories, fitting & auxiliary equipment in an enclosure to supply Low-voltage energy from high-voltage system as detailed in this specification. The complete unit shall be installed on a substation plinth (base) as Outdoor substation.

2.2.0 The prefabricated-package substation shall be designed for a) Compactness, b) fast installation, c) maintenance free operation, d) safety for worker/operator & public.

2.3.0 The Switchgear and component thereof shall be capable of withstanding the mechanical and thermal stresses of short circuit listed in ratings and requirements clause without any damage or deterioration of the materials.

2.4.0 For continuous operation at specified ratings temperature rise of the various switchgear components shall be limited to permissible values stipulated in the relevant standard and / or this specification.

2.5.0 Service Conditions:

The Package substation shall be suitable for continuous operation under the basic service conditions indicated below

Ambient Temperature:	40 Deg C
Relative Humidity	upto 95%
Altitude of Installation	upto 1000m

The Enclosure of High Voltage switchgear-control gear, Low Voltage switchgear-control gear & Transformer of the package substation shall be designed for use under normal outdoor service condition as mentioned. The enclosure should take minimum space for the installation including the space required for approaching various doors & equipment inside.

3.0.0 **SPECIFICATION:**

3.1.0 The main components of a prefabricated- package substation are Transformer, High-voltage switchgear-control gear, Low-voltage switchgear-control gear and corresponding interconnections (cable, flexible bus bars) & auxiliary equipment. The components shall be enclosed, by either common enclosure or by an assembly of enclosure. All the components shall comply with their relevant IEC standards.

OUTDOOR ENCLOSURE:

3.2.0 **Outdoor enclosure**:

3.2.1 The enclosure shall be made of Sheet Steel tropicalised to local weather conditions.

3.2.2 The metal base shall ensure rigidity for easy transport & installation.

3.2.3 The protection degree of the Enclosure shall be appropriate onefor LT & HT switchgear compartment & IP23 for Transformercompartment. Proper / adequate ventilation aperture shall be provided for natural ventilation by way of Louvers etc.

3.2.4 The doors shall be provided with proper interlocking arrangement for safety of operator.

3.2.5 The H.V. & L.V. outgoing of the transformer are to be connected to SF6 Circuit Breaker of 3 way 11kV RMU & incomer of the Low Voltage Switchgear by means of Copper Cables / Flexible Busbars.

3.2.6 **Internal Fault**: Failure within the package substation due either to a defect, an exceptional service condition or mal-operation may initiate an internal arc. Such an event may lead to the risk of injury, if persons are present. It is desirable that the highest practicable degree of protection to persons shall be provided. The Design shall be tested as per IEC 61330.

3.2.7 **Covers & Doors**: Covers & doors are part of the enclosure. When they are closed, they shall provide the degree of protection specified for the enclosure. Ventilation openings shall be so arranged or shielded that same degree of protection as specified for enclosure is obtained. Additional wire mesh may be used with proper Danger board for safety of the operator. All covers, doors or roof shall be provided with locking facility or it shall not be possible to open or remove them before doors used for normal operation have been opened. The doors shall open outward at an angle of at least 90^0 & be equipped with a device able to maintain them in an open position.

3.2.8 **Earthing**: All metallic components shall be earthed to a common earthing point. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include:

a) The enclosure of Package substation,
b) The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose,
c) The metal screen & the high voltage cable earth conductor,
d) The transformer tank or metal frame of transformer,
e) The frame &/or enclosure of low voltage switchgear,

3.2.9 There shall be an arrangement for internal lighting activated by associated switch for HV, Transformer & LV compartments separately.

3.2.10 **Labels**: Labels for warning, manufacturer"s operating instructions etc. shall be durable & clearly legible.

3.2.11 Cleaning & Painting:
The paints shall be carefully selected to withstand tropical heat and rain. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.

11KV SF6 Non-extensible RMU Circuit Breaker:

3.3.0 **11KV SF6 RMU Circuit Breaker:** The requirement of 11kV Ring Main Unit is as under.

3.3.1 SF6 Gas filled Non-extensible Ring Main Units with Circuit Breakercomprising of 3 panels as indicated below:

3.3.2 **Panel No.1 & 2**: Isolator panel with one number SF6 insulated load- breaking fault making isolator switch with one cable box.

3.3.3 **Panel No.3:**Vaccum Circuit Breaker complete with operating mechanism, protection system and one number of cable box.

3.3.4 The above Isolators, breaker, Busbars should be mounted inside a robotically welded sealed for life, stainless steel tank. The tank should be filled with SF6 gas at adequate pressure.

3.3.5 The Circuit Breaker is required to control 11kV/415 volts distribution Transformer of rating 1000KVA and relay settings shall be selected accordingly.

3.3.6 **General Finish**: Totally enclosed, metal clad, vermin and dust proof suitable for tropical climate use as detailed in the specification.

3.3.7 **Ratings**: The busbars shall have continuous rating of 630 Amps. The isolator shall have a continuous rating of 630 Amps, Circuit Breaker shall have a continuous rating of 630Amps. in accordance with relevant IEC standard

3.3.8 **Breaking & Making Capacity**: The isolators shall be capable for breaking rated full load current. Circuit Breaker shall be capable of having rupturing capacity of 20kA symmetrical at 11KV.

3.3.9 **Busbars**: Switchgear shall be complete with all connections, busbars etc. The continuous rating of copper busbars shall be 630 Amps and they shall be fully encapsulated by SF6 gas inside the steel tank.

3.4.0 **Isolator**:

The Isolators offered shall conform to IEC60129. The isolator shall be triple pole, spring assisted, hand operated, and non-automatic type with quick break contacts. The operating handle shall have three positions „ON", „OFF" and „EARTH" which shall be clearly marked with suitable arrangement to padlock in any position. A safety arrangement for locking shall be provided by which the isolator operation shall be prevented from „ON" position to „EARTH" position or vice versa in a single operation.

3.5.0 **Switchgear:**

The SF6 RMU shall be sealed for life, the enclosure shall meet the "sealed pressure system" criteria in accordance with IEC: 298. There shall be no requirement to „top up" the SF6 gas. It shall provide full insulation, making the switchgear insensitive to the environment. Thus assembled, the active parts of the switchgear unit shall be maintenance free.

The switchgear & switchboard shall be designed so that the position of different devices is visible to the operator on the front of the switchboard & operations are visible as well. The switchboard shall be designed so as to prevent access to all live parts during operation without the use of tools.

RMU should be tested for internal arc fault test.

3.5.1 **Circuit Breaker**:

The Unit shall consist 630A Tee-off spring assisted three position, three pole circuit breaker, with integral fault making / dead breaking earth switch. The function shall be naturally interlocked to prevent the main & earth switch from being switched „ON" at the same time & the CB not allowed to trip in „Earth On" position. The selection of the main/earth switch lever on the panel, which is allowed to move only if the main or earth switches in the off position. The lever shall be able to pad locked in either the main or earth position.

The manual operation of the circuit breaker shall not have an effect on the trip spring. This should only be discharged under a fault (electrical) trip condition; the following manual reset operation should recharge the trip spring & reset the CB mechanism in „main off" position.

Protection Relay: The CB shall be fitted with self-powered relay inside the front cover to avoid any tampering. The relay should be 2 Over Current + 1 Earth Fault, fed by protection CTs mounted in the cable box.

3.5.2 **Cable Box**:

Every isolator shall be provided with suitable and identical cable boxes in front for connecting 3 core, 11kV cable from vertically below. The cable boxes shall be so located at convenient height to facilitate easy cable jointing work. The height available for cable termination should be minimum 500 mm. The Cable termination shall be done by Heat shrinkable Termination method so adequate clearances shall be maintained between phases for Termination. It shall be possible to terminate 1 run of 240 sq.mm three core XLPE cable.

3.5.3 **Locking Arrangement**: Suitable padlocking arrangements shall be provided as stated below…

a) CB manual operating handle in the "OFF" position.
b) Each feeder Panel operating handle in „Closed" „Open" or „Earth" position.
c) Each isolator-operating handle in „Closed", „ Open", or „Earth" position.

3.6.0 **Ratings**:

Non-Extensible ring main unit with SF6 CB		
3.6.1	**Switchgear Data**	
a)	Service	Outdoor but inside Enclosure
b)	Type	Metal clad
c)	Number of phases	3
d)	Voltage	11000V
e)	Rated Frequency	50 Hz
f)	Rated Current	630 Amp (isolator)
g)	Short Circuit rating	
	i) Breaking	20 kA rms for Breaker
	ii) Short time withstand for 3 Sec.	201 KA rms
	iii) Rated S/c making	52.5 kA peak for Breaker
h)	Short duration pwer freq.	28 kV

i)	Insulation Level	75 KVpeak
j)	System earthing	Solidly earthed at substation
3.6.2	**Breaker**	
a)	Type	SF6 Breaker
b)	Rated voltage	11kV
c)	Breaking current	
	i) Load breaking	21 KArms.
d)	Making current	52.5 KA peak
e)	Rated current	630 Amps.
f)	No. of poles	3
g)	Operating mechanism.	Trip free & free handle type with mechanically operated indication & pad locking.
3.6.3	**Isolators**	
a)	Type	load breaking and fault making in SF6 tank
b)	Rated current	630 Amps.
c)	Rated breaking capacity	630 amps.
d)	Fault making capacity	52.5 KA peak
e)	No. of poles	3
f)	Operating mechanism	Operating handle with ON, OFF, Earth positions with arrangement for padlocking in each position.
3.6.4	**Busbars: (If any)**	
a)	Material	Copper
b)	Type	SF6 insulated
c)	Rated Current	630 Amps
d)	Short time rating for 3 Sec.	

11kV/415V, 1000kVA CAST RESIN DRY TYPE TRANSFORMER:

4.0 **Requirement**: 11000/415 Volt Cast Resin Dry Type 1000KVA, AN cooled transformer Suitable for installation at outdoor in Enclosure for Floor mounting.

4.1 **Voltage Ratio:** No load voltage 11000/415 volt within tolerance as stipulated in IS.

4.2 **Rating:** The transformer shall have a continuous rating as specified at any of the specified tapping position and with the maximum temperature Rise specified.

SPECIFICATION FOR 1000KVA CAST RESIN DRY TYPE TRANSFORMERS

Sr.No.	Descriptions	Unit	Specification
1			
2			
3	Rating	KVA	1000
4	Rated frequency	Hz	50
5	Number of Phase		
	HV Side		3
	LV Side		3
6	Rated Voltage		
	HV Side	kV	11
	LV Side	kV	0.415
7	Vector Group		Dyn 11
8	Type of Cooling		AN (Air Natural)
9	Class of Insulations		Class F
10	Method of earthing-LV		Solidly Earthed
11	Duty		Continuous
12	Taps		
	a) Range	%	+ 5% to -5 %
	b) No. of Steps		Four
	c) In steps of		2.5
	d) Tapping provided on HV Side		Taps Provided on HV side
13	Tap Changer Type		By Off Circuit Tap Links
14	Reference Standards		IS 2026/IS 11171
15	Fittings and Accessories		
	a) Off circuit tap links		Yes
	b) 02 Nos. Earthing Terminal		Yes
	c) Rating and Diagram Plate		Yes
	d) Lifting Lugs for Complete Transformer		Yes
	e) Cover Lifting lugs		Yes
	f) Rollers		Yes

5.0 **L.T. Panel**

5.1.0 **System**:

a) **Nominal voltage**: 3 Phase, 415V, 50 Hz
b) **Neutral**: Solidly earthed at substation.
c) **Busbar**: Aluminum

5.2.0 **Circuit Ways:**

1 No. 2000A or higher, 3 Pole ACB, fixed Type with Over Current, short circuit and Earth Fault Releases (Microprocessor Based)

5.3.0 **Earthing**:

5.3.1 Earthing arrangement shall be provided for earthing each cable, PVC cable gland, neutral busbar, chassis and framework of the cubicle with separate earthing terminals at two ends. The main earthing terminals shall be suitably marked. The earthing terminals shall be of adequate size, protected against corrosion, and readily accessible. These shall be identified by means of sign marked in a legible manner on or adjacent to terminals.

5.3.2 Neutral bus bar strip shall be connected to Earthing terminal with help of GI strip of suitable capacity & nut-bolt arrangement.

ROUTINE TEST ON PACKAGE SUBSTATION:

6.0.0 **ROUTINE TESTS FOR THE PACKAGE SUBSTATION COMPLETELY ASSEMBLED:**

6.1.0 **Routine Tests**: The routine tests shall be made on each complete prefabricated substation.

a) Voltage tests on auxiliary circuit.
b) Functional test.
c) Verification of complete wiring.

6.2.0 **Test Certificates:**

Certified reports of all the tests carried out at the works shall be furnished in three (3) copies for the approval from CEA.

Annexure-XI

Specification for Synthetic High Voltage Insulating Mats as per IS-15652:2006

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of High Voltage Insulating Synthetic Mats,with High die-electric Strength, Fire Retardant. Insulation Resistance Up to 100,000 Mega Ohm with 5000V Megger. Good Mechanical Properties to With Stand Load and Movement of Breaker Trolleys and Associated Electrical Equipment. No Adverse Effect of Acids, Alkalis and Transformer Oil. to the specification given below		
1.0	**High Voltage Insulating Synthetic Mats**		
1.1	Nominal Thickness of earthmat	2.0 mm, 2.5mm & 3mm	
1.2	Width	1 Mtr.	
1.3	Roll Length	Upto 20 mtrs.	
1.4	Synthetic High Voltage Insulating Mats as per latest IS-15652:2006	Vendor to confirm	
1.5	Di Electric Strength	Vendor to confirm	
1.6	Conformance to Indian Standard specification	IS:15652 / 2006	
1.7	Tensile strength: 15 N/sqm & elongation: 250	Vendor to confirm	
2.0	Technical leaflet of the insulating earth mats indicating the approx. diameter,length, weight, thickness of insulation, current rating etc. to be enclosed with the offer.	Vendor to confirm	
3.0	**General Features of the Insulating Synthetic Mats:**		
3.1	Insulating Synthetic Mats shall have the manufacturer name embossed/ printed/ indented on the mats at regular intervals.	Vendor to confirm	
3.2	ERDA/CPRI test shall be conducted as per IS on the insulating earth mats and test certificate shall be produced.	Vendor to confirm	
4.0	Reference List/ Qualifying Conditions:		
4.1	Only those vendors who have supplied similar or higher rating of insulating earth mats should quote.		
4.2	Information about the customers to whom similar insulating earth mats have been supplied is to be submitted for qualification of the offer.		
5	Preferred Makes	A.M. Vinyl Pvt. Ltd., Premier Polyfilm Limited, RMG Polyvinyl INDIA Limited, Vardhman Hoses (P) Ltd., V.R. Enterprises.	

Annexure-XII

Technical specifications for the 33kv meetering box as per the MSEDCL norms

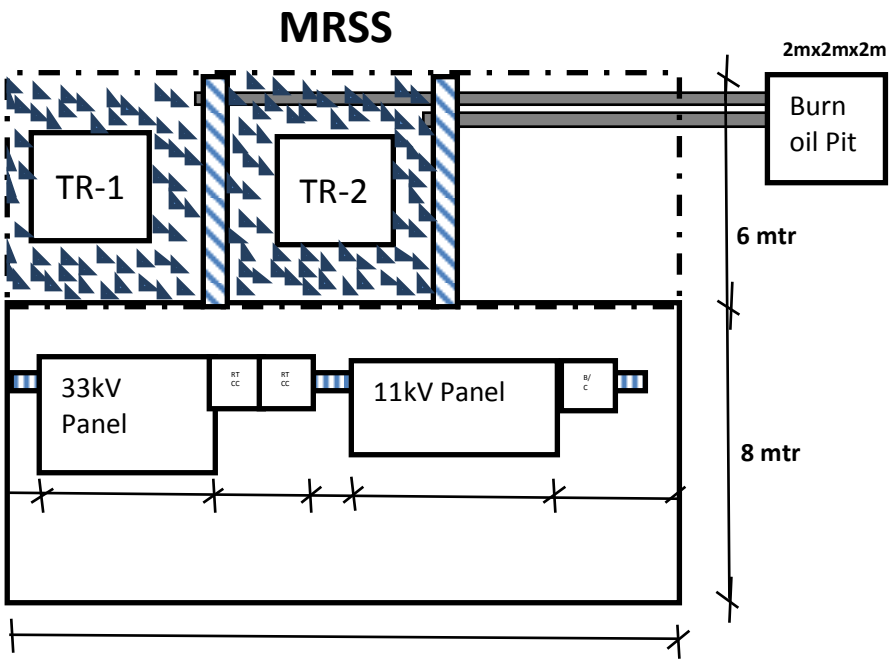
Sl. No	Description/Specifications	Vendor to confirm	Deviations
1	Design, fabrication, painting and supply of sheet metal cubicle, supply of coppercomponents, wiring, testing at works, packing and supply on destination basis and performance testing of 33KV self equipped metering cubicle	Vendor to confirm	
2	Construction should of four cabins viz HT, metering and two nos termination compartment	Vendor to confirm	
3	**System parameters:**	Vendor to confirm	
3.1	Rated voltage: 33kV	Vendor to confirm	
3.2	Highest system voltage: 36kV	Vendor to confirm	
3.3	Frequency: 50Hz	Vendor to confirm	
4	**Current Transformer:**	Vendor to confirm	
4.1	Type: Single Phase, Cast resin	Vendor to confirm	
4.2	Rated voltage: 33kV	Vendor to confirm	
4.3	CT ratio: 200/5A	Vendor to confirm	
4.4	Burden: 15VA	Vendor to confirm	
4.5	Accuracy class: 0.2	Vendor to confirm	
4.6	Applicable standard: IS:2705-1992 or latest	Vendor to confirm	
5	**Potential Transformer:**	Vendor to confirm	
5.1	Type: Single Phase, Cast resin	Vendor to confirm	
5.2	Rated primary voltage: 33000V/√3	Vendor to confirm	
5.3	PT secondary voltage: 110V/√3	Vendor to confirm	
5.4	Burden: 50VA	Vendor to confirm	
5.5	Accuracy class: 0.2	Vendor to confirm	
5.6	Applicable standard: IS:3156-1992 or latest	Vendor to confirm	
6	Metal Cabinet:	Vendor to confirm	
6.1	Material: Mild steel	Vendor to confirm	
6.2	Plate thickness: 2mm	Vendor to confirm	
6.3	Busbar thickness: 200 Sqmm	Vendor to confirm	
6.4	Ingress Protection class: IP 53	Vendor to confirm	
7	The metering box should have the following:	Vendor to confirm	
7.1	3 nos 33kV class CTs	Vendor to confirm	
7.2	3 nos 33kV class PTs	Vendor to confirm	
7.3	Tinned copper busbars/connecting links totally covered by resin casting	Vendor to confirm	

Sl. No	Description/Specifications	Vendor to confirm	Deviations
7.4	The secondary wires from the terminals of CTs & PTs in the CT/PT. Compartment shall be covered by resin cast blocks and the secondary wires shall be brought in the metering compartment through rubber bush and shall be left open duly crimped with suitable pin type copper lugs	Vendor to confirm	
7.5	Resin cast bushing board/s with arrangement to receive Reychem or equivalent type of cable terminations (240Sqmm) for incoming and outgoing supply points.	Vendor to confirm	
7.6	Electronic safety lock (optional)	Vendor to confirm	
7.7	All four cabninets should be provided with the removable type doors with neoprene gaskets. HT compartment should be provided with suitable ventilation for cooling.	Vendor to confirm	
7.8	Cable termination from Top	Vendor to confirm	
8	**Special Condition:** Drawing should be submitted to BHEL before starting the manufacturing.	Vendor to confirm	
9	Metetering box should be tested as per the relevent standards and reports should be submitted to BHEL.	Vendor to confirm	

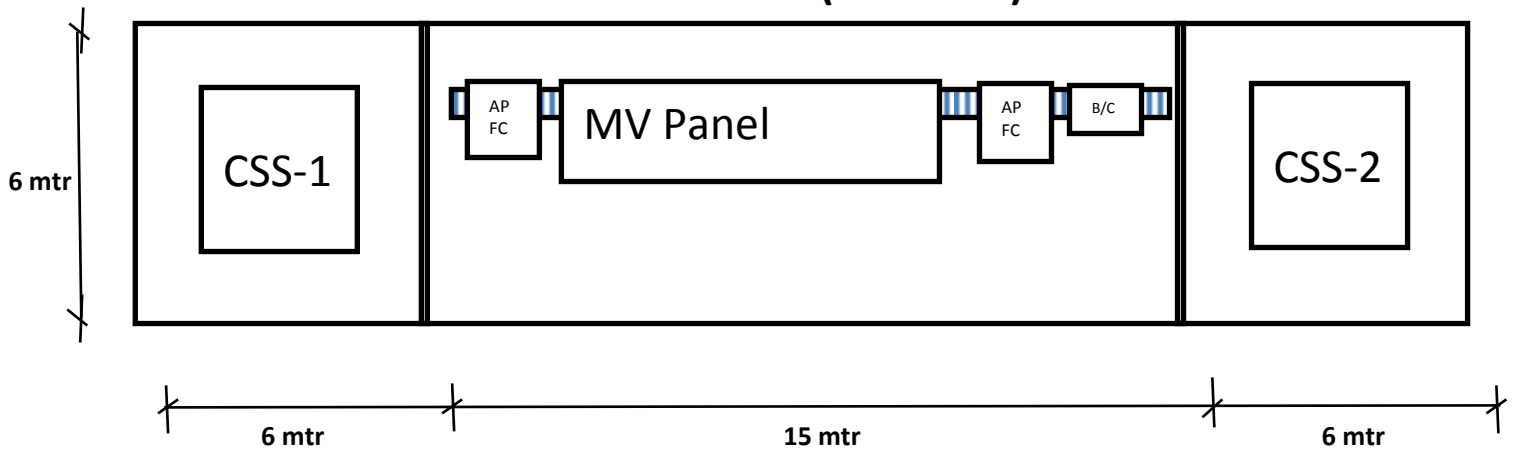
Annexure-XIII
TOOLS & TACKLES AND SAFETY EQUIPMENT

Sl No	Equipment	Unit	Quantity	Preferable Makes	Vendor to confirm	Deviations
1	Digital multimeter (Voltage: AC/DC- 0 to 750V Current: AC/DC- 0 to 200A Resistance: 0 - 20 Mega Ohm)	No	2	Fluke, Motwani, Krycard	Vendor to confirm	
2	Insulation Tester (0-5000V)	No	1	Krycard, Kyoritsu, Fluke, Megger	Vendor to confirm	
3	Insulation Tester (0-500V)	No	1	Krycard, Kyoritsu, Fluke, Megger	Vendor to confirm	
4	Tong Tester (Voltage: AC/DC- 0 to 750V Current: AC/DC- 5mA to 200A)	No	1	Fluke, Motwani, Krycard	Vendor to confirm	
5	3 meter length Earth rods	No	4	Reputed make	Vendor to confirm	
6	Double End Spanner Generally Conforming to IS 2028-2004 (Size: 6x7 to 24x27)	Set	1	Taparia, Gedore	Vendor to confirm	
7	Ring Spanners Generally Conforming to IS 2029-1998 (Size: 6x7 to 24x27)	Set	1	Taparia, Gedore	Vendor to confirm	
8	Allen Keys Generally Conforming to IS 3082-1988 (Size: 1.5mm to 14mm)	Set	1	Taparia, Gedore	Vendor to confirm	
9	Seamless 33kV, 11kV and 415V grade Hand gloves (Each voltage grade 3 Sets)	Set	9	Reputed make	Vendor to confirm	
10	Danger Boards (caution board) written with Marathi, Hindi and English for 33000V, 11000V, 415V (10 nos each)	No	30	Reputed make	Vendor to confirm	
11	Danger Stickers (caution sticker) written with Marathi, Hindi and English for 33000V, 11000V, 415V (20 nos each)	No	60	Reputed make	Vendor to confirm	
12	Combination Plier Generally Conforming to IS 6149-1984 Grade II	No	2	Taparia, Gedore	Vendor to confirm	
13	Screwdriver set	Set	2	Taparia, Gedore	Vendor to confirm	

General Layout of Substations



Individual Substations (SS1 - SS5)



ANNEXURE-XIV

Suggestive Format of Performance Certificate:

The Performance certificate should contain minimum of the below said data and it shall be produced on **Customer's Letter Head** and submitted along with the offer.

1.0	Equipment Supplied to (Customer Details)	
2.0	Substation Capacity	
3.0	Details of Equipment supplied	
3.1	Transformer: Rating/voltage class	
3.2	Medium Voltage Panel (PCC): Busbar rating	
4.0	Purchase Order Number	
5.0	Scheduled date of completion	
6.0	Actual date of completion	
7.0	Reasons for delay (if any)	
8.0	Performance of the contractor during erection & commissioning on turnkey basis	Satisfactory/ Not-satisfactory
Date:		Signature & Seal of the Authority Issuing the Performance Certificate

Commercial Terms for Package-II

a) Delivery Schedule for supply of all the items of substation package:
- 6 months from the PO date.

b) Time period for Installation and Commissioning of all the items of substation package.
- 4 months up on receiving the material.
- The total time period for the supply, installation, commissioning etc should not be more than 10 months from the PO date.

c) 100% Payment will be made after supply, installation, commissioning of the total substation upon producing 10% Performance Bank Guarantee.

PACKAGE-III
ELECTRIFICATION OF SHOP FLOOR
(SHOP LIGHTING)

PART-A

Pre-Qualification Criteria for the Electrification of Shop floor at PEFP Bhandara

Sl. No	Description	bidder to confirm
1	The lead bidder/ agency i.e. PEB (Package-1 bidder) can tie up with an agency who have supplied, erected, tested and commissioned atleast one shop/ factory electrification project (lighting distribution) and other allied works as indicated in the tender in the past five years on EPC/ JV basis and such installation presently working satisfactorily more than one year after commissioning, should quote.	
2	List of the customers / companies on which similar / installations supplied & commissioned by the bidder.	
3	Performance certificate from minimum one customer / company (as per the suggestive format given in Annexure-VII) regarding satisfactory performance of the equipment/ electrification of shopfloor/ lighting projects for a minimum period of one year supplied to them in last five years.	
4	Bidder for Package-III (Shop Electrification) should submit the audited copy of last three years (2010-11, 2011-12 & 2012-13) balance sheet and Profit & Loss account.	
5	Bidders should quote for supply, erection, testing and commissioning of the installations and allied equipments as per the entire scope of items identified in the NIT.	
6	Bidder should have a valid Electrical ESB license – issued by the respective licensing board.	
7	Bidder should have the PAN, TIN and Service Tax Registration documents for the Firm and copies should be submitted along with the offer.	

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

PART B
ELECTRFICATION OF SHOP FLOOR AT PEFP BHANDARA

Item No: A Electrification of Shop Floor- Supply of electrical & lighting installation material					
ITEM No.	**ITEM TEXT**	**Unit**	**QTY**	**RATE**	**AMOUNT**
1	Supply of 8 ways 16 A MCB Lighting distribution Boards with 100A, 4 pole MCB as incomer as per Annexure-I.	NO	**32**		
2	Supply of 400W, metal Halide High bay Industrial light fitting with lamp and luminaire as per Annexure-II.	NO	**830**		
3	Supply of 65W, CFL High performance high bay luminaries with prismatic reflector with lamp as per Annexure-III.	NO	**70**		
4	Supply of 2KVA UPS as per Annexure-IV.	NO	**10**		
5	Supply of roof light timer boxes as per Annexure-V.	NO	**32**		
6	Supply of single core,unsheathed,Flame retarant,Low smoke heat resistant (FRLS),bare high conductivity,Flexible multistrand Bright Annealed Electrolytic copper conductor,IS 8130/1984, insulated with PVC type A of IS 5831/84,650/1100 Volts grade, confirming to PVC insulated and rated upto 1100v as per IS 694/1990. Size. 2.5 sqmm with 100 Mtr. per roll. Preferable makes: Elkay/ Delton/ Gloster/ Nicco/ L&T/ Havells/ Finolex/ Kundan/ Mardia/ Siechem/ RR .	Rolls	**550**		
7	Supply of 2.0mm thick, 20mm diameter Rigid Fire Retardent low Smoke PVC Conduits conforming to IS : 9537 : 2006 and embossed with ISI mark. Preferable makes: KUNDAN/AVONPLAST/FINOLUX	KM	**14**		
8	Supply of 16 SWG Copper Earth wire.	Kg	**175**		
9	Supply of 25x3mm 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.	M	**300**		
10	Supply of 15A 2-way bakelite connector block.	NO	**830**		
11	Supply of 3.5 core 50 sq.mm XLPE cable as per Annexure-VI	M	**2500**		
		TOTAL			

Item No: B Erection of Electrical & Lighting materials for the Electrification of Shop Floor					
ITEM No.	**ITEM TEXT**	**Unit**	**QTY**	**RATE**	**AMOUNT**
1	Assembling, fixing and testing of 8 ways 16 A MCB Lighting distribution Boards. The MCB DB (DL) should be provided with necessary angle iron frame work on the wall / column. Necessary cable adopter boxes for both incoming & outgoing, support channels with required fasteners are to be supplied by the contractor.	NO	**32**		
2	Assembling, Fixing & Testing of 400W, metal Halide High bay Industrial light fitting with lamp & lid on the truss with the supply of necessary MS clamps, bolts and nuts secured by suitable size cotter pin and safety chain. Safety chain shall be GI of suitable dia and required length with 'D' Shackle at one end for connecting to the fitting hook and other end to be connected to the nearby truss member. Note: Clamp and GI Safety chain samples should be produced and get the approval from the Electrical Incharge before fixing the same at the site .Required mobile crane to a height of 20m is under contractor scope.	NO	**830**		
3	Assembling, fixing and testing of 65W, CFL High performance high bay luminaries with prismatic reflector with lamp & lid on the truss with the supply of necessary clamps and safety chains. Safety chain shall be GI of 4 mm dia. and required length with 'D' Shackle at one end for connecting to the fitting hook and other end to be connected to the nearby truss member. Note: - 1)Clamps shall be painted with one coat of red oxide and two coats of Aluminium paint.	NO	**70**		
4	Installation & commissioning of 2KVA UPS on the wall / column with suitable iron frame. Necessary support channels / iron frame works with required fasteners are to be supplied by the contractor.	NO	**10**		
5	Fixing of roof light timer boxes on column near by the MCB DL boards in the shop floors. The timer boxes should be fixed on the 25 mm x 6 mm MS flat with suitable bolts and nuts. **Note:**The materials required like 25 mm x 6 mm MS flat and fasteners are under contactor's scope.	NO	**32**		
6	Wiring with **6 runs of 2.5sqmm** stranded copper conductor unsheathed cable in the medium quality,1.5mm thick,20mm dia,pvc conduit pipe with continuous running of 16 SWG GI wire as earthing on the steel structural members of the roof with suitable clamping .	M	**3500**		

ITEM No.	ITEM TEXT	Unit	QTY	RATE	AMOUNT
	Note: 1.One running meter of wiring consist of 1m PVC conduit, 1m earth wire and 6 runs of 1m copper wire with suitable clamps. 2. Necessary materials like Tees,L bends, Clamps,PVC flexible conduits required for the wiring are under contractor's scope.				
7	Wiring with **4 runs of 2.5sqmm** stranded copper conductor unsheathed cable in the medium quality,1.5mm thick,20mm dia,pvc conduit pipe with continuous running of 16 SWG GI wire as earthing on the steel structural members of the roof with suitable clamping . **Note:** 1.One running meter of wiring consist of 1m PVC conduit, 1m earth wire and 4 runs of 1m copper wire with suitable clamps. 2. Necessary materials like Tees,L bends, Clamps,PVC flexible conduits required for the wiring are under contractor's scope.	M	**4000**		
8	Wiring with **2 runs of 2.5sqmm** stranded copper conductor unsheathed cable in the medium quality,1.5mm thick,20mm dia,pvc conduit pipe with continuous running of 16 SWG GI wire as earthing on the steel structural members of the roof with suitable clamping . **Note:** 1.One running meter of wiring consist of 1m PVC conduit, 1m earth wire and 2 runs of 1m copper wire with suitable clamps. 2. Necessary materials like Tees,L bends, Clamps,PVC flexible conduits required for the wiring are under contractor's scope. **Break up:** 1) Roof light wiring :1700m 2) Emergency light wiring : 3300m **Total :4900m.**	M	**5000**		
9	Running of 2 core 2.5 sq.mm stranded copper conductor PVC insulated unsheathed TRS flexible cable in the 20 mm dia flexible conduit with required connections at lamp and terminal box. Note: Flexible TRS conduit is in contractor's scope	M	**830**		
10	Laying of 25 X 3 mm GI earth flat for earthing the MCB DB's in the wall/column and terminating in the trench.	M	**300**		
11	Fixing of 15A 2-way bakelite connector block on the truss for facilitating power supply to high bay luminaire in a suitable polycarbonate junction box.	NO	**830**		
12	Laying of 3.5 core 50 sq.mm XLPE cable in the excavated/formed trench between: 1. ML and the roof light timer box 1. 16A MCB DB and roof light timer box.	M	**2500**		

ITEM No.	ITEM TEXT	Unit	QTY	RATE	AMOUNT
13	Making of end termination for Medium voltage 3.5 core 50 sq.mm XLPE cable with suitable brass cable glands, copper lugs, gland earthing, cable clamping etc. **Note: -** 1)Brass cable glands, copper lugs, gland earthing, cable clamping and PVC insulation tape etc. are contractor's scope. 2) Crimping tools and other materials required for carrying out the work will be in the scope of the contractor. 3) The cable Glands should be properly earthed by suitable copper earth plate with 16 SWG copper wire.	NO	**150**		
14	**Special Instructions:** 1. The contractor should arrange the lifting tools like ladder/ hydraulic lift for fixing the lamps to the shop floor roof (Max. 18 meters). 2. Cable tags should be provided for all power and control cables. 3. Letter painting work in all breakers 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 are to be arranged by contracor scope. 5. Welding m/c,gas cutting set and regulator should be brought by the contractor. 6. Any clarification & modification of the work should be directly discussed with the Electrical In charge. 7. Minor paint touching shall be done in the panel for damages caused during transport are under contractors scope. 9.The contractor should get proper clearance from the security personnel while taking their materials inside and outside the site.They should maintain an invoivce register ,which is liable for inspection by the Electrical Incharge. 10. Crane facility required for the unloading/movement of the equipment are under the contractor scope. 8. Pre dispatch inspection for all the equipment should be arranged at the supplier works. 9. For the erection of the items, quantity on Pro-Rata basis to be considered.	SET`	**1**		
		TOTAL			
	Note: 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 & erection the same at the original rate mentioned in the offer.	Vendor to confirm			

ANNEXURE-I

Specification for 16A MCBDB Lighting Distribution Board

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of Medium Voltage, 8 Way MCB distribution boards with 16A, single pole MCB per way as outgoing, 3 nos. 63A DP MCB as phase controller,100A , 4 pole MCB incomer,Metalic Double door. The DB should be Phase Segregated and Separated between incomer and outgoings , suitable for flush / surface mounting. The distribution boards conforming to the specification and features given below.		
1.0	**MCB Distribution Board**		
1.1	Current rating: 100A, 4 pole MCB for main incomer. 63A, 2 pole MCB in each phase for phase isolation. 16A, 1 pole MCB for each outgoing way.		
1.2	Configuration: Three poles and neutral DB with per phase isolation		
1.3	Type of enclosure: Fabricated Sheet steel		
1.4	Number of ways per phase: 8 Ways		
1.5	Busbar Rating: 100A		
1.6	Make of the MCB distribution Board should be Legrand/ Siemens /L&T/ Hager/ ABB makes only acceptable.		
2.0	**Miniature Circuit Breaker**		
2.1	Current rating: 16 A/ 100 A (as specified for outgoing/incomer)		
2.2	Number of MCB: 24 nos. 16A, 1P, MCB 3 nos. 63A, 2P, MCB 1 no. 100A, 4P. MCB		
2.3	Breaking capacity of the MCB: 10kA		
3.0	**General Features of the Lighting Distribution board:**		
3.1	The DBs shall be ready to use with neutral links, earth links, Busbar and interconnecting wires/links.		
3.2	DB shall be provided with gland plates at the top and bottom with knockouts.		
3.3	Earth bar for facilitating individual earth for each outgoing circuit with necessary terminallugs, bolts and nuts.		
3.4	Label to be permanently and securely fixed inside the case to mark the name, current rating of the circuit.		
3.5	Neoprene Gaskets shall be provided to ensure vermin proof condition.		
3.6	The DB shall be painted with one coat of red oxide primer and two coats of enamel paint.		
3.7	The DB should conform to IS:13032-1991 and Indian Electricity Rules.		
3.8	The MCB shall conform to IS:8828-1996		
3.9	Double earthing provison for the DB shall be provided with suitable i-bolts on both the sides.		

ANNEXURE-II

Specification for 400W Industrial Highbay Luminaire and MH lamp

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of High Performance, Integral, Industrial, High Bay, closed version Luminaire with control gear box, reflector and lamp as specified below:		
1.0	Luminaire Suitability: Suitable for operation with **400 Watts** Metal Halide lamp		
1.1	Housing: Made out of die cast aluminium and powder coated in black/ grey and to ensure IP65 ingress protection.		
1.2	Reflector construction: Parabolic, anodized and electrochemically brightened and made of aluminium. To be provided with heat-resistant and toughened glass with gasket to ensure IP54 ingress protection.		
1.3	Reflector suitability: Reflector suitable for narrow beam application.		
1.4	Input Power supply: 1 phase,230V, 50 Hz. A.C supply.		
1.5	Control Gear: Control gear shall comprise of Copper wound ballast, power factor improvement capacitor, mains connector and electronic ignitor all prewired upto terminal block and mounted on a gear tray/ base for ease of maintenance.		
1.6	Safety chain: Safety chain to be provided in the fitting		
1.7	Access for Maintenance: Access to gear compartment shall be provided to facilitate easy maintenance, replacement and connection		
1.8	Dimensional details and net weight		
1.9	Nominal Power factor, mains current for the lamp to be mentioned by the vendor.		
1.10	Technical catalogue/ drawing: Vendor to furnish with the offer		
2.0	Specification for lamp: Metal Halide 400 Watts, elliptical version, suitable for 230V, 50Hz, 1 phase supply with E40,screw cap to house the lamp.		
3.0	Preferable make of the luminaire/ lamp: Philips, GE, Crompton Greaves, Bajaj		
3.1	Type no. /Make offered		

ANNEXURE III

Specification for 65 W Highbay Luminaire and CFL lamp

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of High Performance, Integral, Industrial, High Bay, open version Luminaire with necessary accessories like lamp holder, eye bolt etc, reflector and lamp as specified below:		
1.0	Luminaire Suitability: Suitable for operation with 65 watts CFL lamp		
1.1	Housing: Made out of die cast aluminium and powder coated.		
1.2	Reflector construction: Special transluscent poly corbonate prismaytic refractor with more vertical lighting in the area		
1.3	Input Power supply: 1 phase, 230V, 50 Hz. A.C supply.		
1.40	Technical catalogue/ drawing: Vendor to furnish with the offer		
2.0	Specification for lamp: CFL 65 watts lamp suitable for 240V, 50Hz, 1 phase supply with E27 holder to house lamp .		
3.0	Make of the luminaire/ lamp: Philips, GE, Bajaj,Crompton Greaves makes makes only acceptable.		
3.1	Type no. /Make offered		

ANNEXURE-IV

Specification for the 2 kVA Emergency Power Supply Unit

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	General purpose of 2KVA Emergency power supply unit for Emergency light with 4 hrs. backup. and suitable for operation on 1phase, 230V, 50Hz AC.supply.		
1.0	**Specification**		
1.1	Preferable Make: Powertronics, Hitachi Hirel, Emerson, Aplab, APS Model: Vendor to specify.		
1.2	AC input Voltage: 1 Phase, 170 - 270 VOLTS ,50 Hz, AC supply.		
1.3	Output Voltage: 1 Phase,Voltage: 230 Volt AC, Frequency: 50 + 0.1% Wave form: Pure sine wave.		
1.4	Efficiency: 90% and above on Resistive load. Vendor to specify.		
1.5	Time delay: The out put voltage should be switched OFF (OFF delay) after 5 minutes . Vendor to speify.		
1.6	Overload capacity: 110 % for 5 minutes.		
1.7	Metering: Output AC and DC metering (LED type) for voltage & current. Vendor to specify.		
1.8	Indication: Inverter ON, Mains On, Charger ON, Low battery, overload, Present battery full. Vendor to specify.		
1.9	Protection: Input under voltage and over voltage.Battery Low voltage, Output short circuit, Out put under / over voltage,Out put overload, Over temperature, DC over current protection,Output voltage regulation,Spike protection. Vendor to specify.		
2.0	**Control switches:** Input, out put, and inverter MCB"S HRC fuses for the above, Beep sound for tripping, Over/under/low voltage, Short circuit & inverter trip control. Vendor to specify.		
3.0	**Battery specification**		
3.1	Type: Maintenance Free Tubular Battery.		
3.2	Make: Exide Industries Ltd, HBL Power Systems Ltd, Hoppecke Batterien GMBH & CO.KG, Amara Raja batteries. Model: Vendor to specify		
3.3	Specification: 12Volts,Battery AH to be offered for the connected load of 1000 Watts for a barttery back up of 4 Hrs . Vendor to specify.		

ANNEXURE-V

Specification for the supply of Timer Controller Box

Sl. No	Description	Vendor to Confirm	Deviations
1	Manufacturing and supply of weather proof outdoor type , street light Timer controller of approx size 750x400x250 mm using 1.6 mm thick CRCA sheet, with continuously hinged door & 10mm gasket to be provided in the door for protection from water and dust with locking arrangement. The timer box should contain the following components &suitable to mount on the columns.		
2	63 Amps three pole Siemens/L&T/Schneider/ABB make power contactor suitable for coil voltage 230 V AC-1no		
3	EAPL make timer 203B model digital timer suitable for coil voltage 230 V AC-1no		
4	63 Amps 4 pole MCB (make ; Siemens/L&T/Legrand/ABB)-1no		
5	32 Amps single pole MCB (make ; Siemens/L&T/Legrand/ABB)-6no		
6	6Amps single pole toggle switch-1 no		
7	63 Amps 6 way din rail mounting terminal strip elmex make -1no		
8	Steel Mounting clamps .		
9	One No. of punch hole of size 25mm dia to be provided in the back side of box.		
10	Three Nos. of punch hole of 25mm dia. to be provided for cable/ conduit entry at the bottom of the terminal box.		
11	32 X 6 mm GI flats 2 Nos. are to be provided as a mechanical support for clamping arrangement of the box with pole.		
12	Two Nos. of separate earth terminals duly welded to the box.		
13	All the above items should be mounted on a base plate duly wired with 6 sq.mm multi strand flexible insulated copper wires for the power wiring and with 1.5 sqmm single strand copper wire for control wiring for automatic controls of street lights . The sheet steel MS box should be undergone with Degreasing, De rusting, Phosphating and applied with 2 coat of primary enamel paint and powder coating of finishing paint –colour-Siemens Grey.		

ANNEXURE-VI

Specification for Medium Voltage Power Cable

Sl. No	Description/Specifications	Vendor to confirm	Deviations
	Supply of Medium Voltage, 50 Sqmm XLPE insulated conductor, PVC inner & outersheathed insulation , armoured Power Cable conforming to the specification given below.		
1.0	**Medium Voltage Power Cable:**		
1.1	Nominal area of conductor: 50 sq.mm		
1.2	Number of cores: 3.5 cores specified in the scope of supply. Cores identified with different colours		
1.3	Conductor: Stranded, Circular/ shaped, Aluminium as specified in the scope of supply.		
1.4	Voltage rating: 1.1KV, 50Hz, AC		
1.5	Conductor Insulation: Insulation material XLPE as per IS -7098, Part-I		
1.6	Innersheath: PVC innersheath- Type ST2 as per IS-5831 -Black colour		
1.7	Armouring: Galvanized steel wire/ strip armouring as per IS-3975 & IS-7098		
1.8	Outersheath: XLPE insuation as per IS: 7098 Part-1		
1.9	Conformance to Indian Standard specification: IS:7098(Part 1)/IS-5831		
2.0	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.		
3.0	**General Features of the M.V.Cable:**		
3.1	Cable shall have the manufacturer name embossed/ printed/ indented on the outer sheath at regular intervals.		
3.2	Cable shall have Voltage grade, cable size embossed on the outer sheath.		
3.3	Routine tests shall be coducted on the cables as per IS and test certificate shall be produced		
4	The cable offered should have been „Type Tested" as per relavent standards, in any one of the government approved laboratory like CPRI, ERDA. Copy of the „Type Test Certificate" should be enclosed along with the offer for acceptance of the make of the cable offered.		
5	Preferable make of cable: RPG,KEI, Gloster, Universal, Mansfield, , 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.		

ANNEXURE-VII

Suggestive Format of Performance Certificate:

The Performance certificate should contain minimum of the below said data and it shall be produced on **Customer's Letter Head** and submitted along with the offer.

1.0	Equipment/Project Supplied to (Customer Details)	
2.0	Project Name	
3.0	Details of Equipment/installation supplied	
3.1	Roof Lights: Type/ Make	
3.2	MV Cable : Size/ Make	
4.0	Purchase Order/ Work order Number	
5.0	Scheduled date of completion	
6.0	Actual date of completion	
7.0	Reasons for delay (if any)	
8.0	Performance of the contractor during erection & commissioning on turnkey basis	Satisfactory/ Not-satisfactory
Date:		Signature & Seal of the Authority Issuing the Performance Certificate

Commercial Terms for Package-III

a) Delivery Schedule for supply of all the items for Electrification of shop floor package:
- 6 months from the PO date.

b) Time period for Installation and Commissioning of all the items of Electrification of shop floor package.
- 4 months up on receiving the material.
- The total time period for the supply, installation, commissioning etc should not be more than 10 months from the PO date.

c) 100% Payment will be made after supply, installation, commissioning of the total Electrification of shop floor upon producing 10% Performance Bank Guarantee.

PACKAGE-IV
HIGHMAST LIGHTING SYSTEM

PART-A
Pre-Qualification Criteria for the Supply, Erection and Commissioning of Highmast Lighting at PEFP Bhandara

Sl. No.	Description	Bidder to confirm
1	The lead bidder/ agency i.e. PEB (Package-1 bidder) can tie up with an agency who have supplied and commissioned similer or higher capacity high mast and working satisfactorily for at least one year on EPC/ JV basis after commissioning.	
2	List of the customers / companies on which similar installations supplied & commissioned by the bidder.	
3	Performance certificate from minimum one customer / company regarding satisfactory performance of the Highmast lighting system for a minimum period of one year supplied to them in last five years as per the suggestive format given in Annexure-B.	
4	Bidder for Package-IV (Highmast Lighting system) should submit the audited copy of last three years (2010-11, 2011-12 & 2012-13) balance sheet and Profit & Loss account.	
5	Bidders should quote for supply, erection, testing and commissioning of the installations and allied equipments as per the entire scope of itemsas per BOQ	
6	Bidder should have the PAN, TIN and Service Tax Registration documents for the Firm and copies should be submitted along with the offer.	

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

PART B

Specification of High Mast for PEFP BHEL Bhandara Site, Total Nos of HM - 11 Nos

Sl.No.	Description	Vendor to confirm	Comment/Deviation
1	The scope of this specification covers the manufacture, transport, installation, testing and commissioning of the complete lighting system, using Raising and Lowering type of High Mast Towers, including the Civil Foundation Works. BHEL will only provide the supply point at inlet of isolator switch. Isolator switch, feeder pillar & its connecting cable are in the scope of vendor. However, all items required for the safe and efficient operation and maintenance of the lighting system, including the high mast, whether explicity stated below or not, shall be included by the Vendor.		
2	Supply of 20 meters High Mast system with all accessories including but not restricted to the following. (a) Mast shaft in two section, hot dip galvanised and suitable for wind velocity as per IS 875 part 3. (b) Head frame, steel wire rope of min. 6 mm dia, double Drum winch (c) Galvanised Lantern carriage arrangement suitable for 12 nos. luminaries & its control gear boxes and lighting finial. (d) Integral power tool installed inside base compartment for its operation. (e) The 20 mtr. Himast lighting system should be of BAJAJ,PHILIPS,CROMPTON,GE or any reputed makes approved by BHEL is acceptable.		
3	Supply of foundation bolts manufactured from special steel along with nuts, washers, anchor plate and templates .		
4	Design, supply and casting of suitable shallow foundation with M-15 concrete for the High mast considering safe soil bearing capacity & wind pressure at PEFP, BHEL Bhandara/Maharasrta site. The Wind force and wind pressure for PEFP, Bhandara, Nagpur city can be taken from IS 875: part 3 (Wind load) and the soil bearing capacity for the shallow foundations are given in the attached **Annexure C.**		
5	Supply of 12 nos. Non - Integral 2 x 400 watts High Pressure Sodium vapour floodlight luminiaire with two nos. 400W HPSV lamps in each luminaires and required control gear boxes suitable for operation of 230V, 50 Hz, a.c. supply. Philips : Type RVP 301-2 X 400 SON T/HP 1-T 400 or Bajaj : Type BGENF 22 R or Crompton Greaves : Type FHD 1524 or G E Type : GELF 2 X 400 (N 1) makes only acceptable.		

Sl.No.	Description	Vendor to confirm	Comment/Deviation
6	Supply of twin dome aviation obstruction light with 2 nos. Red LED lamps & lightning arrester.		
7	Supply of 3 nos. of 50 mm dia.length of 2.5mts with Class "C" GI pipe earthing system confirming to I.S.3043 for high mast (1 no. for Mast,1 no for lightening arrestor, 1 no. for power control panel)).Inter connections of equipment to earth pit shall be made by using 50X6 mm Hot Dip GI flat.		
8.0	Supply of control panel housing suitable control circuit for the operation of the mast, precision digital timer for automatic ON / OFF control of lights and required controls for the power tool motor.(make of the timer EAPL /L&T/MDS/GE/SIEMENS)		
9.0	Erection / Installation and commissioning of the High Mast system comprising of foundation, mast and its accessories, aviation warning lamps, lightning arrester, trailing cable, earthing, luminaires, control panel etc. with the help of suitable equipments.		
10.0	3 sets of wiring / connection diagram, O&M manual to be supplied along with each high mast.Single copy of make,rating details,technical details and catalogue of all the bought out items used in the panel should be submitted along with the material.		
11.0	Technical leaflet giving the dimensions, features are to be attached with the offer. The fitting and control gear boxes offered should be suitable for outdoor application confirming to IP 65 or better. The lamp holders and fitting bracket fasteners and any other fasteners outside the fitting should be SS material. The gaskets sealing should be pasted around the fitting firmly to prevent rain water entry into the fitting. The glass door locking clips should be provided with rigid SS material. The glass door shall be hinged type for easy maintenance confirming to IP 65. The lamps should be independently connected and the plated brass gland position shall be at the bottom to prevent rain water entry. The connecting wires to the holders should be insulated with hi temp resistance material like FRLS/ glass wool only. The lamp fixing bracket on the tower shall be designed to hold all the fittings in the same axis.		
11.1	The electrical works should be carried out by a licensed electrical contractor.		
12.0	General Features		

Sl.No.	Description	Vendor to confirm	Comment/Deviation
12.1	Winch		
	The winch shall be of completely self sustaining type, without the need for brake shoe, springs or clutches. Each driving spindle of the winch shall be positively locked when not in use. Individual drum also should be operated for fine adjustment of lantern carriage. The capacity, operating speed, safe working load, recommended lubrication and serial number of the winch shall be clearly marked on each winch. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay, with no chances of rope slippage. The rope termination in the winch shall be such that distortion or twisting is eleminated and at least 5 to 6 turns of rope remains on the drum even when the lantern carriage is fully lowered and rested on the rest pads. It should be possible to operate the winch manually by a suitable handle by an integral power tool.(winch should be standard reputed make)		
12.2	Head Frame		
	The head frame, which is to be designed as a capping unit of the mast, shall be welded steel construction, galvanised both internally and externally after assembly. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire rope and the multi-core electric cable. The pulley block shall be made of non-corrodible material, and shall be of die cast Aluminium Alloy. Pulleys made of synthetic materials such as Plastic or PVC are not acceptable. Self-lubricating bearings and stainless steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period. The pulley assembly shall be fully protected by a canopy galvanised internally and externally. Close fittings guides and sleeves shall be provided to ensure that the ropes and cables do not get dislodged from their respective positions in the grooves. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage.		
12.3	Stainless Steel Wire Ropes. The suspension system shall essentially be without any intermediate joint and shall consist of only non-corrodible stainless of AISI 316 or better grade. The stainless steel wire ropes shall be of suitable size, the central core being of the same material. The overall diameter of the rope shall not be less than 6 mm. The thimbles shall be secured on ropes by compression splices. Two continuous lengths of stainless steel wire ropes shall be used in the system and no intermediate joints are acceptable in view of the required safety. No intermediate joints / terminations either bolted or else, shall be provided on the wire ropes between winch and lantern carriage.Certificate to this effect has to be obtained from the manufacture of this rope to confirm the above requirement.		

Sl.No.	Description	Vendor to confirm	Comment/Deviation
12.4	Electrical system, cable and cable connections.		
	A suitable terminal box shall be provided as part of the contract at the base compartment of the high mast for terminating the incoming cable. The electrical connections from the bottom to the top shall be made by special trailing cable(FRLS) and size of the cable shall be minimum4 core 6 sq.mm. multistrand PVC flexible copper cable. At the top there shall be weather proof junction box to terminate the trailing cable. Connections from the top junction box to the individual luminaries shall be made by using 3 core 2.5 sq.mm. Copper flexible HR PVC cables of reputed make with ISI mark.The system shall have inbuilt facilities for testing the luminaries while in lowered poistion. Also suitable provision shall be made at the base compartment of the mast to facilitate the operation of internally mounted, electrically operated power tool for raising and lowering of the lantern carriage assembly. The trailing cables of the lantern carriage rings shall be terminated by means of metal clad, multipin plug and socket provided in the base compartment to enable easy disconnection whenever required.		
12.5	Power Tool for the Winch		
	A suitable high-powered, electrically driven, internally mounted power tool, with manual over ride shall be supplied for the raising and lowering of the lantern carriage for maintenance purposes. The speed of the power tool shall be to suit the system. The power tool shall be single speed, provided with a motor of the required rating. The power tool shall be supplied complete with suitable control. The capacity and speed of the electric motor used in the power tool shall be suitable for the lifting of the design load installed on the lantern carriage. The power tool mounting shall be so designed that it will be not only self-supporting but also aligns the power tool perfectly with respect to the winch spindle during the operations. Also, a handle for the manual operation of the winches in case of problems with the electrically operated tool shall be provided.The quality of the gear box to withstand minimum 500 operations to be ensured by supplier,Gears(worm gear with worm shaft) from good quality material ensure for durability.		
12.6	Lightning Finial		
	One number heavy duty hot dip galvanised lightning finial shall be provided for each mast. The lightning finial shall be minimum 1.2 M in length and 12mm dia. shall be provided at the center of the head frame. It shall be bolted soildly to the head frame to get a direct conducting path to the earth through the mast.		
12.7	Aviation Obstruction Lights :		
	Suitable 2 Nos. 230 V, LED Aviation Obstruction Lights of reliable design and reputed manufacturer shall be provided on top of each mast		

Sl.No.	Description	Vendor to confirm	Comment/Deviation
12.8	Earthing Terminals :		
	Suitable earth terminal shall be provided at a convenient location on the base of the mast, for lighting and electrical earthing of the mast.		
12.9	Feeder Pillar		
	Each mast shall be provided with a feeder pillar and control box of size 750mm height 450mm breadth and 250mm depth fabricated with 14 SWG CRCA sheet with hinged doors and locking arrangement,out door type,stand mounting,dust and vermin proof as per IP55,panel will have powder coat finish to shade 631 of IS and stand black enamel paint. The feeder pillar control box to be fixed on the stand by 50mm X 50mm X5 mm MS angle and comprise of incoming as 4 pole 63amps 415 volt Legrand/Havells/siemens/L&T make TPN MCB. for incoming, one no.32amps TP MCB for outgoing, one no. 6amps TP MCB for motor control circuit. The 6sq.mm PVC multi strand copper cable for power circuit wiring with colour sleeve and ferrule and 1.5sq.mm PVC multi strand flexible copper cable for control circuit wiring with No. ferrules and insulated copper lug should be used. All the electrical aceessories should be fixed on the 2mm thick base plate with suitable size self threading holes and 3mm thick detachable cable entry bottom plate with suitable cutouts for cable entries. Din rail mounting type ELMEC make 63 amps strips for control circuit feeders pillar shall be mounted near to high mast. Suitable digital timer (as per the Point nos.8) for automatic on-off control with the siemens/L&T make 63amps contractor for incoming supply and 16 amps for motor control and ON-OFF control of the lamps should be provided and connected in the circuit.		
12.10	Each High Mast must be supplied with 1 No 63A SFU (Iron glad / Metal glad) as incomer to feeder piller along with 50mm x 50mm x 5mm Angle frame for fixing feeder piller box and 63 A SFU . The SFU should be provided with required canapy and suitable for mounting in outside . The grouting of frame and interconnecting with suitable cable are supplier scope.		
12.11	Power Cable.		
	The cable of size 3.5 core25 sq.mm. Aluminium conductor, Armoured cables to be used for power supply from the TPN swich disconnector to the feeder pillar by the supplier . The supply of 4 core 6sq.mm HR PVC flexible multi strand copper cable shall be taken from the base compartment of the high mast to the feed pillar control box through the cable entry hole made in the foundation by the supplier.		
	Note: Point by point confirmation is required from the supplier otherwise the offer will not be considered		
	The tentative location of High Mast at PEFP BHEL/ Bhandara Site (attached Annexure 'D')		

ANNEXURE-B

Suggestive Format of Performance Certificate:

The Performance certificate should contain minimum of the below said data and it shall be produced on **Customer's Letter Head** and submitted along with the offer.

1.0	Equipment/Installation Supplied to (Customer Details)	
2.0	Project Name	
3.0	Details of Equipment/installation supplied	
3.1	High-mast Lighting: Type/ Make	
4.0	Purchase Order/ Work order Number	
5.0	Scheduled date of completion	
6.0	Actual date of completion	
7.0	Reasons for delay (if any)	
8.0	Performance of the contractor during erection & commissioning on turnkey basis	Satisfactory/ Not-satisfactory
Date:		Signature & Seal of the Authority Issuing the Performance Certificate

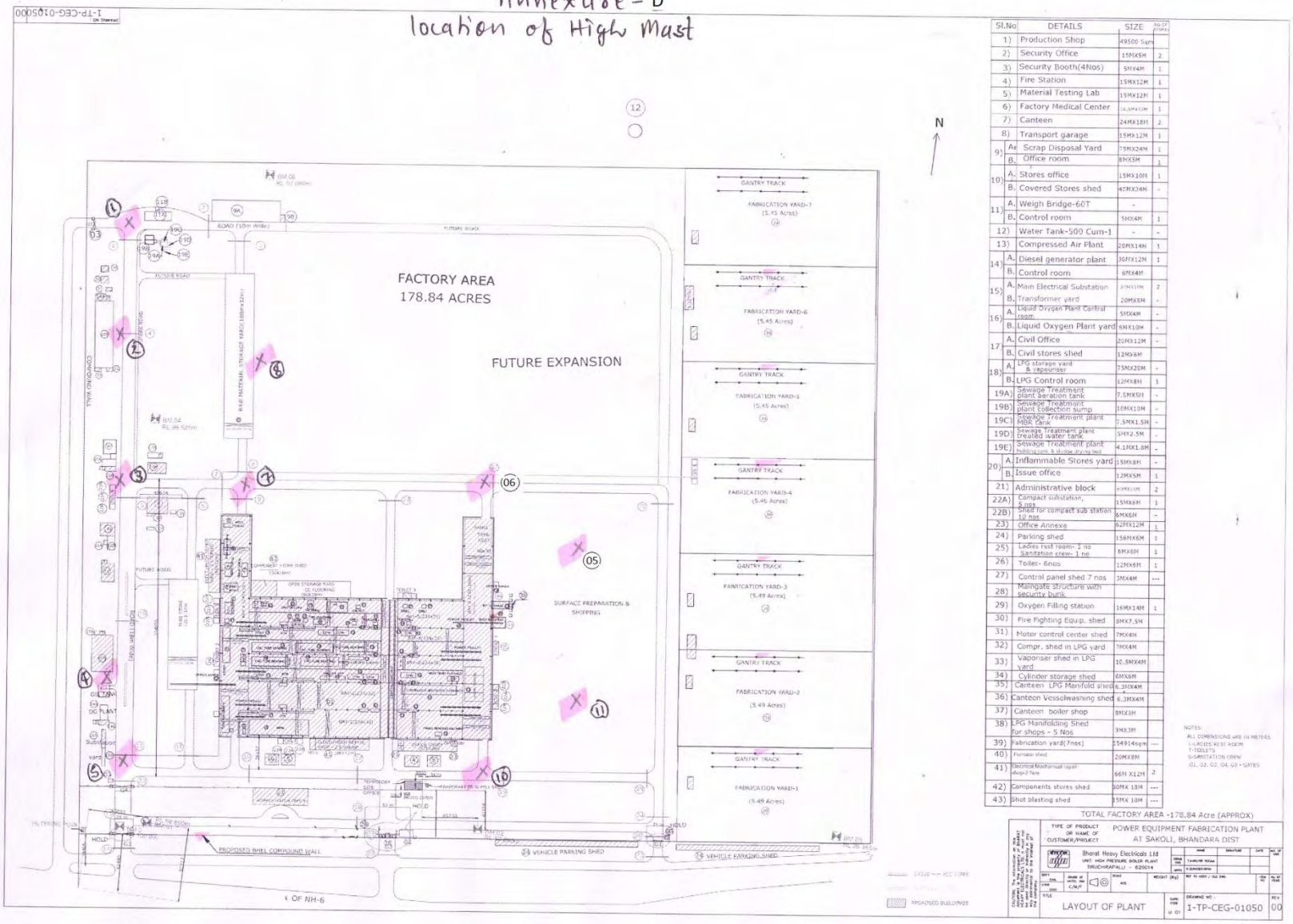
Annexure C

Soil bearing capacity at PEFP BHEL Bhandara Site		
DEPTH	FOUNDATION WIDTH	NET SAFE BEARING CAPACITY (T/m^2)
1.5m	1m to 3m	15
	3m to 5m	7
	More then 5 m	13
2 m	1m to 3m	15
	3m to 5m	8
	More then 5 m	13
2.5 m	1m to 3m	17
	3m to 5m	7
	More then 5 m	13
3 m	1m to 3m	15
	3m to 5m	8

Table 8: Net Safe Bearing Capacity for Open Foundation (BH-02 to BH-10)

Annexure - D

location of High Mast



Sl.No		DETAILS	SIZE	No Of Units
1)		Production Shop	49500 Sqm	
2)		Security Office	15MX5M	2
3)		Security Booth(4Nos)	5MX4M	1
4)		Fire Station	15MX12M	1
5)		Material Testing Lab	15MX12M	1
6)		Factory Medical Center	16.5MX12M	1
7)		Canteen	24MX18M	2
8)		Transport garage	15MX12M	1
9)	A.	Scrap Disposal Yard	75MX24M	1
	B.	Office room	8MX5M	1
10)	A.	Stores office	15MX10M	1
	B.	Covered Stores shed	40MX24M	-
11)	A.	Weigh Bridge-60T	-	
	B.	Control room	5MX4M	1
12)		Water Tank-500 Cum-1	-	-
13)		Compressed Air Plant	20MX14M	1
14)	A.	Diesel generator plant	36MX12M	1
	B.	Control room	6MX4M	
15)	A.	Main Electrical Substation	30MX10M	2
	B.	Transformer yard	20MX8M	-
16)	A.	Liquid Oxygen Plant Control room	5MX4M	-
	B.	Liquid Oxygen Plant yard	6MX10M	-
17)	A.	Civil Office	20MX12M	-
	B.	Civil stores shed	12MX6M	
18)	A.	LPG storage yard & vaporiser	75MX20M	-
	B.	LPG Control room	12MX8M	1
19A)		Sewage Treatment plant aeration tank	7.5MX5M	-
19B)		Sewage Treatment plant collection sump	10MX10M	-
19C)		Sewage Treatment plant MBR tank	7.5MX1.5M	-
19D)		Sewage Treatment plant treated water tank	5MX2.5M	-
19E)		Sewage Treatment plant	4.1MX1.8M	-
20)	A.	Inflammable Stores yard	15MX8M	-
	B.	Issue office	12MX5M	1
21)		Administrative block	45MX15M	2
22A)		Compact substation, 5 nos	15MX6M	1
22B)		Shed for compact sub station 10 nos	6MX6M	-
23)		Office Annexe	62MX12M	1
24)		Parking shed	156MX6M	1
25)		Ladies rest room- 1 no Sanitation crew- 1 no	6MX6M	1
26)		Toilet- 6nos	12MX6M	1
27)		Control panel shed 7 nos	3MX4M	---
28)		Maingate structure with security bunk		
29)		Oxygen Filling station	16MX14M	1
30)		Fire Fighting Equip. shed	8MX7.5M	
31)		Motor control center shed	7MX4M	
32)		Compr. shed in LPG yard	7MX4M	
33)		Vaporiser shed in LPG yard	16.5MX4M	
34)		Cylinder storage shed	6MX6M	
35)		Canteen LPG Manifold shed	6.3MX4M	
36)		Canteen Vesselwashing shed	6.3MX4M	
37)		Canteen boiler shop	9MX3M	
38)		LPG Manifolding Shed for shops - 5 Nos	9MX3M	
39)		Fabrication yard(7nos)	254914sqm	---
40)		Furnace shed	20MX8M	
41)		Electrical Mechanical repair shop-2 Nos	66M X12M	2
42)		Components stores shed	30MX 18M	---
43)		Shot blasting shed	15MX 10M	---

NOTES:
ALL DIMENSIONS ARE IN METERS
L=LADIES REST ROOM
T-TOILETS
S-SANITATION CREW
G1, G2, G3, G4, G5 = GATES

TOTAL FACTORY AREA -178.84 Acre (APPROX)

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT	POWER EQUIPMENT FABRICATION PLANT AT SAKOLI, BHANDARA DIST		
Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI – 620014			
TITLE: LAYOUT OF PLANT	DRAWING NO.: 1-TP-CEG-01050	REV: 00	

Commercial Terms for Package-IV

a) Delivery Schedule for supply of all the items ofHigh-mast Lighting system package:
- 6 months from the PO date.

b) Time period for Installation and Commissioning ofall the items ofHigh-mast Lighting system package.
- 4 months up on receiving the material.
- The total time period for the supply, installation, commissioning etc should not be more than 10 months from the PO date.

c) 100% Payment will be made after supply, installation, commissioning of the total High-mast Lighting system upon producing 10% Performance Bank Guarantee.

GENERAL SAFETY PRECAUTIONS TO BE FOLLOWED AT WORK SITE DURING EXECUTION

The following safety measures should be strictly adhered to during execution of works at sites.

1. Providing the working platform with toe board and handrail for continuous working at heights.
2. Providing safety belt and life line at all times for men working at heights.
3. Providing dust or fume respirator in places where dust and fume concentration exists.
4. Providing goggles and welding screens.
5. Providing acid and alkali proof rubber gloves for handling acid and alkali and chemical which are corrosive.
6. Providing rubber gloves for working on electrical works.
7. Ensuring proper lashing of the components while being transported in vehicles.
8. The vehicles must have side supports or have body to support the materials conveyed.
9. The materials should not be allowed to extend or overflow the sides of the vehicles.
10. Materials should not be allowed to overhang from the rear edge of the body of the vehicle.
11. Driver of the vehicle must possess license.
12. Vehicle must not be overloaded prescribed limits.
13. Red flags and lights for parts projecting from the body of vehicle must be provided.
14. The speed restrictions within the factory premises must be strictly adhered to.
15. The gas cylinders must be always handled on trolleys or kept tied down not in use. They should never be rolled as Roller for conveying.
16. Cylinders should not be used without regulators.
17. All excavations must be barricaded and red lamps must be provided.
18. All electrical connections must be properly earthed.
19. No work should be taken up for execution inside shop floor, without obtaining necessary work permit.
20. Providing helmet, safety belt, etc., for high level work and sufficient number of Industrial Safety nets at appropriate level to safeguard the persons working at high level particularly nin trusses, girders, roofing etc., of industrial and high roof buildings.
21. The contractor should maintain a register regarding the driver license particulars.
22. All personal protective equipment conform with standard specification as per the details given in the code of conduct.

Contractor including their sub contractors, agents and labour engaged on the work are required to scrupulously adhere to the safety regulations, safety precautions and measurers. Any violation thereof will invite punitive action being taken against them. Also contractors with frequent violations of safety regulations will not be entrusted with further work in this organization.

SAFETY PRECAUTIONS TO BE OBSERVED WHILE TRANSPORTING MATERIALS

I. VEHICLE

1. Vehicles carrying material should have proper registration documents and must be produced on demand by our Security Staff.

2. The light on right side, i.e., over the drivers cabin shall be in working condition.

3. Both the head lights as well as park lamps must be in working conditions.

II. MOVEMENT OF VEHICLE

1. The vehicle should not travel at more than 20 km.ph in our premises.

2. The Driver of the vehicle must possess heavy duty licence and produce on demand by the Security Staff.

3. Vehicles carrying inflammable liquids in the tank containers should have grounding chain or the tank should be coated with insulating material also to avoid Static Electricity.

4. In road junctions, speed breakers and railway crossing, the speed should be lowered and vehicle should proceed cautiously.

5. The driving should „KEEP TO THE LEFT" at all places.

6. The vehicle should not be parked in road which could obstruct the vehicular traffic.

7. No person other than driver should be allowed to sit or stand on the prime mover or trailer.

8. The vehicle should pass only through the approved routes. Short cuts should be forbidden.

9. There must be a safe distance behind another moving truck.

10. The driver should avoid making quick starts, jerky stops or quick turns at excessive speed.

III SHIPPING

1. Strong side supports should be provided on both sides of the trailer. The side supports should be fixed in such a way that it cannot be removed even temporarily.

2. Adequate packing must be given for easy slinging operation. The packing materials should be good enough to withstand the load.

3. The stacking of loads in the truck should be evenly placed. The load should not be heaped together or dumped over the chassis.

4. The loaded materials should be fastened tightly with „WIRE ROPE". Manila rope or coir rope should not at all be used. There must be side packing such as gunny or rubber tyre between the sharp edge of the job and wire rope in order to avoid cut in the wire rope.

5. There must be minimum two fastenings and it should be more in case of lengthier loads.

6. The wire rope should be in sound conditions i.e, there should not be links, knots or bristles etc.,

7. The wire rope ends should be clamped with „U" clamps.

8. The load on the truck should not be beyond its standard capacity. The carrying capacity must be clearly marked on the trailer also.

9. The loose pieces should be bundled before loading on the truck.

10. There must be red flags or red lamps for the lengthy loads which extend beyond chassis.

11. The load should not be over hanging more than 3 ft. from the end of the body.

12. The materials should not be stacked too high to avoid hitting against live electric lines.

13. While transporting the scraps, there must be wire knitting cover to prevent falling of scrap.

IV GENERAL

The vehicles should not be moved directly inside the production building in case the materials are to be unloaded there. But the vehicle should be parked outside the building and the driver should ascertain the passage as well as the unloading points with the help of shop officials. This will avoid the congestion of blocking of traffic in the gangway.

TERMS AND CONDITIONS REGARDING COMPLIANCE WITH VARIOUS LABOUR LAWS BY THE CONTRACTORS FOR BHEL

1. The Contractor shall not employ in connection with the work any person who has not completed 18 years of age.

2. The Contractor shall in respect of labour employed by him either directly or through subcontractors, comply with or cause to be complied with the following statutory provisions and rules and in regard to all matters provided therein.

a) The Contract Labour (Regulation & Abolition) Act 1970 and the related Maharastra State Rules.
b) The Minimum Wages Act 1948 and the related Maharastra State Rules.
c) The Payment of Wages Act 1936 and the related Maharastra State Rules.
d) The Factories Act 1948 and the related Maharastra State Rules.
e) The Employee"s Provident Fund & Miscellaneous Provisions Act 1952.
f) The Employees State Insurance Act 1948.
g) The Workmen Compensation Act 1923.
h) The Industrial Disputes Act 1947.
i) **The Payment of Bonus Act 1965**.
j) **BOCW Act**. 1996 and rules of 1998, etc.

and any other law or modifications to the above or to the Rules made thereunder from time to time.

REGISTRATION AND LICENSING

3. Every Contractor shall register his name with the Welfare Section of BHEL - PEFP Project site before taking up the work awarded to him by giving the following information and getting a Code Number :

a) The Name of the Contractor
b) Nature of Contract Work
c) Period of work
d) Number of maximum labour employed by him on any one day
e) License No. & Date (Applicable in case of contractor employing 20 or more workers)
f) Whether enrolled for PF, ESI, etc., and enrolment No.

If ESI is not applicable to the work site, the tenderer has to cover his all workmen including supervisors and executives with contractor's all risk insurance policies.

This information is called for, for the purpose of informing the Inspectorate of Factories whenever they call for information regarding contracts.

4. The Contractor employing 20 or more workmen is required to obtain license from the authorities (The Deputy Chief Inspector of Factories / Assistant Commissioner of Labour as the case may be). The license shall be amended and / or renewed wherever, there is an increase in the workmen employed by him or in the event of contract being extended or renewed. The Contractor shall inform the licence number to the BHEL Management before taking up the work.

5. The Contractor (Licensed or unlicensed) shall promptly furnish every information and document required by BHEL authorities for the purpose of fulfilling their obligations as Principal Employer and / or Occupier of the Factory and shall render all necessary assistance for the same.

WAGES

6. The tenderer has to ensure payment of Minimum Wages as per Maharastra State Minimum Wages including its periodical revision as applicable under law from time to time.

The labourers engaged in this contract shall be paid additional payment asmentioned below in addition to the payment of Minimum wages as stated above.

1. **Unskilled Worker** **Rs. 2000 per month**
2. **Semi-skilled Worker** **Rs. 2300 per month**
3. **Skilled Worker / Supervisor** **Rs. 2500 per month**

Also the labourers shall be paid a minimum bonus which shall be 8.33% as per the payment of Bonus Act 1965 for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

The Contractor shall have to remit EPF & ESI contributions at the rates applicable under law to the authorities concerned for the total wages paid (i.e) Payment of minimum wages and additional payment as mentioned above.

If ESI is not applicable to the work site, the tenderer has to cover his all workmen including supervisors and executives with contractor's all risk insurance policies.

7. The Contractor shall fix wage periods in respect of which wages shall be payable. No wage period shall exceed one month.

8. The Contractor shall ensure payment of wages to the contract labour employed by him within three days from the end of wage period in case the wage period is one week or a fortnight and in all other cases before 10th day of the following month.

9. All Payment of wages shall be made on working days at the work site and during the working time and on date notified in advance. In case the work is completed before the expiry of the wage period final payment shall be made within 48 hours of the last working day.

10. Where the employment of any worker is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of the second working day from the day on which his employment is terminated.

11. Wages due to every worker shall be paid to him direct or to the person authorized by him in this behalf. All wages shall be paid in current coin or currency in both.

12. The Contractor shall ensure the disbursement of wages in the presence of such authorized representative of BHEL Management.

13. The above payment shall be verified by the authorized officer / representative of BHEL with the following certificate of the payment sheet "Certified that the amount shown in Column No…….. has been paid to the workmen concerned in my presence on ……..at…….

14. A certificate of payment shall be furnished in duplicate by the Contractor to the Engineer in charge each month in Form „A".

15. A notice showing the wage period and the place and time of disbursement of wages shall be displayed at the place of work and a copy to be sent to the Welfare Department by the Contractor under acknowledgement.

16. Notices showing the rate of wages, weekly rest days, hours of work, wage period, date of payment of wages, names and addresses of the Inspector having jurisdiction, the date of unpaid wages shall be displayed in Tamil and English in conspicuous places at the establishment and at work site by the Contractor. The Contractor shall inform the BHEL Management every month the details of contract labour engaged for contract in this following form :

a) Serial Number
b) Location
c) Period of work
d) No. of contract labour engaged during the month
e) No. of days worked
f) No. of men worked
g) Wages paid to workers

The above statement shall be furnished to BHEL Management at the end of every month.

REGISTERS AND RECORDS AND COLLECTION OF STATISTICS

17. The following documents / formats under Contract Labour (Regulation & Abolition) Act 1970 and Maharastra State Government Rules thereunder shall be maintained by each contractor.

a) Register of persons employed by the Contractor
b) Employment Card
c) Service Certificate
d) Muster Roll, Wage Register, Deduction Register, Wage slip, Overtime Register, Register of Fines, Register of Advances etc.,

18. The Contractor shall display the abstract of the Contract Labour (Regulation&Abolition) Act and the Rules thereunder both in English and Tamil.

19. Half yearly Return shall be sent by the Contractor in duplicate to the Licensing Officer.

20. The Contractor shall submit the returns required under the Contract Labour (Regulation & Abolition) Act 1970 periodically to BHEL Management.

21. The Contractor shall without fail give upto date information in writing of the attendance of the workers employed by him.

22. The Contractor shall ensure that his workers keep and produce their Employment Card when coming to duty and take them back when leaving duty.

23. All the above registers and records shall be preserved in original for a period of three years. All the registers, records and notice maintained under the Act and rules shall be produced on demand by Inspector or any authority under the Act.

WORKING HOURS AND WORKING CONDITIONS

24. No worker shall be required or allowed to work on Sunday unless he has or will have a holiday on anyone of the three days before or after the said day.

25. The Contractor shall inform BHEL Management in the prescribed form details of the contract workers scheduled to work on Sunday, the day of rest and also indicate the substituted holiday in lieu thereof. This shall be intimated two days in advance before his workmen are booked for work on Sunday.

26. The contract labour working for more than nine hours in any day or for more than 48 hours in any week shall be paid wages at the rate of twice the ordinary rate of wages in accordance with the provisions of Sections 59 of the Factories Act 1948.

27. The Contractor shall provide all safety devices and personal protective equipment to his workmen at his own cost and shall ensure that his workmen wear / use such devices or equipment provided to them while doing the work and there should not be any relaxation on this.

28. The Contractor shall give four paid National Holidays to his workers, viz., 26th January, 1st May, 15th August and 2nd October.

29. The Contractor shall ensure that his workmen vacate the premises after the shift is over.

30. The Contractor shall give leave with wages to his workmen who have worked for a period of 240 days or more in the Factory premises during a calendar year. This leave shall be allowed during the subsequent calendar year at the rate of one day for every 20 days of work performed by the worker during the previous calendar year. The worker whose services commences on a day other than the first of January shall be entitled to leave with wages at the above rate (One day for every 20 days of work) only if he had worked for a minimum of 2 /3 of the total number of days in the reminder of the calendar year. This leave will be admissible only during the subsequent calendar year.

31. No woman worker shall be required or allowed to work in the Factory except between the hours of 6.00 A.M. and 7.00 P.M.

32. The Contractor shall comply with the provisions relating to Welfare and Health facilities as provided in the Contract Labour (Regulation and Abolition) Act 1970 read with the Maharastra State Governments" Contract Labour Rules, if any.

NOTICE OF ACCIDENTS

33. Not-withstanding anything contrary to this, in the event of accident the contractor shall be required to fill injury report and submit the Engineer in charge immediately and ensure the compliances of ESI / Workmen"s compensation Act, Factories Act and Rules made thereunder. He shall also maintain a register of accident as per the Act.

34. The Contractor shall get the contract labour engaged by him insured under Workmen"s Compensation policy from General Insurance Corporation of India before actually starting the work of contract. The insurance coverage should be for the entire period of Contract. The Contract shall comply with the provisions of the Workmen"s Compensation Act 1923. (This should be read in conjunction with the provisions of ESI Act)

COVERAGE UNDER THE ESI ACT / PF AND MISCELLANEOUS PROVISIONS ACT

35. The contractor shall ensure that all his workmen are covered under the Employee"s State Insurance Act and produce to BHEL such Registration Number / Enrolment Number before executing the contract work.

If ESI is not applicable to the work site, the tenderer has to cover his all workmen including supervisors and executives with contractor's all risk insurance policies.

36. The Contractor shall regularly pay the amount of contribution. i.e., employer"s contributions as well as employees" contribution pursuance of the above scheme as fixed from time to time. The Contribution payable presently is 1.75% wages to be recovered from his workmen and 4.75% of wages to be contributed by the Contractor. Contributions recovered from employee and contribution made by the contractor may be rounded to the next higher multiples of five paise.

37. The Contractor shall take note of any amendment that may be brought forth in the above contribution rate and act accordingly.

38. The contractor shall ensure that his workmen are covered under the EPF & Miscellaneous Provisions Act 1952 and accordingly produce to the BHEL Management the registration / enrolment number before awarding of contract work. As per the existing provisions every worker shall be entitled and required to become a member of the fund. The employee"s contribution payable at present is 12% of wages which will be recovered by the contractor from the wages of his workmen and the contractor should pay equal contribution. The contractor is also liable to pay any administrative charges in this behalf that may be decided from time to time. It will be the responsibility of the contractor to ensure such contribution payable in respect of workmen employed through sub-contractors also.

39. The Contractor shall take note of any amendment in the rate of contribution payable under the scheme from time to time.

40. The Contractor shall within seven days of the close of every month submit to BHEL a statement showing the amount of contribution payable / paid for employees engaged by him or through him and shall also furnish to BHEL such information as Principal Employer is required to furnish under the provisions of the ESI Act and PF as well as the schemes made thereunder to the authorities concerned.

41. Whenever any sum of money is found to be recoverable from or payable by the contractor under the above Act, the sum shall be deducted from any sum that may be due or which at any time thereafter may become due to the Contractor under this contract or under any other contract or from his security deposit. In case the recoveries are not sufficient to satisfy the claim, the contractor shall pay the balance thereof on demand. In case any recoveries are made under this clause from security deposit, the contractor shall immediately thereafter pay such further sums as may be required to replenish the shortage caused by such recoveries in amount of security deposit.

42. The Contractor shall abide by all the labour and other laws applicable to contract labour / worker under this contract and shall at all times keep BHEL indemnified against all loses, claims, prosecutions under any law.

43. In case of non-compliance of any of the provisions of the Acts and in case BHEL having complied with the same, BHEL will be entitled to recover the same from the contractor / sub-contractor.

44. Non-exercise of any of the powers or rights available to BHEL hereunder or under any law, shall not in any way operate as waiver thereof.

Note : The Specimen forms for the following are available in BHEL.

1)	Form „A"	-	Payment Certificate
2)	Form IV	-	Application for License
3)	Form XIII	-	Register of Workmen employed by contractor
4)	Form XIV	-	Employment Card
5)	Form XV	-	Service Certificate
6)	Form XVI	-	Muster Roll
7)	Form XVII	-	Register of wages
8)	Form XIX	-	Wage slip

GENERAL CONDITIONS OF CONTRACT FOR LUMPSUM, ITEM RATES AND PERCENTAGE CONTRACT

CONTENTS

Condition No	Description
	CHAPTER - I
1	DEFINITIONS
	CHAPTER - II
	SCOPE OF CONTRACT
2	HEADING TO THE CONTRTACT
3	CONTRACT DOCUMENTS
4	WORKS TO BE CARRIED OUT
5	PROVISIONAL ITEMS
6	DEVIATIONS
7	TIME
8	STORES & MATERIALS
9	DELAY & EXTENSION OF TIME
10	PATENT RIGHTS
11	OCTROI AND OTHER DUTIES
12	ROYALTIES
13	PLANT & EQUIPMENT
14	ASSIGNMENT OR TRANSFER OF CONTRACT
	a) SUB-CONTRACT
15	COMPLIANCE TO REGULATIONS AND BYE-LAWS
	CHAPTER - III
	PERFORMANCE OF THE CONTRACT
16	SECURITY DEPOSIT
17	ORDERS UNDER THE CONTRACT
18	ADMISSION TO SITE
19	CONTRACTOR'S SUPERVISION
20	LABOUR
21	WATER
22	TEMPORARY WORKSHOPS, STORES ETC.
23	STORES & MATERIALS ON SITE
24	TOOLS AND PLANTS ON SITE
25	STATEMENT OF HIRE CHARGES
26	PRECAUTIONS AGAINST RISKS

27 NOTICE & FEES

28 SETTING OUT OF THE WORKS & PROTECTION & MAINTAINING SIGNALS AND WORKS

29 SITE DRAINAGE

30 EXCAVATIONS, RELICS ETC.

31 FOUNDATIONS

32 COVERING-IN WORKS

33 APPROVAL OF WORKS BY STAGES

34 EXECUTION OF WORKS

35 DAY WORKS

36 INSPECTION OF THE WORKS

37 RESPONSIBILITY FOR BUILDING

38 INSURANCE OF WORKS

39 DAMAGE AND LOSS TO PRIVATE PROPERTY & INJURY TO WOKMEN

40 COMPLETION

41 COMPENSATION FOR DELAY

42 LAWS GOVERNING THE CONTRACT

43 CANCELLATION OF CONTRACT FOR CORRUPT ACT

44 CANCELLATION OF CONTRACT FOR INSOLVENCY,ASSIGNMENT OR SUB LETTING OF CONTRACT

45 CANCELLATION OF CONTRACT FOR DEFAULT

46 TERMINATION OF CONTRACT FOR DEATH

47 SPECIAL POWERS OF DETERMINATION

48 FAIR WAGE

CHAPTER – IV

VALUATION AND PAYMENT

49 RECORDS & MEASUREMENTS

50 VALUATION OF DEVIATIONS

51 REIMBURSEMENT/ REFUND ON VARIATION IN PRICE

52 ADVANCES ON ACCOUNT

53 FINAL BILL

54 PAYMENT OF BILLS

55 RECOVERY FROM CONTRACTOR

56 POST TECHNICAL AUDIT OF WORKS AND BILLS

57 REFUND OF SECURITY DEPOSIT

58 ARBITRATION

ANNEXURE

BHEL CONTRACTOR'S LABOUR REGULATIONS

MODEL RULES FOR LABOUR LAWS

BHEL SAFETY CODE

CHAPTER- I

1. DEFINITIONS

In these General Conditions of Contract, the following terms shall have the meaning hereby assigned to them except where the context otherwise requires:-

a) The “CONTRACT” means the documents forming the tender and acceptance thereof, together with all documents referred to therein including General and Special Conditions of Contract, Schedules „A", „B", „C", „D", „E", and / or General Summary attached to the form of tender, the Bharat Heavy Electricals Limited, Schedule of Rates as amended and in force the Specifications and the Drawings. All these documents as applicable taken together shall be deemed to form one Contract and shall be complementary to one another.

b) The “TENDER DOCUMENTS” means the form of Tender the applicable Schedules „A", „B", „C", „D", „E", and / or General Summary, General and Special Conditions of Contract and the Specification and / or Drawings as given to Contractors on payment for the purpose of preparing their tenders.

c) The “WORK” means the work described in the tender documents in individual work orders and/or accompanying Drawings and Specifications as may be issued from time to time to the Contractor by the Engineer–in– charge within the powers conferred upon them, including all modified or additional works and obligations to be carried out either at the site or at any Factory Workshop or other place as required for the performance of the Contract.

d) The “SITE” means the lands and/or other places on, in into or through which the work is to be executed under the Contract or any adjacent land, path or street which may be allotted to or used for the purpose of carrying out the contract.

e) The “CONTRACTOR” means the individual, firm or Company, whether incorporated or not undertaking the work and shall include the legal personal representatives of such individuals or the persons composing the firm or Company, or the successors of the firm or Company and the permitted assigns of such individual or firm or Company.

f) The “ Engineer–in–charge” means the Engineer who is incharge for the works referred.

CHAPTER II

SCOPE OF CONTRACT

2. Heading to the Contract:

The heading to these conditions shall not effect the interpretation thereof.

3. Contract Documents

The Accepting Officer shall furnish to the Contractor on demand “FREE OF COST” three copies of signed drawings and one copy of the signed agreement comprising of preamble to agreement, General and Special Specifications, Schedule „A", „B", „C", & „E", etc., (but excluding General Conditions of Contract and Drawings) and **three** copies of all further drawings issued during the progress of work.

However, for any additional copies of the agreement or drawings required by the Contractor the same will be supplied on payment at the specified cost.

The Contractor shall keep one copy of all the Drawings and the Specifications at the site and the Engineer-in-charge or his representative shall have access to them at all reasonable times.

None of these documents shall be used by the contractor for any purpose other than that of this contract.

The Contractor shall take necessary steps to ensure that all persons employed on any work in connection with this contract have noticed that the Indian official Secrets Act 1923 (XIX of 1923) applies to them and shall continue so to apply even after the execution of such works under the contract.

4. Works to be Carried Out

The Contract shall, except as provided under Schedules "B" and „C" include all labour, materials, tools, plants equipment and transport which may be required in preparation for, and in the entire execution and full completion of the work. Schedule „A" shall be deemed to have been prepared in accordance with good practice and recognized principles and unless otherwise stated, the descriptions given therein shall be held to include waste on materials carriage and cartage, lead, return of empties, hoisting, setting, fitting in position and all other labour necessary in and for the entire execution and full completion aforesaid. Any error in description or quantity in schedule „A" or any omission there from shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the work comprised therein according to the Drawings and Specifications, or from any of his obligations under the Contract. The insertion of the name of any firm of suppliers in the Tender Documents is for the purpose of obtaining a particular class or quality of materials or workmanship but the articles or materials specified may be obtained from any other firm subject to prior written approval of the Engineer – in – charge.

In the case of a discrepancy between Schedule „A" the specification and / or the Drawing, the Accepting Officer shall be the sole deciding authority as to which shall prevail and his decision shall be final and conclusive. If neither Drawings nor Specifications contain any mention of minor details of construction, which in the opinion of the Accepting Officer whose decision shall be final and conclusive, are reasonable and obviously and fairly intended for the satisfactory completion of the work, such details shall be provided by the Contractor without any extra cost as if they were specially mentioned and shall be deemed to be included in the contract.

The contractor will be deemed to have satisfied himself as to the nature of the site, local facilities of access and all matters affecting the execution and completion of the work. No extra charges consequent on any mis-understanding in these respects or otherwise will be allowed.

5. Provisional Items

The full amount of provisional lumpsums and the value annexed to each provisional item inserted in the tender documents shall be deducted from the contract sum and the value of work ordered and executed thereunder shall be ascertained by measurement or valuation as for deviations.

No work under these items is to be begun without instructions in writing from the Engineer-in-charge.

The extent of quantities or items described as “Provisional” shall not be held to guarantee or limit the amount and description of the work to be executed by the contractor either in respect of the items concerned or the work as a whole.

No addition or deduction shall be made by the Contractor to the amount of the provisional lumpsums as included in the tender documents.

6. Deviations

The contractor shall not make any alteration in addition to or omission from the work as described in the tender documents except in pursuance of the written instructions of the Engineer-in-charge. No such deviation from the work described in the tender documents shall be valid unless the same has been specifically confirmed and accepted by the Accepting Officer in writing and incorporated in the contract.

The Accepting Officer may deviate either by way of addition or deduction, from the work so described, provided that the contract sum be not thereby varied on the whole by more than the percentage set out in the tender documents. The value of all addition and deductions will be added to, or deducted from the contract sum. Whenever the Accepting Officer intends to exercise such a right, his intention shall specify the deviations which are to be made, the lumpsum assessment or the proposed basis of payment, the extra time allowed, if any, and the date for completion of the entire contract.

Any objection by the Contractor to any matter concerning the order shall be notified by him in writing to the Engineer-in-charge within **Seven days** from the date of such order, but under no circumstances shall the work be stopped (unless so ordered by the Engineer-in-charge) owing to differences or controversy that may arise from such an objection. In the absence of such a notification of objection by the contractor, he will be deemed to have accepted the order and the conditions stated therein. In the event of the contractor failing to agree with the Engineer-in charge regarding the terms of the proposed deviation, the objection shall be referred to the Project Manager whose decision shall be final conclusive and binding on the Contractor.

7. Time

Time is the essence of the contract and is specified in the tender document or in each individual Work Order.

As soon as possible after the contract is let or any substantial Work Order is placed and before work under is to begin, the Engineer-in-charge and the Contractor shall agree to a Time and Progress Chart. The Chart shall be prepared in direct relation to the time stated in the Tender Documents or the Work Order for the completion of the individual items there of and/the contract or order as a whole. It shall indicate the forecast of the dates for the commencement of the various trade processes or sequences of the work, and shall be amended as may be required by agreement between the Engineer-in-charge and the Contractor within the limitation of the time imposed in the Tender Documents or Order

In the absence of any specific Time and Progress chart to be agreed to between the Contractor and the Engineer–in–charge, the contractor shall ensure and maintain uninterrupted progress of the work such that the entire work shall be completed within the time imposed in the Tender Documents or Order and that the proportion of work completed upto any time in relation to the entire work to be under the Contractor Order shall not be less than the proportion that the time elapsed bears to the total time of completion provided in the Tender Documents or Order.

The contractor shall suspend the execution of the work, or any part or parts thereof whenever called upon in writing by the Engineer–in–charge to do so, and

shall not resume work thereon until so directed in writing by the Engineer –in–charge. The Contractor will be allowed an extension of time for completion not less than the period of suspension. However, no other claim in this respect for compensation or otherwise however will be admitted. Provided the cause for suspension is not attributable to any default on the contractor‟s part to proceed with or fulfill the contractual obligations. This may also be extended to allow for alteration of work made by the deviation order.

8. Stores and Materials

The Contractor shall, at his own cost and expense, provide all materials required for the works, other than those listed in Schedule „B‟, which are to be supplied by Bharat Heavy Electricals Limited. All materials to be supplied by the Contractor shall be of the best kind as described in the specifications and the Contractor shall, if requested by the Engineer–in–charge, furnish proof to the satisfaction of the Engineer-in-charge, that the materials so comply with the specifications.

The contractor shall, at his own expense and without delay, supply samples of materials proposed to be used in the execution of the work for approval of the Engineer–in–charge, who may reject the materials not corresponding either in quality or character to the approved samples.

In the case of stores provided under Schedule „B‟ the Contractor shall bear the cost of loading, transporting to site, unloading, storing under cover as required assembling and jointing the several parts together as necessary and incorporating or fixing these stores materials in the work, including all preparatory work of whatever description as may be required, and of closing, preparing, loading and returning empty cases or containers to the place of issue without any extra charges.

9. Delay and Extension of Time:

if, in the opinion of Engineer–in–charge the work is delayed:

i) by reason of abnormally bad weather, OR

ii) by reason of serious loss or damage by fire, OR

iii) by reason of Civil commotion, local combination of workmen strike or lockout, affecting any of the trades employed on the work OR.

iv) by delay on the part of the agency or tradesman engaged by BHEL in executing work not forming part of this contract, OR

v) by reason of any other cause which in the absolute discretion of the Engineer–in–charge is (when he is the Accepting Officer of the Contract) beyond the Contractor‟s reasonable control, than in such case the Accepting Officer on the recommendation of the Engineer-in-charge (or higher authority) may make fair and reasonable extension in the completion dates of the individual items of work or the contract as a whole. Such extension which will be communicated to the Contractor by the Engineer–in–charge in writing shall be final and binding on the Contractor. No other claim in this respect for compensation or other–wise howsoever is admissible. Upon the happening of any such event causing delay, the Contractor shall immediately given notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavour to prevent or make good the delay and shall do all that may reasonably be required to the satisfaction of the Engineer–in–charge to proceed with the work.

10. Patent Rights:

The Contractor shall fully indemnify B.H.E.L or the agent, servant, or employee of B.H.E.L against any action, claim or proceeding relating to infringement or the use of any patent or design or any alleged patent or design rights, and shall pay any royalties which may be payable in respect of any article / or part there of included in the contract.

In the event of any claims being made or action brought against B.H.E.L or any agent, or servant or employee of BHEL in respect of matters aforesaid the Contractor shall immediately be notified thereof for taking necessary action provided that payment of indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by the BHEL but the Contractor shall pay any royalties payable in respect of any such use.

11. Octroi and Other Duties:

All charges on account of Octroi, Terminal or Sales Tax and/or other duties on material obtained for the work (excluding materials provided by B.H.E.L on payment) shall be borne by the contractor.

12. Royalties:

Royalties fixed from time to time as per prevalent local rules will be recovered for materials, which the Contractor may be allowed to remove from quarries situated on land which is in charge of the B.H.E.L authorities.

13. Plant and Equipment:

The Contractor, shall at his own expense, supply all tools, plant and equipment (here-in-after referred to as T & P) required for the execution of the contract other than those listed in Schedule „C" which subject to their availability may be hired by B.H.E.L., to the Contractor or issued free for use in the execution of the work as specified in Tender Documents.

14. Assignment or Transfer of Contract:

The Contractor shall not, without the prior written approval of the Accepting Officer, assign or transfer the Contract or any part thereof, or any share, or interest therein to any other person. No sum of money which may become payable under the Contract shall be payable to any person other than the Contractor unless the prior written approval of the Accepting Officer to the assignment or transfer of such money is given.

14. (a) Sub Contract:

The Contractor shall not sub–let any portion of the Contract without the prior written approval of the Accepting Officer.

15. Compliance to Regulations and Bye Laws:

The Contractor shall conform to the provision of any statute relating to the work and regulations and bye-laws of any local authority and of any water and lighting Companies or Undertakings with whose system the work is proposed to be connected. He shall, before making any variation from the drawings or the specifications that may be necessitated for such connections give the Engineer–

in– charge notice, specifying the variation proposed to be made and the reasons there for and shall not carry out any such variation until he has received instructions from the Engineer–in–charge in respect thereof. The contractor shall be bound to give all notice required by Statute Regulations or Bye-laws as aforesaid and to pay all fees, and taxes payable to any authority in respect thereof.

CHAPTER III

PERFORMANCE OF THE CONTRACT

16. Security Deposit

16.1 Security Deposit should be collected from the successful tenderer. The rate of Security Deposit will be as below:

Upto Rs. 10 lakh	10%
Above Rs. 10 lakh upto Rs.50 lakh	1 lakh + 7.5% of the amount Exceeding Rs.10 Lakh
Above Rs. 50 lakh	4 lakh + 5 % of the amount exceeding Rs.50 Lakh

At least 50% of the security Deposit should be furnished before start of the work by the contractor in the form of Demand Draft / Bank Guarantee.

Security Deposit may be furnished in any one of the following forms :-

i) Cash (as permissible under the Income Tax Act)
ii) Pay Order, Demand Draft in favour of BHEL.
iii) Local cheques of scheduled banks in the name of BHEL subject to realization.
iv) Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged).
v) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act subject to a maximum of 50% of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The Bank Guarantee format should have the approval of BHEL.
vi) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act . The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
vii) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and the balance 50% may be recovered from the running bills.
viii) EMD of the successful tenderer shall be converted and adjusted against the security deposit.
ix) The security deposit shall not carry any interest.

NOTE: Acceptance of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

All compensation or other sums of money payable by the Contractor to BHEL, under the terms of this Contract or under any other contract with BHEL, may be deducted from the Security Deposit or realized by the sale of the Securities or from the interest arising there from or from any sums which may be due or may become due to the Contractor payable by BHEL, on any account whatsoever against this Contract or any other Contract with BHEL, and in the event of his Security Deposit being reduced by reason of such deductions or sale as aforesaid, the Contractor shall, within seven days thereafter, make good in cash or in securities endorsed as aforesaid, any sum or sums by which the Security Deposit has been so reduced.

50% of the Security Deposit / may be refunded on completion of the work after payment of the final bill and the balance 50% of the Security Deposit is refundable only after the expiry of the maintenance period of Twelve (12) months from the date of completion of work as stipulated in the Contract concerned.

17. Order under the contract

All orders, notices etc., to be given under the contract shall be in writing typescript or printed and if sent by registered post to the address given in the tender of the contractor, shall be deemed to have been served on the date when in the ordinary course they would have been delivered to him.

The contractor shall carry out without delay all orders given to him.

18. Admission to site

The Contractor shall not enter on (other than for inspection purposes) or take possession of the site unless permitted to do so by the Engineer-in-charge. The portions of the Site to be occupied by the Contractor will be clearly defined and marked on the site plan, and the Contractor will on no account be allowed to extend his operations beyond these areas.

The Contractor shall provide, if necessary or required at the Site, temporary access there to and shall alter, modify and maintain the same as required from time to time. He shall take out and clear away the access route when no longer required and restoring the area to its original condition.

The Engineer-in-charge shall have power to execute other works (whether or not connected with the work in the contract agreement) on the site contemporaneously with the execution of the original work and Contractor shall give reasonable facilities for this purpose.

B.H.E.L reserves the right of taking over, at any time, any portion of the site which they may require and the Contractor shall at his own expense clear such portion forthwith. No photographs of the Site or of the work or any part there of shall be taken, published or otherwise circulated without the prior approval of the Engineer-in-charge.

No such approval shall however exempt the contractor from complying with any statutory provisions in regard to the taking and publication of such photographs.

B.H.E.L Officials connected with the Contract shall have the right of entry to the Site at all times.

Engineer - in charge shall have the power to exclude from the site any person whose admission there to may, in his opinion be undesirable for any reason whatsoever.

19. Contractor's Supervision

The Contractor shall either himself supervise the execution of the Contract or shall appoint a competent Agent approved by the Engineer–in–charge to act in his stead. The contractor shall employ an Engineer/Agent having at least a „Degree of Bachelor of Civil Engineering" from a recognized University/on any work with a Contract value exceeding rupees two lakhs, and having at least a Diploma in civil Engineering from a recognised college, on work with a contract value exceeding Rs. 50,000/- but not exceeding rupees two lakhs.

The Employment of an Engineer/Agent as aforesaid shall not be necessary if the Contractor himself in possession of a recognized technical qualification and is in opinion of the Engineer-in-charge capable of receiving instructions of the Engineer–in–charge and of executing the work to the satisfaction of the Engineer–in–charge. If the Contractor fails to appoint a suitable Engineer/ Agent as aforesaid, the Engineer–in–charge shall have full powers to suspend the execution of work and stop payment of any advances that may have become due until such date as a suitable Engineer/Agent is appointed and the contractor shall be held responsible for the delay caused to the work and no extension of time on this account shall be given to him as stipulated in condition (9) above.
Orders given to the Contractor"s Agent/Engineer shall be considered to have the same force as if they had been given to the Contractor himself.

The contractor or his Agent shall be in attendance at the site during all working hours and shall superintend the execution of work with such additional assistance in each trade as the Engineer–in - charge may consider necessary.

The contractor or his accredited agent shall attend when required and without making any claim for doing so, either the Office of the Engineer–in–charge or the work site to receive instructions.

The Engineer–in–charge shall have full powers, and without assigning any reason to require the Contractor immediately to cease to employ in connection with the Contract any Agent, servant or employee whose continued employment is, in his opinion undesirable.

The Contractor shall not be allowed any compensation on this account.

LABOUR

20. The Contractor shall employ labourer in sufficient numbers either directly or through sub-contractors to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Engineer-in-charge. The Contractor shall not employ in connection with the works any person who has not completed his fifteen years of age.

The Contractor shall furnish to the Engineer-in-charge at the intervals specified by him, a distribution return of the number and description by trades of the work people employed on the works. The Contractor shall also submit on the 4th and 19th of every month to the Engineer-in-charge a true statement showing in respect of the second half of the preceding month and the 1st half of the current month (i) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (ii) The number of female workers who have been allowed maternity benefit as provided in the Maternity Benefit Act, 1961 or Rules made thereunder and the amount paid to them.

The Contractor shall pay to labour employed by him either directly or through sub–contractors wages not less than fair wages as defined in the Contractor"s Labour Regulations.

The contractor shall in respect of labour employed by him either directly or through sub – contractors comply with or cause to be complied with Contractor"s Labour Regulations in regard to all matters provided therein.

The Contractor shall comply with the provisions of the Payment of Wages Act 1936, Minimum Wages Act 1948, Employers liability Act 1938, Workmen"s Compensation Act 1923, Industrial Disputes Act 1947, Maternity Benefit Act 1961 and Mines Act 1952, Contract Labour Regulation and Abolition Act 1970 or any modifications thereof, BOCW Act or any other law relating thereto and rules made thereunder from time to time.

The contractor shall be liable to pay his contribution and the employees" contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of " The Employees" State Insurance Act, 1948" as amended from time to time. In case the contractor fails to submit full details of his account of labour employed and the contribution payable, the Engineer–in–charge shall recover from the running bills of contractor an amount of contribution as assessed by him. The amount so recovered shall be adjusted against the actual contribution payable for Employees" State Insurance.

The Engineer–in–charge shall on a report having been made by an Inspecting Officer as defined in the Contractor"s labour Regulations have the power to deduct from the moneys due to the Contractor any sum required or estimated to be required for making good the loss suffered by the worker or worker by reason of non-fulfillment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deductions made from his or their wages which are not justified by the terms of the Contract or non-observance of the said Contractor"s Labour Regulations.

The Contractor shall indemnify the B.H.E.L against any payments to be made under and for observance of the Regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractors.

In the event of the Contractor committing a default or breach of any of the provisions of the aforesaid Contractor"s Labour Regulations, as amended from time to time or furnishing any information or submitting or filling any form / Register/Slip under the provisions of these Regulations

which is materially incorrect then on the report of the Inspecting Officers as defined in the Contractor"s Labour Regulation, the Contractor shall without prejudice to any other liability pay to the B.H.E.L a sum not exceeding Rs. 50/- as liquidated damages for every default breach or furnishing, making submitting, filling materially incorrect statement as may be fixed by the Engineer–in–charge and in the event of the Contractor"s default continuing in this respect, the liquidated damages may be enhanced to Rs. 50/- per day for each day of default subject to a maximum percent of the estimated cost of works put to tender.

The Engineer in charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the Welfare Fund constituted under Regulations. The decision of the Engineer-in-charge in this respect shall be final and binding.

Model Rules for Labour Welfare

The Contractor shall at his own expense comply with or cause to be complied with Model Rules for Labour welfare as appended to these Conditions or rules framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly/or indirectly on the works. In case the Contractor fails to make arrangements as aforesaid, the Engineer–in– charge shall be entitled to do so and recover the cost thereof from the Contractor.

Safety Code

The Contractor shall at his own expense arrange for the safety provisions as appended to these conditions or as required by the Engineer – in – charge, in respect of all labour directly or indirectly employed for performance of the works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer– in–charge shall be entitled to do so and recover the cost thereof from the Contractor.

Failure to comply with model Rules for Labour Welfare, Safety Code, or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the Contractor liable to pay to the B.H.E.L as liquidated damages an amount not exceeding Rs. 50/- for each default or materially incorrect statement. The decision of the Engineer–in–charge in such matters based on reports from the Inspecting Officers as defined in the Contractor"s Labour Regulation as appended to these conditions shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.

WATER

21. The Contractor shall allow in his Tender and provide at his cost all water required for the work or his employees on the work, together with all pipes and fittings or other means that may be necessary or required to ensure a proper and ample supply of water for all purposes connected with the work.

    Water will not be supplied from the BHEL supply system, or other sources at one point fixed by the Engineer-in-charge on the site of work at free of cost. The Contractor shall make his own necessary arrangement for water supply, lifting pumping, carrying or conveying the water as required at his own cost.

22. Temporary Workshops, Stores Etc.

The Contractor shall, during the progress of the work provide, erect and maintain at his own expense all necessary temporary workshops, stores, offices, etc., required for the proper and efficient execution of the work. The planning, siting and erection of these buildings shall have the approval of the Engineer-in-charge and the Contractor shall at all times keep them tidy and in a clean and sanitary condition to the entire satisfaction of the Engineer-in-charge.

On completion of the work all such temporary buildings shall be cleared away and the site restored and left in a clean and tidy condition to the entire satisfaction of the Engineer-in-charge.

23. Stores and Materials on Site

All stores and materials required for the work are to be deposited by the Contractor only in places to be indicated by the Engineer-in-charge.

Where in accordance with the contract stipulations certain Stores & Materials (for incorporation in the work) are to be issued to the Contractor by the BHEL as detailed under Schedule "B" **such items will be so issued only to the extent required for the actual completion of the work** as stipulated in the contract. The decision of the Engineer-in-charge regarding the quantities to be issued as above shall be final and binding on the contractor. For any excess quantities consumed on the work upto 5% over the theoretical consumption will be charged at issue rates and excess consumption beyond this limit, their cost will be recovered from the Contractor at punitive rates which will be 100% (Hundred Percent) more than the issue rates of the BHEL as specified in the Instructions to the Tenderers.

In regard to the materials and stores which may be issued to the Contractor by BHEL the Contractor shall give the Engineer-in-charge reasonable notice in writing of his requirements of such stores and materials and on the approval of his demand being notified to him, he shall make immediate arrangements for drawing the same. Such stores and materials shall be transported by the Contractor at his own expense direct from the place of issue to the site of the work, unless prior written approval is obtained from the Engineer-in-charge to take them to a Store or Workshop elsewhere.

The Contractor shall have to build a weather proof shed for the storage of cement required for 15 days consumption of the work.

BHEL Officers connected with the Contract shall have the power at any time to inspect and examine any stores or materials intended to be used in or on the work, whether on the site or at any factory or workshop or other place where such stores or materials are being fabricated or manufactured or at any place where the same are lying and the contractor shall give necessary facilities for such inspection and examination.

The Engineer-in-charge shall be entitled to have tests made of any stores or materials supplied by the Contractor who shall provide at his own expense all facilities which the Engineer-in-charge may require for this purpose. If at the discretion of the Engineer-in-charge an independent expert is employed to make any such tests his charges shall be borne by the Contractor only if the test discloses that the said stores or materials are not in accordance with the provisions of the Contract.

Should the Engineer-in-charge consider at any time during the construction or re-construction, on prior to the expiry of the “MAINTENANCE PERIOD” that the stores or materials provided by the Contractor are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract (in respect whereof the decision of the Engineer-in-charge shall be final and conclusive) the Contractor, shall on demand, in writing from the Engineer-in-charge specifying the Stores or materials complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith remove the stores or materials so specified and provide other proper and suitable stores or materials at his own expense; to the entire satisfaction of the Engineer-in-charge and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid the Engineer-in-charge may replace within others the stores or materials complained of at the risk and expense in all respects of the Contractor. The liability of the contractor under this condition shall not extend beyond the maintenance period aforesaid except as regards stores or materials which the Engineer-in-charge shall have previously given notice to the contractor to replace.

All stores and materials brought to the Site shall become and remain the property of B.H.E.L and shall not be removed from the site without prior written approval of the Engineer-in-charge. However, when the work is finally completed, the Contractor shall at his own expense forthwith remove from the site all surplus stores or materials originally supplied by him and upon such removal, the same shall revert in and become the property of Contractor. All B.H.E.L Stores and materials issued to Contractor for in-corporation or fixing in the work and which, making due allowance for reasonable wear and tear/or waste, have not on completion of the work been so incorporated or fixed, shall be returned by the Contractor at his own expense to the place of issue.

Credit for surplus stores and/ or materials returned by the contractor to B.H.E.L will be given to him at a price based on the prevailing market rate but not exceeding that at which the said stores and materials were originally issued to him but due consideration shall be given to the allowance claimed by B.H.E.L in respect or any depreciation or damage suffered by the stores and/or materials whilst in the custody of the Contractor regarding which the decision of Engineer-in-charge shall be final and conclusive.

If, in the opinion of the Engineer-in-charge (which shall be final and conclusive) any stores, supplied by B.H.E.L have either during currency of the work or after completion of the work whilst under the custody of the Contractor, become damaged to such an extent that they cannot be usefully utilized, either in the same work or in other works, the Engineer-in-charge shall not accept the stores and in the event of his rejection the contractor shall be charged for the said Stores at a rate as fixed by the Accepting Officer. The Contractor shall not be entitled to any claim whatsoever on this account.

24 Tools and Plants on site:

All tools, plants and equipment brought to the site shall become the property of B.H.E.L and shall not be removed from the site without the prior written approval of the Engineer-in-charge when the work is finally completed or the Contract is determined for reasons other than the default of the Contractor he shall forthwith remove from the site all tools, plants, equipments etc., (other than those as may have been provided by B.H.E.L) and upon such removal, the same shall in, and become the property of the Contractor.

25. Statement of Hire Charges:

A monthly detailed statement of the hire charge incurred in respect of B.H.E.L tools, plants, equipments etc., shall be given to the Contractor by the Engineer-in-charge.

26. Precaution Against risks:

The Contractor shall be responsible for providing at his own expense, for all precautions to prevent loss or damage from any and all risks and to minimize the amount of any such loss or damage and for the necessary steps to be taken for the said purpose until the works have been handed over complete in all respect of the Engineer-in-charge.

The Contractor shall provide all watchmen necessary for the protection of the site, the work, the materials, tools, plants, equipments and anything else lying on the Site during the progress of the work. He shall be solely responsible for and shall take all reasonable and proper steps for protecting, securing, lighting and watching, all places on or about the work and the Site which may be dangerous to any person whomsoever.

27. Notices and Fees:

The Contractor shall give all notices required by any Statutory provision or by the regulations and/or bylaws of any local Authority and/or of any Public Service, Company or Authority affected by the work or with whose system the same are or will be connected. The Contractor shall pay and indemnify B.H.E.L against any fees and charges payable under such Acts. Regulation and/or byelaws in respect of the work and shall make and supply all drawings and plans required in connection with any such notice.

28. Setting out of the Works and Protective and Maintaining Signals and Works:

The Engineer-in-charge shall supply dimensioned drawings, levels and other information necessary to enable the contractor to set out the work. The Contractor shall at his own expense set accurately according to the drawings and figured dimension thereon, all the work comprised in the contract and any extras or additions there-to and shall be solely responsible for their being so set out and executed. All bench marks, pegs, signals on the surface, alignment stones, milestones and all similar marks whether put in by B.H.E.L Authorities for the purpose of checking the Contractor"s

work or in the nature of permanent survey marks will during the tenure of the contract, be under the care of the Contractor who shall, at his own expense, take,all proper and reasonable precautions and care to preserve and maintain them in their true position. In the event of these marks being disturbed or obliterated by accident or due to any other cause whatsoever, the same may, if deemed necessary, be replaced by the Engineer-in-charge at the Contractor"s expense and the cost thereof deducted from any money then or thereafter becoming due to the Contractor.

Where requested by the Contractor, the level marks, center line and chainage pegs corresponding to those shown on the Drawing will be pointed out to the Contractor on the ground but all bench marks or chainage pegs additional to those shown on the Drawing will be set out by BHEL authorities.

29. Site Drainage:

All water that may accumulate on the site during the progress of the work or in trenches and excavations shall be removed to the entire satisfaction of the Engineer-in-charge and at Contractor"s expense.

30. Excavations, Relics Etc.

Material of any kind obtained from excavation on the site shall remain the property of BHEL and shall be disposed off as Engineer-in-Charge directs.

All gold, silver, oil and other minerals of any description and all precious stones, coins, treasures, relics, antiques and other similar items which may be found in or upon the site shall be the property of Bharat Heavy Electricals Limited and the Contractor shall duly preserve the same to the satisfaction of the BHEL and shall from time to time deliver the same to such person or persons as the B.H.E.L may appoint to receive the same.

31. Foundations

The Contractor shall not lay any foundations until the excavations for the same have been examined and approved in writing by the Engineer-in-charge.

32. Covering-in Work

The Contractor shall give reasonable notice in writing to the Engineer-in-charge whenever any work is to be permanently covered up or concealed, whether by earth or other means so that it can finally be inspected or measured if necessary. In default of so doing, the Contractor shall, if required by the Engineer-in-charge uncover such work at his own expense.

33. Approval of works by Stages:

All work embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice in writing to the Engineer-in-charge when each stage is ready. In default of such notice being received, the Engineer-in-charge shall be entitled to approve the quality and extent thereof at any time he may choose and in the event of any dispute, the decision of the Engineer-in-charge thereon shall be final and conclusive.

34. Execution of the Work:

The work shall be executed in a workman-like manner and to the satisfaction in all respects of the Engineer-in-charge.

The Engineer-in-charge will communicate or confirm his instructions to the Contractor in respect of the execution of the Work in a "Work Site Order Book" maintained at his office and the Contractor shall visit this office daily and shall confirm receipt of such instructions by signing the relevant entries in this book. Such entries will rank as order or notices in writing within the intent and meaning of these conditions.

35. Day Work:

No day-work shall be performed without the prior written instructions of the Accepting Officer.

The Contractor shall give to the Engineer-in-charge reasonable notice of the start of any work ordered to be executed by day-work and shall deliver to the Engineer-in-charge within two days of the end of each pay week a return in duplicate giving full detailed accounts of labour and materials for that pay-week. One copy of each of these returns, if found correct, will be certified by the Engineer-in-charge and returned to the contractor and must be produced at the time of adjustment of accounts.

An invoice in duplicate signed by the Contractor or his agent shall be sent with each delivery of materials for day-work and the Contractor will be furnished with a receipt signed by the Engineer-in-charge specifying the description, quantities weight or measurement (as the case may be) of the articles approved, reference will be made in this receipt in the return aforesaid and the Contractor"s Bill.

In the case of Lumpsum Contracts, the rates to be charged and the percentage addition for profit and establishment charges, etc., will be agreed upon between the Accepting Officer and the Contractor prior to the execution of the work.

36. Inspection of the Work:

B.H.E.L Officers concerned with the Contract shall have power at any time to inspect and examine any part of the work and the Contractor shall give such facilities as may be required to be given for such inspection and examination Should Engineer-in-charge consider, at any time during the expiry of the maintenance period, that any work has been executed with unsound, imperfect or unskilled workmanship or of a quality inferior to that contracted for or not otherwise in accordance with the contract (in respect) whereof the decision of the Engineer-in-charge shall be final and conclusive the Contractor shall on demand in writing from the Engineer-in-charge specifying the fault notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part as the case may be required at his own expense to the entire satisfaction of the Engineer-in-charge and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand as aforesaid, the Engineer-in-charge may carry out the work by other means at the risk and expense in all respects of the Contractor. However, the liability of the Contractor under this condition shall not extend beyond the maintenance period except as regards workmanship which the Engineer-in-charge shall have previously given notice to the Contractor to rectify.

37. Responsibility for Building:

In the event of any building or part of any building being handed over to the Contractor for the execution of work thereto under the provisions of the Contract, he shall give a written receipt for all fixtures, glass etc. and he shall be required to make good at his own expense all damages resulting from any cause whatsoever while in his charge and on completion of the work to deliver the said building or part thereof in a clean state complete in every particular to the entire satisfaction of the Engineer-in-charge.

38. Insurance

The contractor shall within one month after the date of the acceptance of the contract, insure the work against loss or damage to the contract works, temporary work and materials erected in performance of the contract on "all risks" basis from the time of arrival on site until taken over by BHEL on completion of the contract.

The cover shall also include wherever necessary the risks of testing including breakdown or explosion of plant and machinery undergoing testing, trail and commissioning operations. The insurance shall also specifically cover removal of debris cost. The sum insured shall represent the estimated full value of the contract works inclusive of value of free supply materials by BHEL, transport charges, customs dues, express freight, overtime charges, cost of erection, value of constructional plants and machinery, removal of debris and escalation of costs where the contract includes a maintenance period, the insurance cover shall specifically include the contractors" liabilities during the maintenance period. The insurance shall also be extended to cover third party personal injury and property damage for a sum to be specified by BHEL. The insurance shall be effected in the name of BHEL and the contractor shall submit to BHEL a draft of the insurance policy for approval. The policy when issued will be lodged with BHEL together with receipts of premium for such insurance and the contractor shall maintain such policies in force until the obligations of the contractor are fully discharged.

If the contractor fails to comply with the terms of this condition the Accepting officer may insure the work and may deduct the amount of premiums from any money that may become payable to the contractor or may at his discretion refuse payment of any advances to the contractor until the contractor shall have complied with the terms of this condition. This provision does not, however, absolve the contractor of his responsibility for taking up the insurance. The contractor is, therefore, primarily responsible for taking up the insurance in time.

39. Damage and loss to private property and injury to workmen

The contractor shall at his own expense reinstate and make good to the satisfaction of the Engineer–in-charge and pay compensation for any injury, loss or damage occasioned to any property or rights whatever including property and rights of **B.H.E.L**, (or agents, servants or employees of **B.H.E.L**) the injury loss or damage arising out of or in anyway in connection with the execution or purported execution of the contract and further the contractor shall indemnify B.H.E.L, against all claims enforceable against B.H.E.L, or any agent, servant, or employee of B.H.E.L a private person, in respect of any such injury (including injury resulting in death loss or damage to any person) whosoever or property, including all claims which may arise under the workmen"s Compensation Act or otherwise, or which would be enforceable against B.H.E.L.

40. Completion

The works shall be completed to the entire satisfaction of the Engineer-in-charge and in accordance with the Contractor"s forecast of Time and Progress where operative, and all unused stores and materials, tools, plants, equipments, temporary buildings and things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of the Engineer-in-charge at the Contractor"s expense and/or before the Scheduled date of completion.

The B.H.E.L shall have power to take over from the Contractor from time to time each sections of the work as have been completed to the satisfaction of the Engineer-in-charge.

In case the Contractor fails to remove any of his properties, assets or fails to clear the rubbish and waste materials within 30 days of the completion of the contract, it is lawful for the contractee, that is BHEL to take such action as it deems fit to clear dispose of such properties, assets or such waste materials and charge the contractor any expenses incurred thereon.

The Engineer-in-charge shall certify to the Contractor the date on which the work is completed and the state thereof.

The Engineer-in-charge shall also certify to the Contractor the state of the work at the end of maintenance period, where applicable.

41. Compensation for Delay:

If the contractor fails to maintain the required progress in terms of condition 7 or to complete the work and clear the site on or before the contracted or extended period of completion, he shall, without prejudice to any other right or remedy of the B.H.E.L on account of such breach, pay as agreed compensation an amount calculated as stipulated below or such smaller amount as may be

fixed by the BHEL on the contract value of the work for every week that the progress remains below that specified in condition 7 or that the work remains incomplete.

This will also apply to items or group of items for which separate period of completion has been specified.

For this purpose the term „Contract Value" shall be the value at contract rates of the work as ordered.

a. Completion period (as originally-stipulated) -- at 1 percent per week.
Not exceeding 6 months.

b. Completion period (as originally-stipulated) -- at ½ percent per week
Exceeding 6 months and not exceeding 2 years.

c. Completion period (as originally-stipulated) -- at¼ percent per week
Exceeding 2 years.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed the under noted percentage of the contract value or of the contract value of the item or group of items of work for which a separate period of completion is given:

a.	Completion period (as originally-stipulated) Not exceeding 6 months.	--	10 percent.
b.	Completion period (as originally-stipulated) Exceeding 6 months and not exceeding 2 years.	--	7½ percent.
c.	Completion period (as original-stipulated) Exceeding 2 years	--	5 percent.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the B.H.E.L.

42. Laws Governing the Contract:

This contract shall be governed by the Indian Laws for the time being inforce.

43. Cancellation of Contract for Corrupt Acts:

The Accepting Officer, whose decision shall be final and conclusive, shall, without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to Bharat Heavy Electricals Limited, cancel the contract in any of the following cases and the Contractor shall be liable to make payment to B.H.E.L for any loss or damage resulting from any such cancellation for default.

If the Contractor shall:

a. Offer or give or agree to give to any person in BHEL service any gift or consideration of any kind as an inducement or reward for doing or for bearing to do or for having done or forborne to do a day act in relation to the obtaining or execution of this or any other contract for BHEL service **OR**

b. Enter into a contract with B.H.E.L in connection with which commission has been paid or agreed to be paid by him or with his knowledge, unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to the Accepting Officer, **OR**

c. Obtain a contract with B.H.E.L as a result of ring tendering or by non-bonafide methods of competitive tendering without first disclosing the fact in writing to the Accepting Officer.

44. Cancellation of Contract for Insolvency, Assignment or Transfer or Sub-Letting of Contract:

The Accepting Officer, without prejudice to any other right or remedy which shall accrue thereafter to B.H.E.L shall cancel the contract in any of the following cases:

If the Contractor,

a) Being an individual, or if a firm any partner thereof shall at any time be adjudged bankrupt or have a receiving order or orders for administration of his Estate made against him or shall take any proceedings, for liquidation or composition under any Bankruptcy Act for the time being in force or make any conveyance or assignment of his effects of composition or arrangement for the benefit of his creditor or purport to do so, or if any application be made under any Bankruptcy Act for the time being in force for the sequestration of his Estate or if a trust deed be granted by him on behalf of his creditors, OR

b) Being a Company, shall pass a resolution or the Court shall make an order for the liquidation of its affairs, or a Receiver or Manager on behalf of the debentures holders shall be appointed or circumstances shall arise which entitle the court or debentures holders to appoint a Receiver or Manager **OR.**

c) Assigns, transfers, sub-lets or attempts to assign, transfer or sub-let any portion of the work without the prior written approval of the Accepting Officer. **OR**

d) Shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

Whenever the Accepting Officer exercises his authority to cancel the Contract under this condition, he may complete the work by any means at the Contractor"s risk and expense provided always that in the event of cost of the completion (as certified by Engineer-in-charge which is final and conclusive) being less than the contract cost, the advantage shall accrue to the BHEL and that if the cost of completion exceeds the money due to the Contractor under the contract, the Contractor shall either pay the excess amount ordered by the Engineer-in-charge or the same shall be recovered from the Contractor by other means.

Engineer-in-charge will have powers to take possessions of the site and any materials, constructional plant, implements, stores, etc, thereon and or carryout the work by any means at the risk and cost of the contractor.

In case the BHEL completes the work under the provisions of this condition the cost of such completion to be taken into account in determining the excess cost to be charged to the contractor under this Condition shall consist of the cost of materials purchased and/or labour provided by the BHEL with an addition of such percentage to cover superintendence and establishment charges as may be decided by the Project Manager/Project Engineer whose decision shall be final and conclusive.

If the contractor fails to pay the excess sum within a period of 30 days, the Engineer-in-charge shall have the right to sell any or all of the contractor"s unused materials, constructional plant implements, temporary buildings, etc., and apply the proceeds of sale thereof towards the satisfaction of any sum due from the contractor under the contract and if thereafter be any balance outstanding from the contractor, it shall be recovered in accordance with the provisions of the contract.

45. Cancellation of contract in part or in full for contractor's default:

If the Contractor:

(a) makes default in commencing the work within a reasonable time from the date of handing over of the site and continue in that state after a reasonable notice from Engineer-in-charge, OR

(b) in the opinion of the Engineer-in-charge at any time, whether before or after the date or extended date for completion, makes default in proceeding with the work, with due diligence and continue in that state after a notice of seven days from Engineer-in-charge, OR

(c) fails to comply with any of the terms and conditions of the contract or after 7 days notice in writing with orders properly issued there under, (OR)

(d) fails to complete the work order and items of work individual dates for completion and clear the site on or before the date of completion or fails to achieve the progress as set out under clauses 7 of these General Conditions of Contract.

The Accepting Officer may, without prejudice to any other right or remedy which shall have accrued or shall accrue there after to B.H.E.L cancel the contract as a whole or in part thereof or only such work order or items of work in default from the contract. Whenever the Accepting Officer exercises his authority to cancel the contract as a whole or in part under this conditions he may complete the work at the Contractor"s risk and cost, provided always that in the event of the cost of completion (as certified by Engineer-in-charge which is final and conclusive) being less than the contract cost the advantage shall accrue to the B.H.E.L if the cost of completion exceeds, the money due to the contractor under this contract, the contractor shall either pay the excess amount ordered by Project Manager or the same shall be recovered from the contractor by other means. Engineer-in-charge will have power to take possession of the site and any materials, constructional plant, implements, Stores, etc., thereon.

In case the B.H.E.L completes the work or any part thereof under the provisions of this conditions the cost of such completion to be taken in to account in determining the excess cost to be charged to the contractor under this conditions shall consists of the cost of materials purchased and/or labour provided by the B.H.E.L with an addition of such percentage to cover superintendence and establishment charges as
may be decided by the Project Manager/Engineer whose decision shall be final and conclusive.

If the contractor fails to pay the excess sum within a period of 30 days, the Engineer-in-charge shall have the right to sell any or all of the contractor"s unused materials, constructional plant implements, temporary buildings, etc, and apply the proceeds of sale thereof towards the satisfaction of any sum due from the contractor under the contract and if thereafter be any balance outstanding from the contractor it shall be recovered in accordance with the provision of the contract.

46. Termination of Contract for Death

Without prejudice to any of the rights or remedies under this contract if the contractor dies, the accepting Officer shall have the opinion of terminating the contract without compensation to the contractor.

47. Special Powers of Determination

If at any time after the acceptance of the tender B.H.E.L shall for any reason whatsoever not require the whole or any part of the work, to be carried out the project Manager/Engineer shall give notice in writing of the fact to the Contractor who shall have no claim to any payment of compensation or otherwise howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of the foreclosing of the work.

He shall be paid at Contract rates, for the full amount of the work executed including such additional works, e.g. clearing of site, etc., as may be rendered necessary by the said fore closing. He shall also be allowed a reasonable payment (as decided by the Accepting Officer) for any expenses sustained on account of labour and materials collected but which could not be utilised on the work, as verified by the Engineer-in-charge. Neither shall the Contractor have any claim for compensation on account of any alterations having been made in the original specifications, drawings, designs and instructions, involving any curtailment of the work as originally contemplated.

48. Fair Wage

a) The contractor shall pay not less than the " Fair Wage" to labourers engaged by him on the work.

"Fair Wage" means wage whether for time or piece work notified at the time of inviting tenders for the work and where such wages have not been notified the wages prescribed by the Project Manager/Engineer for the stations at which the work is done.

b) The Contractor shall not with standing the provision of any contract to the contrary, cause to be paid a “Fair Wage” to labourers indirectly engaged on the work, including any labour engaged by the Sub-Contractors in connection with the said work, as if the labourers had been directly employed by him.

c) In respect of labourers directly or indirectly employed on the work for the performance of the Contractors part of this Agreement, the Contractor shall comply with or cause to be complied with B.H.E.L Contractor‟s Labour Regulations (appended here to as Annexure „A‟ to these conditions) in regard to payment of wages, wage period deduction from wages, recovery of wages not paid and deductions unauthorisedly made, maintenance of wage book, wage-slips publication of scale of wage and other terms of employment inspection and submission of periodical returns and all other matters of alike nature.

d) The Engineer-in-charge concerned shall have the right to deduct from the money due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers non-payment of wages or of deductions made from his or their wages which are not justified by the terms of the contract or non-observance of the regulations.

e) The Contractor shall be liable primarily for all payments to be made under the contract and for the observance of the Regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractors.

d) The regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this Contract.

CHAPTER IV

VALUATION AND PAYMENT

49. Records and Measurements:

All items having a financial value shall be entered in the B.H.E.L Measurement Book so that a complete record is obtained of all works performed under the Contract.

Buildings, etc., priced in Schedule „A" as a unit lumpsum will be entered by number at the unit lumpsum.

Work carried out for agreed lumpsum will be described and similarly recorded.

Lumpsum omissions will be entered for deduction. Measurement shall be restricted to that required to ascertain the financial liability of B.H.E.L under the contract.

Work which fails to be measured in detail shall be measured physically, without reference to any local custom that may obtain excepting where it may otherwise be directed in the tender documents. The measurements shall be taken jointly by any person duly authorized on the part of the BHEL and by the Contractor.

The Engineer-in-charge shall give reasonable notice in writing to the Contractor of appointment for measurement.

The Contractor shall, without extra charge, provide assistance with appliance and other things necessary for measurement.

The Contractor shall bear all the cost of measurement of his work.

Measurement shall be entered in the B.H.E.L Measurement Book and signed and dated by both parties each day at the Site on completion of measurement. If the Contractor objects to any of the measurements recorded on behalf of the B.H.E.L a note to that effect will be made in the BHEL Measurement Book or against the item or items objected to; and such note shall be signed and dated by both the parties engaged in taking the measurement.

If, as a result of such objection, it becomes necessary to re-measure the work wholly or in part, the expense of such re- measurement shall be borne by the party requiring the measurement.

Measurement to be re-taken, provided that a net error is found by this remeasurement to amount to less than 5% (five percent) of the value as recorded by the first measurement. But, where the net errors amount to 5% and over of the said value, then the cost is to be borne by the other party. In any case, if the net value of errors found exceeds Rs. 500/- the expense of re-measurement is to be borne by the other party. If the Contractor"s representative fails to attend when required, the Engineer-in-charge shall have power to proceed by himself to take measurement and in that case these measurements shall be accepted by the Contractor as final.

The contractor shall, once every month, submit to the Engineer-in-charge with a copy to the Civil Manager/Senior Engineer details of his claims for the work done by him up to and including the previous month which are not covered by his Contract Agreement in any of the following respects;

a. Deviation from the items and Specifications provided in the contract documents.
b. Extra Items/New Items of work
c. Quantities in excess of those provided in the contract schedule.
d. Items in respect of which rates have not been settled. He should, in addition furnish a clear certificate to the effect that the claims submitted by him as aforesaid cover all his claim and that no further claims shall be raised by him in respect of the work done up to and including the period under report.

Except where any general or detailed description of the work in quantities expressly shows to the contrary, schedule of quantities shall be deemed to have been prepared and measurements shall be taken in accordance with

the procedure set forth in the schedule of rates specification notwithstanding any provision in the relevant standard method of measurement or any general or local custom. In the case of items which are not covered by the schedule of rates / specification, measurements shall be taken in accordance with relevant standard method of measurement issued by the Indian Standard Institution or as per standard engineering practice.

50. Valuation of Deviations:

Rates for deviated items of work will be fixed as follows:-

1. For any item of work required to be carried out after the contract has been awarded and which is not covered by Contractor"s Schedule but is covered by B.H.E.L Schedule of rates the rate payable for such a fresh item will be derived from B.H.E.L Schedule by the method of proportion as follows:

a. In the same proportion to rate in B.H.E.L Schedule of Rates as the tendered rate for the nearest analogous item of work in Contractor"s schedule bears to rate for the particular analogous item of work in B.H.E.L Schedule of rates.

b. If a single appropriate analogous item of work is not available in both Schedule (Contractor"s and B.H.E.L Schedule) then the method of proportion will be applied to the nearest analogous group of items available in both the Schedules referred to i.e. in the same proportion as the total tendered cost of that particular group of items (the sum of the products of the tendered rates and the quantities for which orders are placed bears to the total cost of the same items and quantities at the B.H.E.L Schedule of Rates.

c. If even an appropriate analogous group of items is not available in Contractor"s Schedule and B.H.E.L Schedule, then the methods of proportion will be applied to all those items of the whole work, which are available in both the Schedules and for which orders have been placed on the contractor, i.e., in the same proportion as the total cost of all these items of work (the sum of the products of the tendered rates and the quantities for which orders are placed) bears to the total cost of the same items and qualities at the B.H.E.L Schedule of Rates.

II. If any work not covered by any of the foregoing is ordered on the Contractor, the basis of payment shall be decided by the Accepting Officer whose decision shall be final and conclusive and binding on the parties.

The selection of analogous items or analogous group of items referred to above shall be done by the Engineer-in-charge. Where the rates for deviated items or new items of work can be derived by the selection of different analogous items or analogous group of items, the lowest of all such derived rates shall be taken as the correct rate.

In the case of the contracts for which the Engineer-in-charge is the Accepting Officer, all disputes regarding the settlement of rates of deviated or new items or work shall be referred to the Deputy Manager/Manager whose decision shall be final and conclusive as the case may be.

51. Reimbursement / Refund on Variation in Price, Materials:

If after submission of the tender and/or during the progress of the works, the price of any material (not being a material supplied from the B.H.E.L store in accordance with the Conditions of the Contract) is increased or decreased by an Act of Legislature (Central or State) and/or any notification there under or on account of new duties or levies such as octroi or on account of increase or decrease in such duties affecting the price of materials required for incorporation in the works and made from materials of

which the price has increased or decreased as aforesaid and the Contractor has thereupon to pay in respect of such material or item a price which is higher or lower than the price of that material or item as prevailing immediately before the passing of such Act or levying, increasing/ decreasing of such duty, the B.H.E.L shall incase of increase in price or the duty reimbursed to the contractor and incase of decrease in price, the B.H.E.L shall be entitled to a refund of the reduction price or the reduction in duty. Provided, however no reimbursement or refund shall be made if the increase/decrease is not more than 10% of the said price, and if so, the reimbursement or refund shall be made only on the excess over 10% provided always that any such increase shall not be payable if, in the opinion of the Deputy Manager/Manager (whose decision shall be final and conclusive) the increase is attributable to the delay in the execution of the contract within the control of the contractor or that any such increase has become operative after the contracted/or extended date of completion of the work or items of work in question.

The Contractor shall, for the purpose of this condition, keep such books of account and other documents as are necessary to show the amount of any increase claimed or any reduction available and shall allow inspection of the same by any duly authorized representative of the B.H.E.L and further shall at the request of the Engineer-in-charge furnish for verification such other information of the Engineer-in-charge may require.

The Contractor shall within a reasonable time of his becoming, aware of any alteration in the prices of any such materials, give notice thereof in writing to the Engineer-in-charge stating that the rate is submitted in pursuance to this condition together with all information relating thereto which he may be in a position to supply.

52. Advances on Account:

No payment shall be made for work estimated to cost less than Rupees **FIVE THOUSAND** till the whole of the work shall have been completed and a certificate of completion given by the Competent Authority.

In the case of work estimated to cost more than Rupees **FIVE THOUSAND** the contractor may at intervals of not less than one month or as otherwise provided for in the Contract Documents, counting from the date on which order to commence work is given by Engineer-in-charge submit claims on B.H.E.L forms for payment of advances on account of work done and of materials delivered in connection with the Contract.

The contractor shall be paid in respect of such claims to the extent approved and passed by the Engineer-in-charge subject a maximum of 90% of the value of the work actually executed to the satisfaction of the Engineer-in-charge. The certificate of the Engineer-in-charge regarding such approval and passing of the sums so payable shall be final and conclusive against the Contractor.

> "After the full amount of Security Deposit is made up through the 10% deduction from On account" bills, 100% payment of all subsequent bills may be made to the Contractor.

The Contractor may also be paid during the progress of the work 75% of the value of any materials which are in the opinion of the Engineer-in-charge in accordance with the Contract, and are actually required for incorporation in the work and which have reasonably been brought to the site in connection therewith and are adequately stored and / or protected against damage by weather or other causes, but which have not at the time of payment of the advance been incorporated in the work on furnishing a formal hypothecation deed. Payment of such advances, however, shall be purely at the discretion of the Deputy Manager/Senior Engineer provided always that payments shall not be made under these periodical certificates in respect of perishable materials like lime, cement, timber, sand, kankar, etc., Any sums/due from the Contractor on account of Tools and Plant, Stores or any other items provided by B.H.E.L shall be deducted from the respective advances, the Engineer-in-charge shall from time to time certify the sums payable to the contractor after retaining the reserves.

Any certificate relating to work done or materials delivered may be modified or corrected by any subsequent interim certificate or by the final certificate and no certificate of the Engineer-in-charge supporting an advance payment shall itself be conclusive evidence that any work or materials to which it relates are in accordance with the contract. All such intermediate payments shall be regarded as advances against the final payment only and shall not be considered as an admission

of the due performance of the contract or any part there of in any respect or the accruing of any claim whatsoever.

Such intermediate payment shall not conclude, determine or affect in any way the powers of the Engineer-in-charge as to the final settlement and adjustment of the accounts or otherwise, or in any way vary or affect the contract.

53. Final Bill

As soon as possible after the completion of the work to the satisfaction of the Engineer-in-charge, the contractor shall forward a certified final account on BHEL form, in duplicate.

It shall be accompanied by all abstracts, vouchers etc., in support thereof and shall be prepared in the manner prescribed by the Engineer-in-charge.

No claims will be entertained after the receipt of the final bill.

The Contractor shall be entitled to be paid the final sum less the value of payments already made on account subject to certification of the final bill by the Engineer-in-charge. Any sums due from the contractor on account of Tools & Plant, Stores or any other items provided by BHEL not yet recovered from the contractor shall be deducted from the final sum aforesaid.

No charge shall be allowed to the Contractor on account of the preparation of the final bill.

54. Payment of Bills

All payment to be made to the Contractor under this contract shall be by "~~Crossed Cheque" marked "A/C payee or~~ Electronic Fund Transfer / RTGS only (Within a reasonable time after the Certification by the Engineer-in-charge).

55. Recovery from Contractor:

Whenever under the contract any sum of money shall be recoverable from or payable by the contractor the same may be deducted from any sum then due or which at any time thereafter may become due to the Contractor under the contract or under any other Contract with BHEL or from his Security Deposit or he shall pay the claim on demand.

56. Post Technical Audit of Work and Bills:

BHEL reserves the right to carry out a post-payment audit and technical examination of the work and final bill including all supporting vouchers, abstracts etc., and to enforce recovery of any sums becoming due as a result thereof in the manner provided in the preceding sub-paragraphs provided however that no such recovery shall be enforced after three years of passing the final bill.

57. Refund of Security Deposit:

50% of the Security Deposit mentioned in condition 16 above, may be refunded to the contractor in respect of all contracts on completion of work and after payment of final bill and the balance 50% on expiry of the maintenance period, (described under clause 23) provided the contractor shall have rendered a "No-Demand" Certificate. In case of works where maintenance period is not involved 100% of the Security Deposit may be refunded after payment of final bill provided that the contractor shall have rendered a "No-Demand Certificate".

58. Arbitration:

Except where otherwise provided for in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the work or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the Executive Director / General Manager of BHEL and if ED is unable or unwilling to act, to the sole arbitration of some other person appointed by the ED / General Manager, willing to act as such arbitrator. The cases referred to arbitration shall be other than those for which the decision of the Manager / Senior Engineer / Engineer-in-charge is expressed in the contract to be final and conclusive. There will be no objection if the arbitrator so appointed is an employee of B.H.E.L and that he had to deal with the matters to which the contract relates and that in the course of his duties as such he had expressed views on all or any of the matters in dispute or difference.

The arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, such Executive Director / General Manager as aforesaid at the time of such transfer, vacation of office or inability to act, shall appoint another person to act as arbitrator in accordance with the terms of the contract. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

Subject as aforesaid the provision of the Arbitration & Reconciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is a term of the contract that the party involving arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute.

The arbitrator(s) may from time to time with consent of the parties enlarge the time for making and publishing the award.

The work under the Contract shall, if reasonably possible, continue, during the arbitration proceedings and no payment due or payable, to the Contractor shall be withheld on account of such proceeding.

The Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the Parties fixing the date of first hearings.

The arbitrator shall give a separate award in respect of each dispute or difference referred to him.

The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion.

The award of the arbitrator shall be final, conclusive and binding on all parties to this contract.

In the event of disputes or differences arising between one public sector enterprise and a Govt. Department or between two public sector enterprises the above stipulations shall not apply the provisions of BPE office memorandum No. BPE/CL 001/ 76MAN / 2 (1.10) 75-BPE (GM-1) dated 1stJanuary 1976 or its amendments for arbitration shall be applicable.

ANNEXURE 'A'

B.H.E.L CONTRACTOR'S LABOUR REGLUATIONS
(See condition 20)

1. Definition:

In these regulations, unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them.

a) "Labour" means workers employed by a contractor directly, or indirectly through a sub-contractor, or by an agent on his behalf on a payment not exceeding Rs.500 per month.

b) "Fair Wage" means wages, which shall include wages for weekly day of rest and other allowances, whether for time or piece work, after taking into consideration prevailing market rates for similar employments in the neighborhood but shall not be less than the minimum rates of wages fixed under the minimum Wages Act.

c) "Contractor" for the purpose of these Regulations shall include an agent or Sub-Contractor employing labour on the work taken on contract.

d) "Inspecting Officer" means any Labour Enforcement Officer, or Assistant Labour Commissioners of the Chief Labour Commissioner"s Organisation.

e) "Form" means a form appended to these Regulations.

2. Notice of Commencement :

The Contractor shall, within **SEVEN DAYS** of commencement of the work, furnish in writing to the Inspecting Officer of the area concerned the following information with copy to the Engineer-in-charge.

a) Name and situation of the work.
b) Contractor"s name and address.
c) Particulars of the Department for which the work is undertaken.
d) Name and address of sub-contractors as and when they are appointed
e) Commencement and probable duration of the work
f) Number of workers employed and likely to be employed,
g) „Fair wages" for different categories of workers.

3. (i) Number of hours which shall constitute a normal working day:
The number of hours which shall constitute a normal working day for an adult shall be **NINE** hours. The working day of an adult worker shall be so arranged that of intervals, if any, for rest it shall not spread over more than twelve hours on any day. When an adult worker is made to work for more than **NINE** hours on any day or for more than FORTY EIGHT hours in any week he shall in respect of overtime work, be paid wages at double the ordinary rate of wages.

(ii) Weekly day of rest: Every worker shall be given a weekly day of rest which shall be fixed and notified atleast TEN days in advance. A worker shall not be required or allowed to work on the weekly rest day unless he has or will have a substituted rest day, on one of five days immediately before or after the rest day. Provided that no substitution shall be made which will result in the worker working for more than ten days consecutively without a rest day for a whole day.

Where in accordance with the foregoing provisions a worker works on the rest day and has been given a substituted rest day he shall be paid wages for the work done on the weekly rest day at the overtime rate of wages.

NOTE:The expression 'Ordinary rate of wages' means the fair wage the worker is entitled to.

4. Display of Notice Regarding Wages, Weekly Day of Rest, Etc.:

The Contractor shall before he commences his work on contract display and correctly maintain and continue to display and correctly maintain in clean and legible condition in consipicuous places on the works, notice in English and in the local Indian languages, spoken by majority of workers, given the rate of fair wages, the hours of work for which such wages are payable, the weekly rest days workers are entitled to and name and address of the Inspecting Officer. The Contractor shall send a copy each of such notices to the Inspecting Officers and the Engineer-in-charge.

5. Fixation of Wage Periods:

The Contractor shall fix wage periods in respect of which wages shall be payable .
No wage period shall normally exceed one week.

6. Payment of Wages:

(i) Wages due to every worker shall be paid to him direct. All wages shall be paid in current coins or currency or in both.

Wages of every worker employed on the contract shall be paid where the wage period is one week, within, **THREE DAYS** from the end of the wage period, and in any other case before the expiry of the 7^{th} day or 10^{th} day from the end of the wage period according as number of workers does not exceed 1,000.

(ii) When employment of any worker is terminated by or on behalf of the contractor, the wages earned by him shall be paid before expiry of the day succeeding the one on which his employment is terminated.

(iii) Payment of wages shall be made at the work site on a working day except when the work is completed before expiry of the wage period, in which case final payment shall be made at the work site within 48 hours of the last working day and during normal working time.

NOTE: The term "Working Day" means a day on which the work on which labour is employed is in progress.

7. Register of Workmen :

A register of workmen shall be maintained in the form appended to these regulations and kept at the work site or as near to it as possible, and the relevant particulars of every workmen shall be entered therein within **THREE** days of his employment.

8. Employment Card:

The Contractor shall issue an employment card in the Form appended to these regulations to each worker on the day of work or entry into his employment. If a worker has already any such card with him issued by the previous employer the contractor shall merely endorse that Employment Card with relevant entries. On termination of employment the Employment Card shall again be endorsed by the Contractor and returned to the worker.

9. Register of Wages etc., :

(i) A register of Wages-cum-Muster Roll in the Form appended to these regulations shall be maintained and kept at the work site or as near to it as possible.

(ii) A wage slip in the form appended to these regulations shall be issued to every worker employed by the Contractor atleast a day prior to disbursement of wages.

10. Fines and Deductions which may be made from wages:

(i) Wages of worker shall be paid to him without any deductions of any kind except the following:

a. Fines;

b. Deductions for absence from duty, i.e., from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.

c. Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money which he is required to account for, where such damage or loss is directly attributable to his neglect or default;

d. Deductions for recovery of advances or for adjustment of overpayment of a wages. Advance granted shall be entered in a register;

and

e. Any other deduction, which the B.H.E.L may from time to allow.

ii. No fines shall be imposed on a worker save in respect of such acts and omissions on his part as have been approved by the Chief Labour Commissioner.

iii. No fines shall be imposed on a worker and no deductions for damage or loss shall be made from wages until the worker has been given an opportunity of showing cause against such fines or deductions.

iv. The total amount of fines which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in rupee of the wages payable to him in respect of that wage period.

v. No fine imposed on a worker shall be recovered from him in instalments, or after expiry of sixty days from the date on which it was imposed. Every fine shall deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

vi. The Contractor shall maintain both in English and the local Indian language a list, approved by the Chief Labour Commissioner, clearly stating the acts and omissions for which penalty or fine may be imposed on a workman and display it in good condition in a conspicuous place on the work site.

vii. The Contractor shall maintain a register of fines and the register of deductions for damage or loss in the Forms appended to these regulations which should be kept at the place of work.

11. Register of Accidents :

The Contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:

a. Full particulars of the labourers who met with the accident.
b. Rates of Wages.
c. Sex
d. Age
e. Nature of accident and cause of accident.
f. Time and date of accident.
g. Date and time when admitted in hospital.
h. Date of discharge from the hospital.
i. Period of treatment and result of treatment.
j. Percentage of loss of earning capacity and disability as assessed by Medical Officer.
k. Claim required to be paid under Workmen"s Compensation Act.
l. Date of payment of compensation.
m. Amount paid with details of the person to whom the same was paid.
n. Authority by whom the compensation was assessed.
o. Remarks.

12. Preservation of Registers :

The Register of Wages-cum-Muster Roll required to be maintained under these Regulations shall be preserved for 3 years after the date on which last entry is made therein.

13. Enforcement :

The Inspecting Officer shall either on his own motion or on a complaint received by him carry out investigations, and send a report to the Engineer-in-charge specifying the amounts representing workers, dues and amount of penalty to be imposed on the contractor for breach of these Regulations, that have to be recovered from the contractor, indicating full details of the recoveries proposed and the reasons therefore. It shall be obligatory on the part of the Engineer-in-Charge on receipt of such a report to deduct such amounts from payments due to the contractor.

14. Disposal of amounts recovered from the Contractor :

The Engineer-in-charge shall arrange payment to workers concerned within **FORTY FIVE** days from receipt of a report from the Inspecting Officer except in cases where the contractor had made an appeal under Regulation, 16 of these Regulations. In cases where there is an appeal, payments of workers, due would be arranged by the Engineer-in-charge, wherever such payments arise, within **THIRTY** days from the date of receipt of the decision of the Regional Labour Commissioner (R.L.C.).

15. Welfare Fund:

All money that are recovered by the Engineer-in-charge by way of workers, due which could not be disbursed to workers within the time–limit prescribed above, due to reasons such as where-about of workers not being known, death of a worker, etc., and also amounts recovered as penalty, shall be credited to a fund to be kept under the custody of B.H.E.L for such benefit and welfare of workmen employed by contractors.

16. Appeal against decision of Inspecting Officer :

Any person aggrieved by a decision of the Inspecting Officer may appeal against such decision to the Regional Labour Commissioner concerned within THIRTY days from the date of the decision, forwarding simultaneously a copy of his appeal to the Engineer-in-charge. The decision of the Regional Labour Commissioner shall be final and binding upon the Contractor and the workmen.

17. Representation of Parties:

i. A workman shall be entitled to be represented in any investigation or enquiry under these Regulations by an Officer of a registered trade union of which the said trade union is affiliated or where the workman is not a member of any registered trade union, by an Officer of a registered trade union connected with, or any other workmen employed in the industry in which the worker is employed.

ii. A Contractor shall be entitled to be represented in any investigation or enquiry under these Regulations by an officer of an association of contractors of which he is a member or by an officer of a Federation of Associations of Contractors to which the said association is affiliated or where the contractor is not a member of any association of employers, connected with, or by any other employer engaged in the industry in which the contractor is engaged.

iii. No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these Regulations.

18. Inspection of Books and other Documents:

The Contractor shall allow inspection of the Register and other documents prescribed under these Regulations by Inspecting Officer and the Engineer-in-charge or his authorized representative at any time and by the worker or his agent on receipt of due notice at a convenient time.

19. Interpretation etc.

On any question as to the application, interpretation or effect of the Regulations the decision of the Chief Labour Commissioner or Deputy Chief Labour Commissioner (Central) shall be final and binding.

20. Amendments:

Central Government may, from time to time, add to or amend the Contractor"s Labour Regulations and issue such directions as it may consider necessary for the proper implementation of the Contractor"s Labour Regulations or for the purpose of removing any difficulty which may arise in the administration thereof, based on which the B.H.E.L., Contractor"s Labour Regulations herein contained shall be subject to revision.

MODEL RULES FOR LABOUR WELFARE
(See Condition 20)

1. Definition:

(a) „Workplace" means a place at which, on an average, twenty or more workers are employed.

(b) „Large Workplace" means a place at which on an average, 500 or more workers are employed.

2. First Aid: At every workplace, there shall be maintained in a readily accessible place first-aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and, in large work places, they shall be placed under the charge of a responsible person who shall be readily available during working hours.

At large workplaces, where hospital facilities are not available within easy distance of the works First Aid posts shall be established and be run by a trained compounder.

Where large workplaces are remotely situated and far away from regular hospitals an indoor ward shall be provided with one bed for every 250 employees.

Where large workplaces are situated in cities, towns or in their suburbs and no beds are considered necessary owing to proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to these hospitals. At other workplaces, some conveyance facilities shall be kept readily available to take injured person or persons suddenly taken seriously ill, to the nearest hospital.

At large workplaces there shall be provided and maintained an ambulance room of the prescribed sizes, containing the prescribed equipment and in the in-charge of such medical and nursing staff as may be prescribed. For this purpose the relevant provisions of the Factory Rules of the State Government of the area where the work is carried on may be taken as the prescribed standard.

3. Accommodation for Labour: The Contractor shall during the progress of the works provide, erect and maintain necessary temporary living accommodation and ancillary facilities for labour at his own expense and to standards and scales as approved by the Engineer-in-charge.

4. Drinking Water: In every workplace, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from an intermittent public water supply each workplace shall be provided with storage where drinking water shall be stored. Every water supply storage shall be at a distance of not less than 15 meters from any latrine drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and water-proof.

A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. Washing and Bathing places: Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept in clean and drained condition.

6. Scale of Accommodation in Latrines and Urinals: These shall be provided within the precincts of every workplace latrines and urinals in an accessible place, and the accommodation, separately for each of these, shall not be less than at the following scales:

		No.of Seats
a)	Where number of persons does not exceed 50	2
b)	Where number of persons exceed 50 but does not exceed 100	3
c)	For additional persons	3 Per 100 or part thereof.

In particular cases, the Engineer-in-charge shall have the power to increase the requirement, where necessary.

7. Latrines and Urinals: Except in workplaces provided with water flushed latrines connected with a waterborne sewage system, all latrines shall be provided with receptacles on dry-earth system which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

If women are employed, separate latrine and urinals, screened from those for men and marked in the vernacular in conspicuous letters “For Women only” shall be provided on the scale laid down in rule 6. Those for men shall be similarly marked “For Men only” A poster showing the figure of a man and of a woman shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water close to latrines and urinals.

8. Construction of Latrines: Inside walls shall be constructed of masonry or other non-absorbent material and shall be cement-washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrines shall have at least thatched roof.

9. Disposal of Excreta: Unless otherwise arranged for by the local sanitary authority, arrangement for proper disposal of excreta by incineration at the workplace shall be made by means of a suitable incinerator approved by the local medical health and municipal or cantonment authorities. Alternatively local excreta may be disposed off by putting a layer of night soil at the Bottom of pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn into manure).

The contractor shall, at his own expenses, carry out all instruction issued to him by the Engineer-in-charge to effect proper disposal of soil and other conservancy work in respect of Contractor‟s work-people or employees on the Site. The Contractor shall be responsible for payment of any charges which may be levied by municipal or cantonment authority for execution of such work on his behalf.

10. Provision of shelters during rest: At every workplace there shall be provided, free of cost, four suitable sheds, two for meals and two others for rest, separately for use of men and women labour. Height of each shelter shall not be less than 3 meters from floor level to lowest part of roof. Sheds shall be kept clean and space provided shall be on the basis of at least 0.5 sq.m. per head.

11. Crèches: At a place at which 20 or more women workers are ordinarily employed, there shall be provided at least one hut for use of children under the age of 6 years of such women. Huts shall not be constructed to a standard lower than that of thatched roof, mud floor and walls with wooden planks spread over mud floor and covered with matting.

Huts shall be provided with suitable and sufficient openings, for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be two „dais‟ in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health and municipal or cantonment authorities. Use of huts shall be restricted to children, their attendants and mothers of children.

When the number of women workers is more than 25 but less than 50, the Contractor shall provide at least one hut and one Dais to look after children of women workers.
Size of crèche (s) shall vary according to the number of women workers employed. Creche(s) shall be properly maintained and necessary equipment like toys, etc. provided.

12. **Canteen:** A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary.

13. Planning, setting and erection of the above mentioned structures shall be approved by the Engineer-in-charge, and the whole of such temporary accommodation shall at all times during the progress of the works be kept tidy and in a clean and sanitary condition to the satisfaction of the Engineer-in-Charge and at the Contractor"s expense. The Contractor shall conform generally to sanitary requirements of local medical, health and municipal or cantonment authorities and at all times adopt such precautions as may be necessary to prevent soil pollution of the site.

On completion of the works the whole of such temporary structures shall be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of site left clean and tidy to the entire satisfaction of the Engineer-in-Charge, and at the Contractor"s expenses.

14. **Anti-malarial precautions:** The Contractor shall, at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-charge, including filling up of any borrow pits which may have been dug by him.

15. **Enforcement:** The Inspecting Officer mentioned in the Contractors Labour Regulations or any other officer nominated in his behalf by the Engineer-in-Charge shall report to the Engineer-in-Charge all cases of failure on the part of the Contractor and or his sub-contractors to comply with the provisions of these Rules either wholly or in part and the Engineer-in-Charge shall impose such fines and other penalties as are prescribed in the conditions.

B.H.E.L SAFETY CODE
See Condition-20

1. Suitable scaffolds shall be provided for workmen for all work that cannot safely be done from the ground, or from solid construction except such short period of work as can be done safely from ladders. When a ladder is used an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and hand-holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to 1 (¼ horizontal and 1 vertical)

2. Scaffolding or staging more than 3.25 meters above the ground or floor, swung or suspended from an overhead support or erected with stationary support, shall have a guard rail properly attached, bolted, braced and otherwise secured atleast 1 meter high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3. Working platform, gangways, and stairways shall be so constructed that they do not sag unduly or unequally, and if height of a platform or gangway or stairway is more than 3.25 meters above ground level or floor level, it shall be closely bordered have adequate width and be suitably fenced, as described in 2 above

4. Every opening in floor of a building or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of 1 meter.

5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 meters in length. Width between side rails in a rung, ladder shall in no case be less than 30 cm, for ladders upto and including 3 metres in length. For longer ladders this width shall be increased by atleast 6 mm for each additional 30 cm. of length. Uniform step spacing shall not exceed 30 cm.
Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Contractor shall provide all necessary fencing and lights to protect public from accidents and shall be bound to bear expenses of defence of every suit action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions, and pay any damages and costs which may be awarded in any such suit, action or proceeding to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.

6. Excavation and Trenching:

   All trenches, 1.5 metres or more in depth, shall at all times be supplied with atleast one ladder for each 30 m length or fraction thereof. Ladder shall be extended from bottom of trench to atleast 1 metre above surface of the ground. Sides of a trench 1.5 metres or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. Excavated materials shall not be placed within 1.5 metres of the edge of trench or half the depth of trench, whichever is more. Cutting shall be from top to bottom. Under no circumstances shall undermining or undercutting be done.

7. Demolition: Before any demolition work is commenced and also during the process of the work:

   a. All roads and open areas adjacent to the work site shall either be closed or suitably protected:

   b. No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

c. All practical steps shall be taken to prevent danger to persons employed, from risk of fire or explosion, or flooding. No floor, roof, or other part of a building shall be so overloaded with debris or materials as to render it unsafe.

8. All necessary personal safety equipment as considered adequate by the Engineer-in-Charge shall be available for use of persons employed on the site and maintained in a condition suitable for immediate use and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned.

a. Workers employed on mixing asphaltic materials cement and lime mortars/ concrete shall be provided with protective footwear and protective gloves.

b. Those engaged in handling any material which is injurious to the eye shall be provided with protective goggles.

c. Those engaged in welding works shall be provided with welder"s protective eye-shields.

d. Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e. When workers are employed in sewers and manholes which are in use, the

Contractor shall ensure that manhole covers are opened and manholes are ventilated atleast for an hour before workers are allowed to get into them. Manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to public.

The Contractor shall not employ men below the age of 18 and women on the work of painting with products containing lead in any form. Whenever men above the age of 18 are employed on the work of lead painting, the following precautions shall be taken:

i. No paint containing lead or lead products shall be used except in the form of paste or ready-made paint.

ii. Suitable face masks shall be supplied for use by workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scraped.

iii. Overalls shall be supplied by the Contractor to workmen and adequate facilities shall be provided to enable working-painters to wash during on cessation of work.

9. When work is done near any place where there is risk of drowning, all necessary equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

10. Use of hoisting machine and tackles including their attachments, anchorage and supports shall conform to the following:

a. i. These shall be of good mechanical construction, sound material and adequate strength and free from defects and shall be kept in good working order.
ii. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from defects.

b. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years shall be in charge of any hoisting machine including any scaffolding winch or give signals to operator.

c. In case of every hoisting machine and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or lowering or as means of suspension, safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall have the safe working load plainly marked there on, In case of a hoisting machine having a variable safe working load, each safe working load and the conditions under which

it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

d. Incase of departmental machine, safe working load shall be notified by the Engineer-in-Charge. As regards contractor"s machine the Contractor shall notify safe working load of each machine to the Engineer-in-Charge whenever he brings it to site of work and get it verified by the Engineer-in-Charge.

11. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards; hoisting appliances shall be provided with such means as will reduce to the minimum risk of accidental descent of load. Adequate precautions shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, working apparel such as gloves, sleeves and boots, as may be necessary shall be provided. Workers shall not wear any rings, watches carry keys or other materials which are good conductors of electricity.

12. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near the places of work.

13. These safety provision shall be brought to the notice of all concerned by display on a notice board at a prominent place at the work spot. Persons responsible for ensuring compliance with the Safety Code shall be named thereon by the Contractor.

14. To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the Contractor shall be open to inspection by the Engineer-in-Charge or his representatives and the Inspecting Officers as defined in the Contractor"s Labour Regulations.

15. Notwithstanding the above conditions 1 to 14, the Contractor is not exempted from the operation of any other Act or Rule in force.

FORM OF REGISTER OF WORKMEN

(Regulation-7)

i. Name and address of the Contractor----------

i. Number and date of the **WORK ORDER & CONTRACT AGREEMENT** ----------

iii. Name and address of the department awarding the contract----------

iv. Nature of the Contract and location of the work----------

v. Duration of the Contract----------

Sl. No	Name and surname of the workers	Age & Sex	Father"s / Husband"s Name	Nature of emp-loyment Desig-nation.	Permanent / Home address of Employee (Village, Distt. Thana).	Present address	Date of commen-cement of emp-loyment	Date of termina-tion or leaving of emp-loyment	Signature or thumb impression of the employee.	Remarks
1	2	3	4	5	6		7	8	9	10	11

CONTRACTOR

ACCEPTING OFFICER

FORM OF EMPLOYMENT CARD
(Regulation-8)

i Name and Sex of the Worker----------

ii Father"s / Husband"s Name ----------

iii Address ----------

iv Age or Date of birth----------

v Identification mark ----------

Particulars of next of kin (wife/husband and children, if any, or of dependent next of kin in case the worker has no wife/ husband or child):-

Name----------

Full address of Dependents

(Specify Village, Dist., and State----------

Sl. No	Name & Address of employer (specify Whether a contractor or a sub contractor).	Particulars of location of worksite and description of work done	Total period for which the worker is employed from…….. to……)	Actual number of days worked	Leave taken (No. of days should be specified).	Nature of Work done by the worker.	Wage rate With Parti-culars of unit in Case of Piece work.	Total Wage earned by the Worker during the period shown Under Col.5.	**REMARKS**	Signature of the Employee
1	2	3	4	5	6	7	8	9	10	11

N.B:- For a worker employed at one time on piece-work basis and at another on daily wages, relevant entries in respect of each type of employment should be made separately.

CONTRACTOR

ACCEPTING OFFICER

FORM OF WAGE SLIP
(Regulation-9)

i. Name of the Contractor **----------**

ii. Place ----------

---

1. Name of the worker with father"s / husband"s name.
2. Nature of employment.
3. Wage period.
4. Rate of Wages payable
5. Total attendance / Unit of work done.
6. Dates on which overtime worked
7. Overtime Wages.
8. Gross Wages payable.
9. Total deductions (indicating nature of deductions)
10. Net wages payable.

Contractor"s Signature / Thumb impression.

Employees" Signature/ Thumb impression.

FORM OF REGISTER OF FINES

(Regulations No.10 vii)

Sl. No.	Name	Father‟s / Husband‟s name	Sex	Department	Nature and date of the offence for which fine imposed	Whether workmen showed cause against fine or not, if so, enter date	Rate of wages	Date and amount of fine imposed	Date on which fine realised	Remarks
1	2	3	4	5	6	7	8	9	10	11

CONTRACTOR 213 **ACCEPTING OFFICER**

FORM OF REGISTER OF WAGES-CUM-MUSTER ROLL

(Regulation – 9)

i. Name and address of the Contractor----------

ii. No. & Date of the Contract Agreement /Work Order----------

iii. Name and address of the department awarding the Contract----------

iv. Nature of the Contract and location of the work----------

v. Duration of the Contract----------

vi. Wage period----------

							Fair Wage Wages payable paid				Overtime Worked			Deduction from wages									
Serial Number	Name and Surname of the work	Father's/Husband's name	Sex	Designation and Nature of work	Daily attendance (No. of units worked 1,2,3,4,5,6,7.,31)	Total attendance Units	Basic	D.A. & other allowance	Basic	D.A. & other allowance	Date	No.of hours.	Overtime wages earned.	Total wages paid	*Fine	Deduction for damage or loss	House rent	Recovery of advances	Other deductions	Net wages payable	Date of payment	Signature of thumb impression of the worker	Remarks
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Reasons to be recorded in Column 24.																							

CONTRACTOR 214 **ACCEPTING OFFICER**

FORM OF REGISTER OF DEDUCTIONS FOR DAMAGES OR LOSS CAUSED TO THE B.H.E.L. BY THE NEGLECT OR DEFAULT OF THE EMPLOYED PERSONS

Regulation No 10 (vii)

Sl.No	Name	Father‟s Husband‟s Name	Sex	Department	Damage or loss caused with date	Whether worked showed cause against deduction if so, enter date	Date & amount of deduction imposed	Number of Instal-ment, if any	Date on which total amount realised	Remarks
1	2	3	4	5	6	7	8	9	10	11

CONTRACTOR 215 **ACCEPTING OFFICER**

PERSONNEL PROTECTIVE EQUIPMENT

NYLON SAFETY BELT

1 It shall be made out of Nylon Webbing of width of 45mm.
2 It shall be provided with Friction Buckles and Semi triangular Block Ring
3 It shall be provided with the Life line of 25ft. length of 10 mm dia
4. The Nylon rope with one end directly spliced to the back and the other end thimbleful and spliced with the Hook..
5. It shall be provided with ISI mark/supplied with test certificate.

ACID AND ALKALI RUBBER GOGGLE

1. It shall be made out of good quality thick Rubber with sponge lining inside.
2. It shall be suitable to fit on the face of any person.
3. It shall be fitted with clear, Non shatter able Lenses, or Toughened Lenses, in size 50 mm dia.
4. It shall give protection from splashing of chemicals and acid fumes.
5. It shall be provided with adjustable Elastic Band.

SPECTACLE TYPE SAFETY GOGGLES

1. The Frame should be of conventional type used with good quality cellulose Acetate material with reinforcement on the sides and opaque (black in colour)
2. The Toughened Lens should be an imported on (English, White Toric, plain, Optically Neutral) and should withstand the steel-ball Impact Test with ISI mark.
3. The thickness of the Lens shall be 2.8 mm.
4. The Hinged- type Foldable Wire mesh side – pieces with good Rivets shall be provided.
5. Good; durable, Screws and Hinges on the side – legs with good workmanship must be ensured.
6. There should not be any defect either in the frame, or in the Lens, and the Goggles should be of smooth and fine surface quality.
7. The size of the goggles is to be marked with Nos. 50 & 52 respectively on the inner side of one side – leg.
8. The initials of the Maker shall be embossed on the inner side of the other Leg, to identify the firm.
9. The goggles should be packed in a good , Safety Case. Completely enclosing the goggles with a cleaner.
10. Subjected to 100% inspection.

GUM BOOTS

1. Gum Boots shall be made up of Rubber/PVC material of Duck Back/Tarzan make
2. It shall have inner lining of good quality cotton/cloth
3. It shall have the carbon steel toe cap to the thickness of 1.5mm and should withstand the impact of 14Kgs/m and provided with ISI mark/supplied with test certificate.
4. It shall be covered up to the knee and give protection from splashing of chemicals, oil, water, etc.
5. It shall have the resistance to acids, alkali and oils
6. It shall be provided with ISI mark/supplied with test certificate.

GAS WELDING GOGGLES

1. They shall be made of Bakelite material with smooth finish
2. They shall have the vents on either side for allowing adequate ventilation, but preventing light and dust.
3. They shall have a pair of cups and screw cap arrangements to hold the filter lenses
4. They shall have a pair of filter lenses in size 50mm dia, shade no.6 of DIN specification to filter the IR radiation from the gas welding/cutting operation
5. They shall have two pairs of clear, protective cover(clear glass) in size 50mm dia.
6. They shall have a pair of spring type elastic band with adjustable leather strap

ACID AND ALKALI PROOF RUBBER GLOVES

1. 1.It shall be made up of good quality, thick Rubber in size 14" and 16". Black in colour
2. .It shall give protection against acid and alkali
3. It shall be of five finger type easy wear.

HEAVY DUTY RESPIRATOR

1. It shall be made of soft PVC material so as to withstand normal usage, exposure to moisture
2. The construction shall be suitable to fit the faces of men
3. It shall have a mouth piece with White Cartridge
4. The cartridge shall be containing Sodium Hydroxide with Potassium Hydroxide
5. It shall absorb gas and afford protection against the following Vapours, gases

1.Acetic acid	2. Bromine
3.Carbolic acid	4. Carbon di oxide
5. Chlorine	6. Hydrochloric acid
7. Hydrogen Chloride	8. Iodine
9. Nitrous gases	10. Nitrogen di oxide
11.Phosgene	12. Sulphur di oxide
13.Sulphurated Hydrogen	14. Sulphur Trioxide

6. It shall be provided with a dust mouth piece provided with cotton pad to be provided to filter the respiration dust
7. It shall have a non return inlet valve at the mouth piece, and side outlet valves
8. It shall have adjustable Elastic Strap not less than ¾" width for holding in position without discomfort
9. It shall be light in weight
10. It shall be provided with 3 nos. spare cotton pad along with each respirator
11. It shall be provided with ISI mark/supplied with test certificate

DUST RESPIRATOR

1. It shall be made of soft PVC material so as to withstand normal usage, exposure to moisture
2. The construction shall be suitable to fit the faces of men
3. It shall have a mouth piece with cotton pad to be provided to filter the respiration dust
4. It shall have Non-return inlet valve at the mouthpiece and side outlet respiration
5. It shall have adjustable Elastic Strap not less than ¾" width for holding in position without discomfort
6. It shall be light in weight
7. It shall be provided with 3 nos. spare cotton pad along with each respirator
8. It shall be provided with ISI mark/supplied with test certificate

LIGHT FUME RESPIRATOR

1. It shall be made of soft PVC material so as to withstand normal usage, exposure to moisture
2. The construction shall be suitable to fit the faces of men
3. It shall have a mouth piece with cotton pad and black cartridge containing activated charcoal to filter fumes from paint, oil etc.
4. It shall have Non-return inlet valve at the mouthpiece and side outlet respirable
5. It shall have adjustable Elastic Strap not less than ¾" width for holding in position without discomfort
6. It shall be light in weight
7. Spare cotton pad 3 nos. to be provided along with each respirator
8. It shall be provided with ISI mark/supplied with test certificate

INDUSTRIAL HELMETS

1. The Helmet shall be made of Fiber Glass Di-electric material with narrow brim
2. The surface of the shell shall be natural finish and Light blue colour
3. It shall have a Nape strap adjustable Head band equipped with sweat resisting lining. The width shall not be less than 30mm
4. Inner cushioning which is flexible and non absorber of water shall be provided between the head band the shell
5. It shall have ventilation gap of 10mm to 20mm
6. Inside, the dimension of the head band in the longitudinal direction shall be 20 to 25% greater than the inside dimension of the cross wise direction
7. The shell shall have a clearance of less than 30mm between the inside of the top of the crown and top of the wearer"s head
8. The wearing height shall not be less than 80 mm
9. The head band shall be fitted with at least four crown straps each extending from side of the head band to the other. The width of the crown strap shall be 20mm
10. It shall have the leather chin strap , It must with stand the penetration resistance test and shock absorption test provided with ISI mark/supplied with test certificate

SAFETY PRACTICES DURING CONSTRUCTION

CONTENTS

1.0 Introduction

2.0 Scope

3.0 Definitions

4.0 General Duties

4.1 General Duties Of Execution Agencies

4.2 General Duties Of Owners

5.0 Safety Practices At Work Places

5.1 General Provisions

5.2 Means Of Access And Egress

5.3 Housekeeping

5.4 Precautions Against The Fall Of Materials And Persons, and Collapse Of Structures

5.5 Prevention Of Unauthorised Entry

5.6 Fire Prevention And Fire Fighting

5.7 Lighting

5.8 Plant, Machinery, Equipment and Hand Tools

6.0 Construction Activities

6.1 Excavation

6.2 Scaffolding, Platforms & Ladders

6.3 Structural Work, Laying Of Reinforcement & Concreting

6.4 Road Work

6.5 Cutting/Welding

6.6 Working In Confined Spaces

6.7 Working At Heights

6.8 Handling And Lifting Equipment

6.9 Vehicle Movement

Demolition

6.10 Masonry works.

7.0 First Aid

8.0 Documentation

Safety Awareness & Training

9.0 List of safety codes for civil Works

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention. Construction is widely recognized as one of the accident-prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel, same needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behavior, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety into the system.

The objective of this standard is to provide practical guidance on technical and educational framework for safety and health in construction with a view to:

(a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
(b) ensure appropriate safety during implementation of construction;
(c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.

2.0 SCOPE

This document specifies broad guidelines on safe practices to be adhered to during construction activities. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment, PPE manual of TLC department shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- *Adequate, appropriate or suitable* are used to describe qualitatively or quantitatively the means or method used to protect the worker.

- *Brace:* A structural member that holds one point in a fixed position with respect to another point; bracing is a system of structural members designed to prevent distortion of a structure.

- *By hand:* The work is done without the help of a mechanised tool.

- *Competent Authority:* A stautory agency having the power to issue regulations, orders or other instructions having the force of law.

- *Competent person:* A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

- *Execution agency:*

  Any physical or legal person, having contractual obligation with the owner, and who employs one or more workers on a construction site

- *Owner:*

  Any physical or legal person for whom construction job is carried out.

  It shall also include owner's designated representative / consultant / nominee / agent, authorized from time to time to act for and on its behalf, for supervising / coordinating the activities of the execution agency.

- *Hazard:* Danger or potential danger.

- *Guard-rail:* An adequately secured rail erected along an exposed edge to prevent persons from falling.

- *Hoist:* A machine, which lifts materials or persons by means of a platform, which runs on guides.

- *Lifting gear:* Any gear or tackle by means of which a load can be attached to a lifting appliance but which does not form an integral part of the appliance or load.

- *Lifting appliance:* Any stationary or mobile appliance used for raising or lowering persons or loads.

- *Means of access or egress:* Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.

- *Scaffold:* Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance as defined above.

- *Toe-board:* A barrier placed along the edge of a scaffold platform, runway, etc., and secured there to guard against the slipping of persons or the falling of material.

- *Worker:* Any person engaged in construction activity.

- *Workplace:* All places where workers need to be or to go by reason of their work.

4.0 GENERAL DUTIES

4.1 GENERALDUTIESOF EXECUTION AGENCIES

4.1.1 Execution agency should:

i) Provide means and organization to comply with the safety and health measures required at the workplace.

ii) Provide and maintain workplaces, plant, equipment, tools and machinery and organize construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

(a) Dangers, liable to arise at the workplace, are prevented;
(b) Excessively or unnecessarily strenuous work positions and movements are avoided;
(c) Organization of work takes into account the safety and health of workers;
(d) Materials and products used are suitable from a safety and health point of view;
(e) Working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.

iii) Arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.

iv) Provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.

v) Employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.

vi) Satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.

vii) Ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

viii) Organize for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.

ix) Establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.

x) Provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act, 1948 etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per PPE Manual of TLC Department. They should also provide access to workers to occupational health services.

xi) Educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect safety and health.

xii) Ensure that except in an emergency, workers, unless duly authorized, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

xiii) Ensure that workers do not operate or interfere with plant and equipment that they have not been

duly authorised to operate, maintain or use.

xiv) Ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment etc.

xvii) Obtain the necessary clearance / permits as required and specified by owner

4.2 GENERAL DUTIES OF OWNERS

4.2.1 Owners should:

i) co-ordinate or nominate a competent person to co-ordinate all activities relating to safety and health on their construction projects;
ii) Inform all contractors on the project of special risks to health and safety;
iii) Ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to safetry practices before starting the job.

5.0 SAFETY PRACTICES AT WORK PLACES

5.1. GENERAL PROVISIONS

5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated.

5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement. They should be trained to use personal protective equipment.

5.1.3 Never use solvents, alkalis and other oils to clean the skin.

5.1.4 Lift the load with back straight and knees bent as far as possible. Seek the help in case of heavy load.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles.

5.1.6 No loose clothing should be allowed while working near rotating equipment or working at heights.

5.2 MEANS OF ACCESS AND ENGRESS

Adequate and safe means of access (at least two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained.

5.3 HOUSEKEEPING

5.3.1 Ensure:

i) proper storage of materials and equipment;
ii) removal of scrap, inflammable material, waste and debris at appropriate intervals.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.4 PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.4 All openings through which workers are liable to fall should be kept effectively covered or fenced and displayed prominently.

5.4.5 As far as practicable, guardrails and toe-boards should be provided to protect workers from falling from elevated workplaces.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorized persons.

5.5.2 Visitors should not be allowed access to construction sites unless accompanied by or authorised by a competent person and provided with the appropriate protective equipment.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

i) avoid the risk of fire;
ii) control quickly and efficiently any outbreak of fire;
iii) bring out a quick and safe evacuation of persons.
iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.

5.6.2 Combustible materials such us packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place.

5.6.3 Places where workers are employed should, if necessary to prevent the danger of fire, be provided with:

i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
ii) an adequate water supply at sufficient pressure meeting the requirements.

5.6.4 To guard against danger at places having combustible material, workers should be trained in the action to be taken in the event of fire, including the use of means of escape.

5.6.5 At sites having combustible material, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.

5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected particularly in high structures and where access is restricted.

5.7 LIGHTING

5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.

5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby lighting source, if normal system fails.

5.7.2 Artificial lighting should not produce glare or disturbing shadows.

5.7.3 Lamps should be protected by guards against accidental breakage.

5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

5.8 PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS

5.8.1 General Provisions

i) Plant, machinery and equipment including hand tools, both manual and power driven, should:

a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
b) be maintained in good working order;
c) be used only for work for which they have been designed.

d) be operated only by workers who have been authorized and given appropriate training.
e) be provided with protective guards, shields or other devices as required.

iii) Adequate instructions for safe use should be provided.

iii) Safe operating procedures should be established and used for all plant, machinery and equipment.

iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.

v) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.

vi) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.

vii) All moving parts of machinery and equipment should be enclosed or adequately guarded.

viii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.

ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.

5.8.2 Hand tools

i) Hand tools should be repaired by competent persons.

ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.

iii) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.

iv) Only insulated or non-conducting tools should be used on or near live electrical installations.

v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 Pneumatic Tools

i) Operating triggers on portable pneumatic tools should be:

a) so placed as to minimize the risk of accidental starting of the machine.
b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.

ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:

a) designed and tested for the pressure and service for which they are intended;
b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.

iv) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.

v) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

5.8.4 Electrical Tools

i) Low voltage portable electrical tools should generally be used.
ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.

iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

5.8.5 Engines

i) Engines should:

a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
b) have controls for limiting speed.
c) have devices to stop them from a safe place in an emergency.

ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided.

iii) When IC engines are being fuelled:the engine should be shut off.
a) care should be taken to avoid spilling fuel;
b) no person should smoke or have an naked light in the vicinity.
c) a fire extinguisher should be kept readily available.

iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

- Excavation
- Scaffolding, Platforms & Ladders
- Structural Work, Laying of Reinforcement & Concreting
- Road Work
- Cutting /Welding
- Working in Confined Space
- Working at Heights
- Handling & Lifting Equipments
- Vehicle Movement
- Demolition
- Masonry Works

The safe practices to be followed during the implementation of above construction activities are given below:

6.2 SCAFFOLDING, PLATFORMS & LADDERS

6.2.1 Metal as material of construction

i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.

ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.

iii) Every scaffold should be constructed, erected and maintained so as to prevent collapse or accidental displacement when in use.

iv) Every scaffold and part thereof should be constructed :

(a) in such a way so as not to cause hazards for workers during erection and dismantling;
(b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
(c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.

v) Boards and planks used for scaffolds should be protected against splitting.

vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

vii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

viii) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.

ix) Scaffolds should be designed for their maximum load as per relevant code.

x) Scaffolds should be adequately braced.

xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.

xiv) Scaffolds should be inspected and certified:

(a) before being taken into use;
(b) at periodic intervals thereafter as prescribed for different types of scaffolds;
(c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.

xv) Inspection should more particularly ascertain that:

(a) the scaffold is of suitable type and adequate for the job;
(b) materials used in its construction are sound and of sufficient strength;
(c) it is of sound construction and stable;
(d) that the required safeguards are in position.

xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

xvii) Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be displaced in consequence of normal use.

6.2.2 Lifting appliances on scaffolds

i) When a lifting appliance is to be used on a scaffold:

(a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;
(b) any movement of the scaffold members should be prevented;
(c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.3 Prefabricated scaffolds

i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.

ii) Frames of different types should not be intermingled in a single scaffold.

iii) Scaffolding shall be erected on firm and level ground.

iv) All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.

v) Entry to scaffolding should be restricted.

vi) Erection, alteration and removal shall be done under supervision of experienced personnel.

vii) Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.

viii) Each supporting member of platform shall be securely fastened and braced

ix) Where planks are butt-joined, two parallel putlogs shall be used, not more than 100mm apart, to give support to each plank.

x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided.

xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.

xii) Erect ladders in the “four up-one out position”

xiii) Lash ladder secured with the structure.

xiv) Using non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.

xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in “four up-one out position.”

xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.

xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.

xviii) Every platform and means of access shall be kept free from obstruction.

xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.

xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.

xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.

xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.4 Suspended scaffolds / boatswain's chair

i) In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.

(a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;
(b) the number or anchorage should be compatible with the dimensions of the platform;
(c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;
(d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;
(e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;
(f) Before use, the whole structure should be checked by a competent person.

6.2.5 Bamboo / Casuarina Scaffolding

i) In general, it should be avoided as far as possible.

ii) For construction and maintenance of residential and office buildings, bamboo / Casuarinas scaffold, if used, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK

6.3.1 General provisions

i) The erection or dismantling of buildings, structures, civil engineering works, formwork, false work and shoring should be carried out by trained workers only under the supervision of a competent person.

ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.

iii) Formwork, false work and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it.

iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilizing are easily fixed to the formwork structure.

6.3.2. Erection and dismantling of steel and prefabricated structures

i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:

(a) ladders, gangways or fixed platforms;
(b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
(c) safety harnesses and lifelines, catch nets or catch platforms;

ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected.

iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:

(a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;

(b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on the structural steel or prefabricated parts.

iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:

(a) to withstand with a sufficient margin the stresses to which they are subjected;
(b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appliance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;
(c) To avoid imbalance or distortion of the lifted load.

v) Storeplaces should be so constructed that:

(a) there is no risk of structural steel or prefabricated parts falling or overturning;
(b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions;
(c) racks are set on firm ground and designed so that units cannot move accidentally.

vi) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.

vii) Every lifting appliance should:

(a) be suitable for the operations and not be capable of accidental disconnection;
(b) be approved or tested as per statutory requirement.

viii) Lifting hooks should be of the self-closing type or of a safety type and should have the maximum permissible load marked on them.

ix) Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:

(a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
(b) be marked with the maximum permissible load in the most unfavourable lifting conditions.

x) Structural steel or prefabricated parts should be lifted by methods or appliances that prevent them from spinning accidentally.

xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.

xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.

xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be imperiled, even by external agencies such as wind and passing loads before its release from the lifting appliance.

xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.

xv) During transportation within the construction area, attachments such as slings and stirrups mounted on structural steel or prefabricated parts should be securely fastened to the parts.

xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.

xviii) When adverse weather conditions such as snow, ice and wind or reduced visibility entail risks of accidents, the work should be carried on with particular care, or, if necessary, interrupted.

xix) Structures should not be worked on during violent storms or high winds, or when they are covered with ice or snow, or are slippery from other causes.

xx) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.

xxi) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a strong support.

xxii) Structural steel parts that are to be erected at a great height should as far as practicable be assembled on the ground.

xxiii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded

xxiv) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.

xxv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.

xxvi) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.

xxvii) Open-web steel joists that are hoisted singly should be directly placed in position and secured against dislodgment.

6.4 CUTTING/WELDING

6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks etc. Following precautions should be taken after getting safe work permit in form 310-016 : -

i) A dry chemical type fire extinguisher shall be made available in the work area.

ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.

iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.

iv) All covers and panels shall be kept in place, when operating an electric Arc welding machine.

v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/structures/equipments etc.

vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

vii) All cables, including welding and ground cables, shall be checked for any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.

viii) Cable coiling shall be maintained at minimum level, if not avoidable.

ix) An energised electrode shall not be left unattended.

x) The power source shall be turned off at the end of job.

xi) All gas cylinders shall be properly secured in upright position.

xii) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.

xiii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.

xiv) When not in use, valves of all cylinders shall be kept closed.

xv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.

xvi) Forced opening of any cylinder valve should not be attempted.

xvii) Lighted gas torch shall never be left unattended.

xviii) Store acetylene and oxygen cylinders separately.

xix) Store full and empty cylinders separately.

xx) Avoid cylinders coming into contact with heat.

xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.

xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.

xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.

xxiv) Do not use matches to light torches, use a friction lighter.

xxv) Move out any leaking cylinder immediately.

xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.

xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.

xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.

xxix) Avoid dragging hoses over sharp edges and objects

xxx) Do not wrap hoses around cylinders when in use or stored.

xxxi) Protect hoses from flying sparks, hot slag, and other hot objects.

xxxii) Lubricants shall not be used on Ox-fuel gas equipment.

xxxiii) During cutting/welding, use proper type goggles/face shields.

6.5 WORKING IN CONFINED SPACES

6.6.1 Following safety practices for working in confined space like towers, columns, tanks and cellars should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.

i) Entry inside the confined area and to carry out any job should be done after issuance of valid permit only, in line with form 310-017.

ii) Ensure proper and accessible means of exit before entry inside a confined space.

iii) The number of persons allowed inside the area should be limited to avoid overcrowding.

iv) When the work is going on in the confined space, there should always be one man standby at the nearby man way.

v) Before entering inside the area - underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel.

vi) Ensure requisite O_2 level before entry in the confined space and monitor level periodically or other wise use respiratory devices.

vii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.

viii) Ensure adequate ventilation or use respiratory devices.

ix) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, manholes or in the confined area where there is a possibility of toxic or inert gas, gas masks shall be used by everyone while entering.

x) Barricade the confined spaces

xi) Use 24V flameproof lamp fittings only for illumination.

xii) Use tools with air motors or electric tools with maximum voltage of 24V.

xiii) House keeping shall be well maintained.

xiv) Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.

xv) Don't wear loose clothing while working in a confined space.

xvi) The gas cylinders used for cutting/welding shall be kept outside.

xvii) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.

xviii) To the extent possible sludge shall be cleared and removed from outside before entering.

xix) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.

xx) Communication should be always maintained between the worker and the attendant.

6.7 WORKING AT HEIGHTS

6.7.1 General Provision

i) While working at a height of more than 2 meters, ISI approved safety belt shall be used.

ii) While working at a height of more than 2 meters, permit should be issued by competent person in form 310-015, before commencement of the job.

iii) Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.

iv) All tools should be carried in tool kits to avoid their falling.

v) If the job is on fragile/sloping roof, roof walk ladders shall be used, in addition to getting safe work permit in form 310-012.

vi) Provide lifeline wherever required.

vii) Additional safety measures like providing Fall Arrestor type Safety belt, safety net should be provided depending upon site conditions, job requirements.

viii) Keep working area neat and clean. Remove scrap material immediately.

ix) Don't throw or drop material/equipment from height.

x) Avoid jumping from one member to another. Use proper passageway.

xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder.

xii) Try to maintain calm at height. Avoid over exertion.

xiii) Avoid movements on beam.

xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

6.7.2 Roof Work

i) All roof-work operations should be pre-planned and properly supervised.

ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.

iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.

v) Roofing brackets should fit the slope of the roof and be securely supported.

vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.

vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.

viii) All covers for openings in roofs should be of substantial construction and be secured in position.

ix) Roofs with a pitch of more than 10 should be treated as sloping.

x) When work is being carried out on sloping roof, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.

xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roof or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8 HANDLING AND LIFTING EQUIPMENT:

6.8.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;

ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factory act".

iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.

iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.

v) Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes, forklifts, trailers etc as per manufacturer's recommendations.

vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.

vii) Allow lifting slings as short as possible and check packing at the friction points.

viii) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.

ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.

x) Control longer jobs being lifted up from both ends.

xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.

xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.

xiii) Allow crane to move on hard, firm and leveled ground.

xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.

xv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.

xvi) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.

xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.8.2 Hoists

i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:

(a) ground level on all sides;
(b) all other levels at all points at which access is provided;
(c) all points at which persons are liable to be struck by any moving part.

ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2mt above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoist way and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1mt in height.

iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.

iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.

v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.

vi) A ladder way should extend from the bottom to the top of outdoor hoist towers, if no other ladder way exists within easy reach.

vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.

viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.

ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.

x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.

xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.

xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.

xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.

xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.

xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.

xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.

xviii) Counterweights should run in guides.

xix) Platforms should be provided at all landings used by workers.

xx) Following notices should be posted up conspicuously and in very legible characters:

(a) on all hoists:

- on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
- on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;

(b) on hoists authorised or certified for the conveyance of persons:

- on the platform or cage: the maximum number of persons to be carried at one time;

(c) *on* hoists for goods only:

- on every approach to the hoist and on the platform: prohibition of use by persons.

xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoist way.

xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.

xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.

6.8.3 Derricks

Stiff-leg derricks

i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.

ii) Devices should be used to prevent masts from lifting out of their seating.

iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.

iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.

v) When derricks are mounted on wheels:

a) a rigid member should be used to maintain the correct distance between the wheels;
b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.

vi) The length of a derrick jib should not be altered without consulting the manufacturer.

Guy derricks

i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.

ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.

iii) The spread of the guys of a guy derrick crane from the mast should not be more than 45^0 from the horizontal.

iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.

v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.

vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.8.4 Lifting ropes

i) Only ropes with a known safe working capacity should be used as lifting ropes.

ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.

iii) Repaired steel ropes should not be used on hoists.

iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.9 VEHICLE MOVEMENT

6.9.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.

6.9.2 Don't overload the vehicle.

6.9.3 Obey speed limits and traffic rules.

6.9.4 Always expect the unexpected and be a defensive driver.

6.9.5 Drive carefully during adverse weather and road conditions.

6.9.6 Read the road ahead and ride to the left.

6.9.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.

6.9.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks

6.9.9 Driver with proper valid driving license shall only be allowed to drive the vehicle

6.9.10 Routes shall be leveled, marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.

6.9.11 While reversing the vehicles, help of another worker should be ensured at all times

6.9.12 An unattended vehicle should have the engine switched off

6.9.13 Wherever possible one-way system shall be followed

6.9.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle

6.9.15 Load should be properly secured

6.9.16 The body of the tipper lorry should always be lowered before driving the vehicle off.

6.9.17 Signs/signals/caution boards etc. should be provided on routes .

6.10.2. Demolition of structural steelwork

i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.

ii) Steel construction should be demolished tier by tier.

iii) Structural steel parts should be lowered and not dropped from a height.

7.0 FIRST AID

First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:

i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers. First aid box should be as per the Factory rules.

ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.

iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

iv) First-aid kit or boxes should not keep anything besides material for first aid in emergencies.

v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and stocked.

vi) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

8.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per Guidelines and Factories Act, 1948.

All accidents (major, minor or near miss) should be investigated, analyzed and recommendations should be documented along with implementation status.

All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

9.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

i) **Poster:** Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).

ii)

iii) **Safety Sign Boards**: Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/ awareness of the workmen while working at site.

iv) **Films & Slides:** Film(s) narrating the accident including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.

v) **Talks, lectures & conferences:** The success of these events would depend much on audience"s understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.

vi) **Compotitions:** Organize competition(s) between the different depts.,/categories of workers. The sense of reward/recognition alsowill improve safety awareness and result in enhancing safety levels.

vii) **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.

viii) **Safety Publication:** Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.

ix) **Safety Drives:** From time to time, an intensive safety drive by organizing a safety day or a safety week etc. should be launched.

x) **Training:** Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related to a job in addition to the general safety training as has been dealt in various chapters and should include all workers.

10.0 LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sl.No.	Code No.	Title
01	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type – Second Revision.
04	IS :1179	Specification for Equipment for Eye and Face Protection during Welding – First Revision.
05	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type – Second Revision.
08	IS : 2361	Specification for Building Grips – First Revision.
09	IS : 2750	Specification for Steel Scaffoldings.
10	IS : 2925	Specification for Industrial Safety Helmets – First Revision
11	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations – First Revision
12	IS : 3521	Industrial safety belts and harnesses
13	IS : 3696	Safety Code for Scaffolds and Ladders : Part I – Scaffolds.
14	IS : 3696	Safety Code for Scaffolds and Ladders : Part II – Ladders.
15	IS : 3764	Safety Code for Excavation Work
16	IS : 4014	Part I & II Code of practice for Steel tubular scaffolding
17	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18	IS : 4082	Recommendations on staking and storage of construction materials at site

Sl.No.	Code No.	Title
19	IS : 4130	Safety Code for Demolition of Buildings – First Revision.
20	IS : 4138	Safety Code Working in Compressed Air-First Revision
21	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards –First Revision.
22	IS : 5121	Safety Code for Piling and other Deep Foundations.
23	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
24	IS : 5983	Specification for Eye Protectors – First Revision.
25	IS : 6922	Structures subject to underground blasts, criteria for safety and design
26	IS : 7205	Safety Code for Erection on Structural Steel Works.
27	IS : 7069	Safety Code for Handling and Storage of Building Materials.
28	IS :7293	Safety Code for Working with Construction Machinery.
29	IS : 7969	Safety code for handling and storage of building material
30	IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
31	IS : 8989	Safety Code for Erection of Concrete Framed Structures
32	IS : 9759	Guidelines for de-watering during construction
33	IS : 11057	Code of practice for Industrial safety nets
34	IS : 13415	Code of Practice on safety for Protective barriers in and around building
35	IS : 13416	Recommendations for preventive measures against hazards at working places

The contractor should engage Technical persons and Workmen with the following qualifications for works as detailed below and the contractor shall carry out the Health Performance check at his cost for the workman engaged in the work through a registered medical practitioner and produce the certificate on demand.

CHECK FOR HEALTH PERFORMANCE

Sl. No.	Activity	Hazard	Exposure Consequence	Check for	Periodicity
1	Concrete Dismantling	Emission of Dust & Noise	1	Lung function	Once in a Year
2	Concrete Mixing	Emission of Dust & Noise	1	Lung function	Once in a Year
3	Painting	Emission of Dust & fumes	1	Lung & throat function	Once in a Year
4	Cutting & Welding	Emission of fumes and gas. Exposure to Live wire	3	Eyes & Lung function	Once in a Year
5	Working on AC sheets	Emission of Dust	3	Lung function	Once in a Year
6	Sweeping of Roads	Emission of Dust	2	Lung function	Once in a Year
7	Collection and disposal of Sanitary waste	Foul smell & susceptibility to decease.	3	Lung function and skin irritation	Once in a Year
8	Handling of Oxygen & Acetylene Cylinders	Leakage of gas	4	Throat irritation	Once in a Year
9	Cleaning of Manholes	Exposure to poisonous gas	4	Suffocation	Once in a Year
10	Cleaning of Overhead tank	Emission of Dust	1	Suffocation & skin irritation	Once in a Year

NOTE: Exposure Consequence

1. Slightly harmful
2. Harmful
3. Very harmful
4. Extremely harmful

BHARAT HEAVY ELECTRICALS LIMITED ,
UNIT: TIRUCHIRAPALLI - 620 014
CIVIL ENGINEERING DEPARTMENT (FACTORY)

NORMS FOR QUALIFICATION

Name of work :

Design, fabrication, supply and erection of Pre-Engineered structural steel shop floor Buildings including crane girder, rail, roof & side cladding, accessories, sky light panels, roof/ turbo ventilators etc. of production shop floorsincluding Electrification of Shop floor (Shop Lighting), High mast lighting system and HT Substation equipment supply and erection works for the Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State.

Tender Schedule No.: **09 / 13-14**

ELIGIBILITY:-

1. **The tenderer should have EPF, PAN, Sales Tax, Service Tax, Excise Duty Registration No., proof of having submitted IT return for the last three years (2010-11 to2012-13), Profit & Loss account and balance sheets certified by the auditor.**

2. **Average annual turnoverof similar works in PEB in the last 3 financial years shall be Rs. 2100Lakhs.**

3. During last seven financial years should have successfully completed works either

   Three similar works not less than (Rs. 2800 L) or

   Two similar works not less than (Rs. 3500 L) or

   One similar work not less than (Rs. 5600 L)

4. **Latest Solvency (obtained within six months) from Nationalised / Scheduled Bank shall be at least for Rs. 2800 Lakhs**

5. **Should possess own Pre Engineering Building components manufacturing facility and design capability to match the present requirement of 7000 Lakhs.**

6. **Should own Pre Engineered Building component manufacturing facility, design capacity to supply PEBs with EOT crane capacity of 30 Tonnes and higher.**

Sl. No	THRUST AREA	SCORE	QUALIFICATION NORMS
I	**NATURE OF COMPANY**	**5**	
	Public Limited	5	
	Private Limited/Partnership firm	3	
	Sole Proprietor	2	
II	**Similar Experience (In PEB Construction)**	**40**	
	Total value of similar works executed in the last three financial years (Pro-rata for in between cases)	40	Rs. 12600 lakh

	More than	24	Rs.6300 lakh
Sl. No	THRUST AREA	**SCORE**	**QUALIFICATION NORMS**
III	**Performance on previous works**	**10**	
	Successful completion of three major works in time.	10	Costing atleast Rs.2800 lakh each
	Successful completion of two major works in time.	8	Costing atleast Rs.2800 lakh each
	Successful completion of one major work in time.	6	Costing atleast Rs.2800 lakh each
IV	**Completion of single work (Rs. 7000 Lakhs) related to Pre Engineered Building in the last 3 financial years.**	**20**	
	(Pro-rata for in between cases)	20	Rs. 14000 lakh
	More than	12	Rs. 7000 lakh
V	**Equipments owned**	**10**	
	Own prefab unit with design office, Mobile crane, Tower crane, Builders Hoist, Winch, Welding generators / transformers, welding transformers, Submerged Arc Welding machines, Drilling machine, Erection tackles & tools, Total station, Measuring instruments with laser technology, Diesel Generator etc	10	
VI	**Qualified staff availability**	**5**	
	Minimum of Graduate Engineer - 5 No Minimum of Supervisors - 5 No	5	
VII	**Financial stability**	**10**	
	Solvency(Pro-rata for in between cases)	10	Rs. 5600 lakh
	More than	6	Rs. 2800 lakh

NOTE: 1. Minimum score required for qualification is 60 out of 100.

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620 014

CIVIL ENGINEERING DEPARTMENT (FACTORY)

QUALIFICATION PROFORMA

1. Name of applicant : Shri / M/s

2. Nationality : Indian ☐ ☐

3. Address : ……..
……..
……..
……..

4. Telephone No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Fax No. : ☐☐☐☐☐☐☐☐☐ E-mail :

5. Constitution

Individual	☐	Sole Proprietorship concern	☐
Partnership Firm	☐	Private Ltd. Company	☐
Public Ltd. Company	☐		

6. In case of Limited Liability Company or Company Limited by Guarantees. :
A) amount of paid-up-capital

7. Enclose a chart showing Company Organisation indicating various factories / workshops / sites / divisions etc., with levels and names of key personnel and clearly depicting the reporting and functional relationships. Also give brief write-up on the functions and responsibilities of each entity.

-8. Details of Owner / Partners / Directors (Strike out whichever is not applicable)

Sl. No.	Name & Designation	Occupation Address	Telephone No.	Fax No.	E-mail
	To be furnished in separate sheet -				

9. Value of property owned, Certificate to be produced from the Revenue Department.

10. Does the applicant maintain any office for preparing designs, drawings, bills, etc.

11. Does the applicant posses facility to set up laboratory for Quality Control at site of work. If so please furnish full details of organisation, equipments, tools, etc.

12. Is the individual/sole proprietor/any partner/ directors of company:

(a)	Dismissed Government Servant	Yes	☐	No	☐
(b)	Having business banned/suspended by any government in the past	Yes	☐	No	☐
(c)	Convicted by a court of law	Yes	☐	No	☐
(d)	Retired Engineer / Official from Engineering Departments of Govt. of India within last two years	Yes	☐	No	☐
(e)	Director or partner of any other company / firm enlisted with CPWD or any other department	Yes	☐	No	☐
(f)	Member of Parliament or any State Legislative Assembly If answer to any of the above is „Yes", furnish details on a separate sheet	Yes	☐	No	☐

13. Name of person holding power of attorney. (Copy to be enclosed) ……

(a) Nationality Indian ☐ Other ☐

(b) Liabilities

14. Name of Banker with full address (**Note**: Banker"s report in original preferably in sealed cover, giving the financial capacity to handle works of the required magnitude should be enclosed) ……

15. Place of business ……

16. Date of commencement of business

17. Details of Income Tax paid during last three years. 1. 2010-11
2. 2011-12
3 2012-13

18. State whether Income Tax Clearance Certificate from the appropriate authority in the prescribed form enclosed. Yes ☐ No ☐

19. Contractor"s capital in the business. (in case of partnership, please mention percentage of shares and amount)

20. Quantum of business done during last three financial years 1. 2010-11
2. 2011-12
3 2012-13

21. Value of fixed assets of the business in the last three years 1. 2010-11
2. 2011-12
3 2012-13

22. Guarantee limits (if any) enjoyed by the firm.

23. Over-draft limits (if any) enjoyed by the firm.

24. State whether Audited report for Profit and Loss Account & Balance Sheet for last three years enclosed. Yes ☐ No ☐

25. Details of Technically qualified staff :-

Sl. No.	Name and Designation	Qualification	Experience and Specialisation	Remarks if any

26. Whether the details of T & P, Machinery, Equipments and work shop as per Annexure – I given. Yes ☐ No ☐

27. Whether enlisted with any other Department Yes ☐ No ☐

(a) If yes, give details:

(i) Name of Department & address ……..……..…….

(ii) Money limit ……..…….

(iii) Enlistment No. & date ……

(iv) Valid upto

28. Licence No. and validity of licence obtained from Dy. Chief Inspector of Factories / Assistant Commissioner of Labour

29. Whether the applicant has registered his workmen under Employees" State Insurance Act. If so, code number may be furnished. If applied, attested copy of application for registration acknowledged by ESI Authorities.

30. Whether the applicant has registered his workmen under Employees" Provident Funds and Miscellaneous Provisions Act ?. If so, the code number may be furnished. If applied, attested copy of application for registration with acknowledged by PF Authorities.

31. Indicate Central / Local Sales Tax, Excise Duty code Numbers and PAN.

1. CST
2. LST
3. ED
4. PAN

32. Is any person working with the applicant as a near relative of the Officer / Official of BHEL Yes ☐ No ☐

(a) If yes, give details

(i) Name ……

(ii) Staff No. ……

(iii) Designation & Department ……

(iv) Unit ……

33. Details of similar works completed during the last seven years (To be submitted in separate sheet as per Annexure-II.)

34. Certificates from clients in original as per proforma given in Annexure -III for all eligible works.

35. Certificates:

(i) I/We (including all partners) certify that I/We have read the Preamble & Terms and conditions and shall abide by them.

(ii) I/We certify that the information given above is true to the best of our knowledge. I/We also understand that if any of the information is found wrong, I/We am/are liable to be debarred.

(iii) I/We certify that I/We will not get myself / ourselves registered as contractor(s) in BHEL under more than one name.

(iv) (a) I certify that I did not retire as an Engineer of Gazetted rank or as any Gazetted Officer employed on Engineering or Administrative duties in any Engineering Department of the Government of India during the last two years. I also certify that I have neither such a person under my employment nor shall I employ any such person within two years of his retirement except with the prior permission of the Government. (For Individuals seeking enlistment in their own name).

(b) We certify that none of the partners/directors retire as an Engineer of Gazetted rank or as any Gazetted Officer employed on Engineering or Administrative duties in last two years. We also certify that we have neither under our employment any such person nor shall we employ any person within two years of his retirement except with the prior permission of the Government. (For partnership firms and limited companies).

Signature(s) of the applicant(s)

	Name	Signature	Address (Seal in case of Firm)
1.	……...	……	……
2.	……...	……	……
3.	……...	……	……
4.	……...	……	……
5.	……...	……	……

Date:

NOTE: 1) All the relevant certificates, details etc. should be attached with the application.
2) The terms that are not applicable may be scored out.

Details of documents attached:-

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

ANNEXURE – I

DETAILS OF PLANTS AND EQUIPMENTS OWNED

Sl. No.	Name of Equipments	Nos.	Capacity or Type	Age	Remarks
	Earth moving equipments				
1.	Excavator (Various sizes)				
	Equipments for hoisting & lifting				
1	Mobile crane				
2.	Tower crane				
3.	Builder"s hoist				
	Equipments for concrete works				
1.	Concrete batching plant				
2.	Concrete pump				
3.	Concrete transit mixer				
4.	Concrete mixer (diesel)				
5.	Concrete mixer (electrical)				
6.	Concrete vibrator (electrical)				
7.	Concrete vibrator (petrol)				
8.	Table vibrator (elect./petrol)				
	Equipments for building works				
1.	Block making machine				
2.	Bar bending machine				
3.	Bar cutting machine				
4.	Wood thickness planer				
5.	Drilling machine				
6.	Circular saw machine				
7.	Welding generators				
8.	Welding transformers				
9.	Cube testing machine				
10.	Steel shuttering				
11.	Steel scaffolding				
12.	Grinding/polishing machine				
	Equipments for road works				
1.	Road roller				
2.	Bitumen paver finisher				
3.	Hot mix plant				
4.	Spreaders				
5.	Earth rammers				
6.	Vibratory road roller				
	Equipments for transportation				
1.	Tipper				
2.	Truck				
	Pneumatic equipments				
1.	Air compressor (diesel)				
	Dewatering equipments				
1.	Pump (diesel)				
2.	Pump (electrical)				
	Power equipments				
1.	Diesel generator				
	Any other plants/equipments				

ANNEXURE - II

DETAILS OF SIMILAR WORKS COMPLETED DURING THE LAST SEVEN YEARS (2006 – 2007 TO 2012-2013)									
Sl. No.	Name of work & Agreement No.	Date of commence ment	Date of completion		Reasons for delay & compensation levied, if any	Work order Value	Gross cost of completion		Name, designation & complete address of the authority for whom the work was done
			Stipulated	Actual			Including cost of cement, steel reinforcement & strl. steel	Excluding cost of cement, steel reinforcement & strl. steel	
DETAILS OF WORK: COMPLETION CERTIFICATES AND WORK ORDERS ETC. ARE TO BE FURNISHED									

CONTRACTOR **ACCEPTING OFFICER**

ANNEXURE - III

CLIENT'S CERTIFICATE REGARDING PERFORMANCE OF CONTRACTORS

Name & Address of the Client

…… …….

…….

Details of works executed by Shri . M/s ……

……

1.	Name of work with brief particulars	:	
2.	Agreement No. and date	:	
3.	Date of commencement	:	
4.	Stipulated date of completion	:	
5.	Actual date of completion	:	
6.	Details of compensation levied for delay, if any:		
7.	Tendered amount	:	
8.	Gross amount of the work completed	:	
9.	Name and address of the authority under whom work executed	:	
10.	Whether the contractor employed qualified Engineer/Overseer during execution of work?	:	
11.	(i) Quality of work (indicate grading)	:	Satisfactory / Not satisfactory
	(ii) Amount of work paid on reduced rate basis, if any	:	
12.	(i) Did the contractor go for arbitration ?	:	
	(ii) If yes, amount of claim	:	
	(iii) Amount received	:	
13.	Comments on the capabilities of the contractor		
	(a) Technical Proficiency	:	Satisfactory / Not satisfactory
	(b) Financial Soundness	:	Satisfactory / Not satisfactory
	(c) Mobilisation of adequate T & P	:	Satisfactory / Not satisfactory
	(d) Mobilisation of manpower	:	Satisfactory / Not satisfactory
	(e) General behaviour	:	Satisfactory / Not satisfactory

NOTE: All columns should be filled in properly.

Signature of the Certifying Officer
with Official seal.

SHEDULE 'A'

LIST OF WORKS AND PRICES

NAME OF WORK:Design, fabrication, supply and erection of Pre-Engineered structural steel shop floor Buildings including crane girder, rail, roof & side cladding, accessories, sky light panels, roof/ turbo ventilators etc. of production shop floorsincluding Electrification of Shop floor (Shop Lighting), High mast lighting system and HT Substation equipment supply and erection works for the Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State.

DETAILS & QUANTITIES of each item of work shown in the BILL OF QUANTITIES are only approximate. They are given as a guide for the purpose of tendering only and are liable to variation and alteration of the Competent Authority. The work under each item as executed shall be measured and priced at the corresponding rate quoted by the contractor in the BILL OF QUANTITIES

Sl.No.	Description of work / supplied	Total amount of work / supplies (in figures and words) Rs. Ps.	Period of contract
1.	**Design, fabrication, supply and erection of Pre-Engineered structural steel shop floor Buildings including crane girder, rail, roof & side cladding, accessories, sky light panels, roof/ turbo ventilators etc. of production shop floorsincluding Electrification of Shop floor (Shop Lighting), High mast lighting system and HT Substation equipment supply and erection works for the Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State.**		**10 MONTHS**

BILL OF QUANTITIES

Sl. No.	Appx. Qty.	Description of work	Rate (Both in Unit fig & Words	Amount Rs. Ps.

AS PER SEPARATE SHEETS ATTACHED CONTAINING **73** PAGES

FROM SERIAL No. **92 to 165of Price Bid**

SCHEDULE 'B'

1. The following materials will be issued FREE of cost to contractor at **Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State.**

Sl.No	Name of Material
01	----NIL---

SCHEDULE 'C'

ISSUE OF TOOLS AND PLANTS TO CONTRACTORS

Sl.No.	Qty.	Particulars	Details of BHEL Crew Supplied	Hire Charges Per unit Per Day	Place of Issue	Remarks
……..Nil…….						

SCHEDULE 'D'

NOTE: All Drawings are to be signed by the Contractor as well as the officer entering into contract.

SL.No.	DRAWING NUMBER	DESCRIPTION
1	**1-TP-CEG-01050**	Layout of Plant.
2	**0-TP-CEG-01413**	General arrangement of production shop
3	**M&S-PD-13-124**	Wheel Load for 10T EOT and 20T EOT
4	**M&S-PD-13-125**	Wheel Load for 30T EOT and 5T SEMI GANTRY
5	**M&S-PD-13-127**	Clearance diagram and Rail Level for EOT Cranes
6	**BHE:CP:04:39:2001**	Details of cup type rail clamp

SCHEDULE 'E'

LEAD STATEMENT

Sl.No	Name of Material	Name of Source	Lead Particulars
1	Cement	NOT APPLICABLE	
2	M.S Rounds,CTD Bars &Structural Steel, rails and all railway materials		
3	Al-Zn alloy coated HT Steel / Polycarbonate Sheets		
4	Cast iron pipes & Specials including pig lead for jointing		

C.A……..Date ……
(To be used in conjunction with BHE Ltd., General Conditions of Contract)

AUTHORITY TO TENDER

Tender Notice No.**09 / 13-14**

Office of the
SR. MANAGER / CIVIL / FACTORY (PLANNING)
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHY – 14.

Tender Schedule No. **18 / 13-14**

Item rate tenderfor the work required,"Design, fabrication, supply and erection of Pre-Engineered structural steel shop floor Buildings including crane girder, rail, roof & side cladding, accessories, sky light panels, roof/ turbo ventilators etc. of production shop floorsincluding Electrification of Shop floor (Shop Lighting), High mast lighting system and HT Substation equipment supply and erection works for the Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State."

Messrs / Mr. ……..

……of…….

are / is hereby authorized to tender for the above work. The Tender is to be delivered at the Office of the SR. MANAGER / CIVIL / FACTORY (PLANNING) Bharat Heavy Electricals Limited Unit, Thiruverumbur, Tiruchirappalli – 620 014, **up to 10.00hrs. on 21.02.2014**addressed to the DY GEN MANAGER / CIVIL / FACTORY (PLANNING & DESIGNS), BHEL. Tiruverumbur, Tiruchirapalli – 620 014 superscribing the name of work as mentioned above.

Any correspondence concerning this tender should be addressed as indicated above quoting the Tender Notice, Schedule No. and other relevant particulars.

BHARAT HEAVY ELECTRICALS LIMITED DO NOT BIND THEMSELVES TO ACCEPT THE LOWEST OR ANY TENDER.

Issuing Officer with

Designation

Contract Agreement No……

TENDER

To

The DY GEN MANAGER / CIVIL / FACTORY (PLANNING & DESIGNS)
Bharat Heavy Electricals Limited
Unit : Tiruverumbur
TIRUCHIRAPPALLI – 620 014.

I / We hereby offer to carry out the**Design, fabrication, supply and erection of Pre-Engineered structural steel shop floor Buildings including crane girder, rail, roof & side cladding, accessories, sky light panels, roof/ turbo ventilators etc. of production shop floorsincluding Electrification of Shop floor (Shop Lighting), High mast lighting system and HT Substation equipment supply and erection works for the Power Equipment Fabrication Plant near Sakoli, Bhandara district in Maharastra State.**

I / We hereby carefully perused the following documents connected with the above noted work and agree to abide by the same.

1. Specifications (General & Particular)
2. Drawings
3. Schedule „A", „B", „C", „D" & „E"
4.Preamble, BOQ with detailed specifications, terms and conditions, etc.
5. BHE Ltd., General & Special Conditions of Contract, Tender Notice and Instructions to Tenders attached hereto.

I / We forward herewith the sum of Rs…….as Earnest Money, which shall be refunded should this tender be rejected. I / We further agree to deposit such sum which along with the sum of Rs……mentioned above shall make up 50% of the fully Security Deposit for this work as provided for under conditions of the BHARAT HEAVY ELECTRICALS LIMITED General Conditions of Contract.

I / We further agree to execute all the work referred to in the said documents upon the terms & conditions contained or referred therein and as detailed in Schedule „A" and Bill of Quantities annexure thereto and to carry out such deviations as may be ordered, vide conditions 6 of the BHEL Ltd., General Conditions of Contract up to a maximum of 20% of the tendered amount of Rs…….

I / We further agree to refer all disputes, as required by condition 62 of the General conditions of Contract to the sole arbitration of an Officer, to be appointed by the General Manager, B.H.E Ltd., in his sole discretion whose decision shall be final and binding.

WITNESS Signature of the Contractor

Date :

1. …….

2. …….

CONTRACTOR **ACCEPTING OFFICER**

GENERAL SUMMARY

1. (a) Net Cost of works or building etc., from Schedule „A" Rs.

2. Provisional sum Rs.

……

Total Rs.

……

Rupees……

……

……

Shri…… in the capacity of …… has been duly authorized by me / us to sign the tender for and on behalf of ……

(in block letters)

Date : SIGNATURE OF CONTRACTOR

Witness : Postal Address :

1……. Telephone No.
Address

2. ……
Address

…….. alterations have been made in the Tender Document and as evidence that these alterations were made before the execution of contract agreement, they have been initialed by the Contractor and the ……

……..……

……..……

……..……

……the said officer is hereby authorized to sign and initial on my behalf the documents forming part of this contract (Number of alternation in figures and words to be given here)

The above tender is accepted by me on behalf of the Bharat Heavy Electricals Limited, Unit: Thriuverumbur, Tiruchirappalli – 620 014. for a sum of Rs…… ……

……..……

……

……..….at the rates as indicated in Schedule „A".(Bill of Quantities)

Signature ……Date……..

Designation ……

To

THE PURCHASE / CONTRACT EXECUTING AGENCY / BHEL

E FORMAT

ACCEPTANCE FOR ELECTRONIC FUND TRANSFER / RTGS TRANSFER

01	Name & Address of the Supplier / Sub-contractor	
02	VENDOR CODE assigned by BHEL	
	Details of Bank Account:	
03	NAME & ADDRESS OF THE BANK	
04	NAME OF THE BRANCH	
05	BRANCH CODE	
06	MICR CODE	
07	ACCOUNT NUMBER	
08	TYPE OF ACCOUNT	CURRENT A/C / OD / CASH CREDIT
09	BENEFICIERY"S NAME	
10	IFSC CODE OF THE BRANCH	
11	EMAIL ID	
12	TELEPHONE/MOBILE NO.	

CERTIFICATE

I / We hereby agree to receive the payments due from BHARAT HEAVY ELECTRICALS LIMITED by the National Electronic Funds Transfer and/or RTGS Transfer mode by credit to my / our above mentioned Bank Account. I / We also agree that payments made to the above mentioned Account are a valid discharge of the liability of Bharat Heavy Electricals Limited. I / We also agree to bear the applicable Bank Charges for the above mode of transfer. **A copy of the cheque leaf/cancelled cheque leaf of the above account is sent herewith.**

AUTHORISED SIGNATORY WITH NAME SEAL

Banker's Certification

We confirm that we are enabled for receiving RTGS and NEFT credits and we further confirm that the account number of _____ ____ _____ (name of account holder), the signature of the authorized signatory and the MICR and IFSC codes of our Branch mentioned above are correct.

PLACE:(Manager / Officer"s)

DATE :

Signature Under Bank stamp and Name Seal

With Membership No.

(Telephone / Mobile No.)

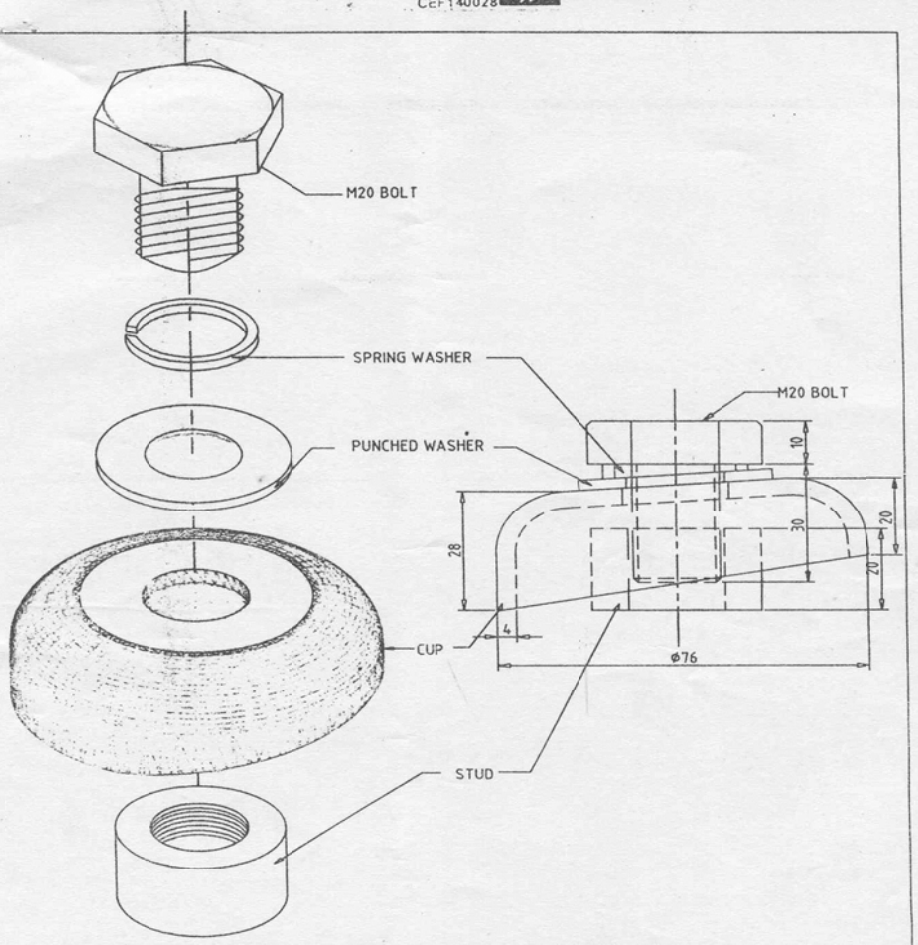
Forwarded to Accounts Dept.

We confirm the above details are verified with the records available with us.

Signature of the BHEL Executive with Name Seal (Operating the Contract/Services)

SIGNATURE OF THE APPLICANT

CEF140028



Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI – 620014	DRN	NAME J.SIMON	SIGNATURE	DATE 04.04.01	NO. OF VAR
	CHD	K.GUNASEKARAN			
	APPD	A.ARULANANDHAM			

DEPT CIVIL CODE 2200	GRADE OF UNTOL. DIM. C/M/F	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG	ITEM NO	No OF ITEMS

TITLE **DETAILS OF CUP TYPE RAIL CLAMP**	CARD CODE U 01	DRAWING NO : **BHE:CP:04:39:2001**	REV