

TENDER SPECIFICATION

BHEL:PS:SR:SAS:SCT:GK1115-078/T.No.20/ 2008-09

FOR

**TRANSPORTATION FROM STORES TO SITE, HANDLING OF
EQUIPMENTS AT SITE, ERECTION, TESTING AND
COMMISSIONING OF ELECTRICAL AND C&I SYSTEMS FOR
5 X 30 MW CAPACITY PUMP SETS.**

At

**KALWAKURTHY LIFT IRRIGATION SCHEME - STAGE I
MAHABOOB NAGAR DISTRICT,
ANDHRA PRADESH**

PART – II PRICE BID

BOOK NO: 2



**BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.**

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

**TENDER SPECIFICATION NO: BHEL:PS:SR:SAS:SCT:GK1115-078/
T.No.20/ 2008-09**

NAME OF WORK

Transportation from stores to site, Handling of equipments at Site, Erection, Testing and Commissioning of Electrical and C&I systems for 5 x 30 MW capacity pump sets at Kalwakurthy Lift irrigation Pump Hydro Electric Project, Mahaboob Nagar District Andhra Pradesh

(PRICE BID)
PART II

Issued to
M/s

(This tender document is not transferable)

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

Sr. Dy. General Manager / C&C

Place : Secunderabad

Date :

SECTION – VIII(A)

RATE SCHEDULE FOR ERECTION & COMMISSIONING

BHEL:PS:SR:SAS:SCT:GK1115-078-083/T.No.20/ 2008-09

BILL OF MATERIAL FOR ELECTRICAL AND C&I PACKAGE
FOR 5 X 30 MW LIFT IRRIGATION PUMP STATIONS OF KALWAKURTHY
LIFT IRRIGATION SCHEME STAGE I

SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
I	BHEL-BHOPAL SCOPE :				
1.0	STATIONAUXILIARY PANELS COMMON FOR UNIT I TO V :				
1.1	H.P AIR COMPRESSOR MOTOR STARTER PANNEL 540X250X900MM : 100 KG	COM MON FOR ALL UNITS	01 NO		
1.2	DRAINAGE PUMP MOTOR STARTER PANEL 1400X350X1800MM : 300 KG		01 NO		
1.3	DEWATERING PUMP MOTOR STARTER PANEL 1400X350X1800MM : 300 KG		01 NO		
2.0	UNIT AUXILIARY STARTER PANELS :				
2.1	COOLING WATER PUMP MOTOR STARTER PANEL 1000X500X2320MM: 300 KG	02 NOS	10		
2.2	BRAKE DUST COLLECTOR PANEL 540X250X1000MM : 100 KG	01 NO.	5		
2.3	H.S LUB OIL PUMP MOTOR PANEL 540X250X1000 MM : 100 KG	01 .NO.	5		
2.4	MOTOR STATOR HEATER CONTROL STARTER PANEL 540X250X900MM :100 KG	01. NO.	5		
2.5	top cover drainage pump motor starter panel 540x250x900 mm : 100kg	01 NO.	05.NO		
2.6	COOLING WATER STRAINER MOTOR STARTER PANEL 640X250X900 : 100KG	02 NOS	10 NO		
2.7	GOVERNOR OIL PUMP MOTOR STARTER PANEL 1000X500X2320 MM : 300 KG	01 NO.	10.NO		
2.8	MIV OIL PUMP MOTOR STARTER PANEL 1000X500X2320 MM : 300 KG	01NO	5NOS		

SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
3.0	CONTROL PANELS :				
3.1	PUMP MOTOR / TRF RELAY PANELS 1525X800X2285MM : 700KG	02.NOS	10.NOS		
3.2	STATION TRF RELAY PANEL (STN.AUX. PANEL) 750X800X2285MM:350KG	01 NO	03.NOS		
3.3	SFC STARTING TRF RELAY PANEL750X800X2285MM : 350 KG	01 NO	04.NOS		
3.4	PUMP GAUGE PANEL 1000X800X2320MM : 600KG THE FOLLOWING ITEMS IF SUPPLIED LOOSE ALONGWITH THE PANEL TO BE MOUNTED AT SITE BY THE CONTRACTOR DIAL TYPE THERMOMETERS : 06 NOS INDICATORS (P.FLOW, LEVEL) : 10NOS TURBINE BEARING OIL LEVEL 01 NO INDICATOR/CONTROLLER	01 NOS	05 NOS		
3.5	PUMP CONTROLLER PANEL 1000X800X2320 MM : 600 KG	01.NOS	05 NOS		
4.0	415 V LT SEGREGATED PHASE BUS DUCT WITH ALL ACCESSORIES	15 MTRS	75 MTRS		
5.0	FIELD INSTRUMENTS FOR PUMP UNIT & STATION AUXILIARIES				
5.1	PUMP UNIT :				
5.1.1	PRESSURE GAUGES	09 NOS	45 NOS		
5.1.2	PRESSURE SWITCHES	02 NOS	10 NOS		
5.1.3	PRESSURE TRANSMITTERS	04 NOS	20 NOS		
5.1.4	TEMPERATURE SENSORS (RTDS)	06 NOS	30 NOS		
5.1.5	DIAL TYPE THERMOMETERS	03 NOS	15 NOS		
5.1.6	OIL LEVEL SWITCHES	02 NO	10 NOS		
5.1.7	OIL LEVEL INDICATORS	01.NO	5 NOS		
5.1.8	LEVEL CONTROLLERS WITH PROBES, CABLES ETC.	02. NOS	10 NOS		

SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
5.1.9	HEAD RACE & TAIL RACE LEVEL MEASURING EQUIPMENTS EACH SET CONSISTS OF : TRANSMITTER 1NO INDICATOR 1NO POWER SUPPLY UNIT 1 NO INTERCONNECTING CABLES ETC. (LUMPSUM PRICE TO BE QUOTED) NOTE :INSTALLATION OF HEAD RACE AND TAIL RACE LEVEL TRANSMITTERS INCLUDE INSTALLATION OF FOLLOWING TRASDUCER, 50NB & 150 NB PIPES WITH SUPPORTING CLAMPS, FIXING OF POWER SUPPLY UNIT, TRANSMITTER WITH CANOPY ETC.	COMMON FOR ALL UNITS	02 SETS		
5.1.10	PUMP DISCHARGE FLOW MEASURING EQUIPMENT CONSISTS OF : DP TRANSMITTER 1 NO DIGITAL INDICATOR 1 NO POWER SUPPLY UNIT 1 NO INTERCONNECTING CABLES ETC. (LUMPSUM PRICE TO BE QUOTED)	01 SETS	05 SETS		
5.1.11	12 POINT TEMPERATURE SCANNER	01 NOS	05 NOS		
5.1.12	LIMIT SWITCHES	33 NOS	165 NOS		
5.1.13	COMMISSIONING ASSISTANCE FOR SOLENOIDS	06 NOS	30 NOS		
5.2	UNIT AUXILIARIES (5.2 TO 5.5)TOP COVER DRAINAGE SYSTEM				
5.2.1	LEVEL CONTROLLER WITH LEVEL PROBES. CABLES ETC.	01 NOS	05 NOS		
5.3	COOLING WATER SYSTEM				
5.3.1	PRESSURE GAUGES	10 NOS	50 NOS		
5.3.2	PRESSURE SWITCHES	01 NO	05 NOS		
5.3.3	DIFFERENTIAL PRESSURE SWITCHES	03 NOS	15 NOS		
5.3.4	DIAL TYPE THERMOMETERS	01 NO	5 NOS		
5.3.5	PRESSURE TRANSMITTERS	01 NO	5 NOS		
5.3.6	COMMISSIONING ASSISTANCE FOR FLOW RELAY CUM INDICATOR	01 NO	5 NOS		

SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
5.4	D.T. WATER DEPRESSION SYSTEM				
5.4.1	PRESSURE GAUGES	03 NOS	15 NOS		
5.4.2	LIMIT SWITCHES	04 NOS	20 NOS		
5.4.3	PRESSURE TRANSMETER	01 NOS	5 NOS		
5.4.4	PRESSURE SWITCHES	02 NOS	10 NOS		
5.4.5	MAGNETIC LEVEL CONTROLLER WITH LEVEL ELECTRODES ETC. FOR DRAFT TUBE	01 SET	05 SETS		
5.4.6	COMMISSIONING ASSISTANCE FOR SOLENOIDS	06 NOS	30NOS		
5.5	OIL PRESSURE UNIT :				
5.5.1	PRESSURE GAUGES	2 NOS	10 NOS		
5.5.2	LEVEL GAUGES	2 NOS	10 NOS		
5.5.3	DIAL TYPE THERMOMETERS	01 NO.	05 NOS		
5.5.4	TEMPERATURE SENSORS (RTDS)	01 SET	05 SETS		
5.5.5	PRESSURE & DIFFERENTIAL PRESSURE SWITCHES	06 NOS	30 NOS		
5.5.6	PRESSURE TRANSMITTER	01. NO	05 NOS		
5.5.7	LEVEL SWITCHES	08 NOS	40 NOS		
	STATION AUXILIARIES (5.6 & 5.7)				
5.6	H.P. COMPRESSOR AIR SYSTEM				
5.6.1	PRESSURE GAUGES	COMMON FOR ALL UNITS	02 NOS		
5.6.2	PRESSURE SWITCHES		04 NOS		
5.6.3	TEMPERATURE SWITCHES		09 NOS		
5.6.4	OIL LEVEL SWITCHES		09 NOS		
5.6.5	PRESSURE TRANSMITTERS		01 NO		

Service Tax + Edn Cess shall be treated as extra.

SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
5.7	Dewatering & drainage System				
5.7.1	PRESSURE GAUGES	COMMON FOR ALL UNITS	04 NOS		
5.7.2	LEVEL CONTROLLERS WITH LEVELPROBES, CABLES ETC.,		04 NO		
5.7.3	LEVEL SWITCHES		02 NOS		
6.0	Field instruments / panels / equipments for motor				
6.1	DIAL TYPE THERMOMETERS	15 NOS	75 NOS		
6.2	TEMPERATURE SENSOR (RTDS)	27 NOS	135 NOS		
6.3	OIL LEVEL SWITCHES	02 NOS	10 NOS		
6.4	24 POINT TEMPERATURE RECORDER	01 NO	05 NOS		
6.5	LIMIT SWITCHES FOR BRAKE AND ROTOR JACKING	05 NOS	25 NOS		
6.6	THERMOSTATS	09 NOS	45 NOS		
6.7	SPACE HEATERS	03 NOS	15 NOS		
6.8	COMMISSIONING ASSISTANCE FOR FLOW INDICATOR CUM RELAYS	03 NOS	15 NOS		
6.9	GENERATOR MARSHALLING BOX 350PT	01 NO	5 NOS		
7.10	24 POINT TERMINAL BOX	01 NO	5 NOS		
7.11	45 POINT TERMINAL BOX	03 NOS	15 NOS		
7.12	63 POINT TERMINAL BOX	01 NO	5 NOS		
7.13	Speed signal probe (magnetic pick-up) with 4 core 0.22 sq.mm screen cable of 50 mtrs long.	01 NO	05 NOS		
8.0	ERECTION HARDWARE :				
8.1	½ " SCH 40 CS PIPE	500 MTRS	2500 MTRS		
8.2	12 WAY MARSHALLING BOX	COMMO N	10 NOS		

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SL. NO.	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
9.0	<u>Commissioning assistance for equipments erected by mechanical contractor</u>				
9.1	HYDRO MECHANICAL CABINET (HYDRAULIC CONTROL PANEL)	01 NO	05 NOS		
9.2	BRAKE AND JACK PANEL INCLUDES CHECKING OF PRESSURE GAUGES, PRESSURE SWITCHES, SOLENOID COILS ETC.	01 NO	05 NOS		
9.3	H.S. LUBRICATION EQUIPMENT CHECKING OF PRESSURE GAUGES, PRESSURE SWITCHES	01 NO	05 NOS		
9.4	Centrifugal over speed device	01 NO	05 NOS		
9.5	MOTORISED POWERPACK ROTOR JACKING		01 MO		
9.6	OIL PURIFIER UNIT WITH THERMOSTATS, SOLENOID VALVES ETC. THE WORK INVOLVES CHECKING THE CONTINIUIITY WIRING ETC.,	COM MON	01 NO		
9.7	LT DRIVES : THE WORK INVOLVES CHECKING, MEGGERING, IMPROVING IR VALUE BY DRY OUT TESTING & COMMISSIONING	20 NOS	100 NOS		
9.8	SOLENOID OPERATED VALVES	07 NOS	35 NOS		
9.9	FIRE FIGHTING EQUIPMENT THE WORK INVOLVES ERECTION OF PANEL , WIRING, COMMISSIONING OF ALL THE ACESSORIES INVOLVE, LOCAL & REMOTE OPERATION.	COM MON	01SET		

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SL. NO	DESCRIPTION OF ITEMS	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
II	BHEL-JHANSI- SCOPE :				
1.0	Busduct 11 KV 1500 a segregated phase bus duct / 600 a tap off busduct connecting phase & neutral side generator buses with associated support structures seal off bushings wall frame assemblies marshalling boxes support insulator assembly lavt cubicle ngt ngr cubicle with cts pts other loose items / accessories supplied along with the system, Length:60Mtrs(Approximate)	01 SETS	05 SETS		
II	BHEL-JHANSI SCOPE :				
	<ul style="list-style-type: none"> • LAVT CUBICLE 2400X2320X2400 MM 2000 KG • N.G TRANSFORMER, SINGLE PHASE DRY TYPE, 11KV / 220V 47 KVA • NGR CUBICLE 2000 X 1250 X1250 MM 1500 KG • SUPPORT STRUCTURE 5000 KG • JOINTS : BOLTED JOINTS • REFERENCE DRAWING : 0-541 -0053-185 SHT 1 	01 SET	05 SET		

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A.STATIC EXCITATION EQUIPMENT

UNIT NO.	EQUIPMENT	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
III	BHEL- EDN SCOPE :				
1	Static excitation equipment consists of:				
	regulation cubicle , Thyrister cubicle(2nos.), field suppression cubicle	1 set	5 Sets		
	Initial excitation panel	1 No	5Nos		
	Excitation Transformer Enclosure.	1 No	5Nos		

B.CONTROL & MONITORING SYSTEM

UNIT NO.	EQUIPMENT	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
1	UNIT CONTROL BOARD (UCB) Consists of:				
	Auto sequencer control	1set	5Sets		
	Temp. Measurement Panel (Empty cubicle)	1No	5Nos		
	Gauge Panel (Empty Cubicle)	1No	5Nos		
	Unit Alarm Panel.	1no	5Nos		
	COMMON ITEMS OF C&M				
COM MON	Manual synchronizing trolley	Com mon	1no		
	Common aux. Service Control Board				
	-Control panel for aux like 11KV, SAB, UABs	COMM ON FOR ALL UNITS	1Set		
	- Indicators for Cistern & surge pool water level.		1Set		
	Line and Bus Coupler Control Board		1Set		
	Mosaic Mimic Panel		1Set		
	Control system with Data Acquisition (MMI System)				
	- OWS, EWS, Printers	COMM ON FOR ALL UNITS	1Set		
	- Control desk, printer tables, Chairs		1Set		
	Alarm Panel for Common aux & line		1No		
	24 V DC battery and battery charger system		1Set		
	230V, 1 phase, UPS		1Set		

C.STATIC FREQUENCY CONVERTER

UNIT NO.	EQUIPMENT	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
1	Converter / Inverter panel	1Set	4Set		
	Control Panel	1Set	4Set		
	P&I Panel	1No	4Nos		
	Grounding Transformer Panel	1No	4Nos		
	Input Power Transformers	1No	4Nos		
	DC Link Reactor	2nos	8Nos		
	AC breaker Panel	1set	4set		
	Isolator panel	1No	4Nos		
	Adaptor Panel	1No	4Nos		
	Output power transformer vector Ddo	1No	4Nos		
2	ISOLATOR PANEL				
COM MON	Isolator Panel	COM MON	1No		
	Isolator Interlock Panel		1No		

Service Tax + Edn Cess shall be treated as extra.

UNIT NO.	EQUIPMENT	Qty per Unit	Total Qty for Five Units	UNIT RATE PER MTR	AMOUNT (IN RUPEES) FOR FIVE UNITS
	CABLES				
	PROVISIONAL RATE SHALL BE QUOTED FOR THE FOLLOWING (PER METRE BASIS).				
1	SIGNAL CABLE				
	2 PAIR FRLS PVC CONTROL CABLE	MTRS	2000		
	4 PAIR FRLS PVC CONTROL CABLE	MTRS	3000		
	8 PAIR FRLS PVC CONTROL CABLE	MTRS	3000		
	12 PAIR FRLS PVC CONTROL CABLE	MTRS	5000		
	16 PAIR FRLS PVC CONTROL CABLE	MTRS	7000		
	¾" /1/2" FLEXIBLE CONDUCT	MTRS	5000		
2	LT Power Cables				
	14 CORE 7.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	2500		
	3CORE 2.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	2000		
	1CORE 16 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1500		
	7CORE 1.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1000		
	4CORE 1.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1500		
	4CORE 4 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1000		
	2CORE 2.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	10000		
	2CORE 2.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1000		
	1CORE 2.5 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	1000		
	1CORE 50 SQ MM AL CONDUCTOR PVC INSULATED UNARMOURED CABLE	MTRS	5000		

UNIT NO.	EQUIPMENT	Qty per Unit	Total Qty for Five Units	UNIT RATE	AMOUNT (IN RUPEES) FOR FIVE UNITS
3	HT Power Cables				
	1 CORE 300SQ MM ALUMINIUM CONDUCTOR CABLE, XLPE INSULATED, 11/11KV (UE), PVC OUTER SHEATH ARMoured CABLE	MTRS	20000		
	HT TERMINATION KITS	NOS	2000		

GRAND TOTAL PRICE:
FOR FIVE UNITS
i.e for 5 x 30 MW }
}

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NOTE TO RATE SCHEDULE

- 1) The quoted rate shall include for the variation of PLUS 10% in quantity.
- 2) **The quantities indicated in the Rate Schedule are only approximate and are liable for variation. Payment shall be made to the actual quantity erected at the unit rate quoted / accepted.**
- 3) Dimension and weight indicated in the Rate Schedule are only approximate and given for guidance of the contractor.
- 4) **Rates include complete installation, testing, commissioning and trial operation of equipments laying and dressing of cables, termination of cables etc.**
- 5) Tenderers are requested to quote their rates, only in the price bid (part II) provided by BHEL. Quoting of rates in any other form/formats will not be entertained.
- 6) Qualification criteria: L1 will be decided on the **grand total quoted price.**