STANDARD

TECHNICAL SPECIFCATION

FOR

3 PHASE 4 WIRE CT OPERATED FULLY STATIC

AMR COMPATIBLE TRI–VECTOR ENERGY METERS

FOR

DISTRIBUTION TRANSFORMERS AND METERING UNIT

Prepared for

R–APDRP PROJECTS

1.0 SCOPE

Design, manufacturing, testing, supply and delivery of AC, 3 Phase, 4 Wire, CT operated fully Static and AMR compatible Tri-Vector for metering DTR according SRS for ITIA under R-APDRP project, Energy Meters for measurement of different electrical parameters listed elsewhere in the document including Active Energy (KWH), Reactive Energy (KVARH), Apparent Energy (KVAH) etc. The detail scope is given below.

2.0 APPLICATION

On Distribution Transformers

3.0 STANDARDS TO WHICH METERS SHALL COMPLY

Guidelines on "Data Exchange for Electricity Meter Reading, Tariff and Load Control – Companion Specification" enclosed with this document as annexure.

IS: 14697 /1999 (reaffirmed 2004) Specification for AC Static Transformer operated Watt Hour & VAR-Hour meters (class 0.5S);

IS-15707 Specification for Testing, evaluation, installation & maintenance of AC Electricity Meters-Code of Practice

The equipment meeting with the requirements of other authoritative standards, which ensure equal or better quality than the standard mentioned above, also shall be considered; in case of conflict related with communication protocol, the Guidelines on "Data Exchange for Electricity Meter Reading, Tariff and Load Control – Companion Specification" enclosed with this document as annexure shall prevail upon. For conflict related with other parts of the specification, the order of priority shall be – i) This technical specification ii) IS: 14697 /1999 (reaffirmed 2004).

4.0 GENERAL TECHNICAL REQUIREMENTS

1	**TYPE**	DLMS AMR Compatible Static as per PFC specification, 3 Ph, 4 Wire Tri-Vector Energy Meter
2	**FREQUENCY**	50 Hz ±5%
3	**ACCURACY CLASS**	0.5S
4	**SECONDARY VOLTAGE**	Suitable for operations on 240V P to N for LT-Distribution Transformer meters
5	**BASIC CURRENT (Ib)**	-/5 Amps. As per existing CT
6	**MAXIMUM CONTINUOUS CURRENT**	2.0 Ib; Starting and Short time current shall be as per IS-14697
7	**POWER CONSUMPTION**	i) The active and apparent power consumption, in each voltage circuit, at reference voltage, reference temperature and reference frequency shall not exceed 1. 5 W and 8 VA. ii) The apparent power taken by each current circuit, at basic current, reference frequency and reference temperature shall not exceed 1.0 VA
8	**POWER FACTOR**	0.0 Lag -Unity- 0.0 Lead

9	**DESIGN**	Meter shall be designed with application specific integrated circuit (ASIC) or micro controller; shall have no moving part; electronic components shall be assembled on printed circuit board using surface mounting technology; factory calibration using high accuracy (0.05 class) software based test bench.

5.0 CONSTRUCTIONAL REQUIREMENT/ METER COVER & SEALING ARRANGEMENT

Poly carbonate cover shall conform to IS 11731 (FH-1category) besides meeting the test requirement of heat deflection test as per ISO 75, glow wire test as per the IS:11000 (part 2/SEC-1) 1984 OR IEC PUB,60695-2-12, Ball pressure test as per IEC--60695-10-2 and Flammability Test As per UL 94 or As per IS 11731(Part-2) 1986 .The meter body should be provided with ultrasonic welding preferably seamless. The meter body box, terminal block and ETBC should be of high grade poly carbonate / fire and flame retardant material.

6.0 WORKING ENVIRONMENT

As per IS 14697-1999 (reaffirmed 2004). Meter to perform satisfactorily under Non-Air Conditioned environment (within stipulations of IS)
Meter body will conform to IP51 degree of protection. For outdoor use meter shall be installed in sealed enclosure conforming to IP 55.
The meter shall be suitable designed for satisfactory operation under the hot and hazardous tropical climate conditions and shall be dust and vermin proof. All the parts and surface, which are subject to corrosion, shall either be made of such material or shall be provided with such protective finish, which provided suitable protection to them from any injurious effect of excessive humidity.

7.0 MANUFACTURING PROCESS, ASSEMBLY AND TESTING

Meters shall be manufactured using latest and 'state of the art' technology and methods prevalent in electronics industry. The meter shall be made from high accuracy and reliable surface mount technology (SMT) components. All inward flow of major components and sub assembly parts (CT, PT, RTCs/Crystal, LCDs, LEDs, power circuit electronic components etc.) shall have batch and source identification. Multilayer 'PCB' assembly with 'PTH' (Plated through Hole) using surface mounted component shall have adequate track clearance for power circuits. SMT component shall be assembled using automatic 'pick-and-place' machines, Reflow Soldering oven, for stabilized setting of the components on 'PCB'. For soldered PCBs, cleaning and washing of cards, after wave soldering process is to be carried out as a standard practice. Assembly line of the manufacturing system shall have provision for testing of sub-assembled cards. Manual placing of components and soldering, to be minimized to items, which cannot be handled by automatic machine. Handling of 'PCB' with ICs/C-MOS components, to be restricted to bare minimum and precautions to prevent 'ESD' failure to be provided.

Complete assembled and soldered PCB should undergo functional testing using computerized Automatic Test Equipment.

Fully assembled and finished meter shall undergo 'burn-in' test process for 12 hrs at 55 degree Celsius (Max. temperature not to exceed 60 degree Celsius) under base current (Ib) load condition.
Test points should be provided to check the performance of each block/stage of the meter circuitry. RTC shall be synchronized with NPL time at the time of manufacture. Meters testing at intermediate and final stage shall be carried out with testing instruments, duly calibrated with reference standard, with traceability of source and date.

8.0 DISPLAYS

The meter shall have 7 digits (with ±indication), parameter identifier, backlit Liquid Crystal Display (LCD) of minimum 10 mm height, wide viewing angle. Auto display cycling push button required with persistence time of 10 Seconds. LCD shall be suitable for temperature withstand of 70 deg C; Sequence of display of various instantaneous electrical parameters shall be as desired by Purchaser at the time of order.
The data stored in the meters shall not be lost in the event of power failure. The meter shall have Non Volatile Memory (NVM), which does not need any battery backup. The NVM shall have a minimum retention period of 10 years.

9.0 PERFORMANCE UNDER INFLUENCE QUANTITIES

The meters performance under influence quantities shall be governed by IS 14697-1999 (reaffirmed 2004). The accuracy of meter shall not exceed the permissible limits of accuracy as per standard IS: 14697 (latest version).

10.0 OUTPUT DEVICE

Energy Meter shall have test output, accessible from the front, and be capable of being monitored with suitable testing equipment while in operation at site. The operation indicator must be visible from the front and test output device shall be provided in the form of LED. Resolution of the test output device shall be sufficient to enable the starting current test in less than 10 minutes.

11.0 REAL TIME INTERNAL CLOCK (RTC)

RTC shall be pre-programmed for 30 Years Day/date without any necessity for correction. The maximum drift shall not exceed +/- 300 Seconds per year.
The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:

a) Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;

b) From remote server through suitable communication network or Sub-station data logger 'PC'.

12.0 QUANTITIES TO BE MEASURED & DISPLAYED

The meter shall be capable of measuring and displaying the following electrical quantities within specified accuracy limits for polyphase balanced or unbalanced loads:

a) Instantaneous Parameters such as phase and line voltages, currents, power factors, overall kVA, kW, kVAr, power factor, frequency etc as per details given in the table below and enclosed annexure.

b) Block Load Profile Parameters such as kVAh/kWh/kVArh (lag/lead)/Maximum Demand (MD) in kW/kVA/power factor/phase and line voltages/currents etc (minimum 5 parameters) as per details given in the table below and enclosed annexure.

c) Daily Load Profile Parameters such as cumulative energy kWh (import/export)/cumulative kVAh (while kW- import/export)/cumulative energy kVArh (quadrant-1/2/3/4)/reactive energy high (V>103%)/low (V<97%), etc as per details given in the table below and enclosed annexure.

In addition to above the meter shall also record the Name plate details, programmable parameters (readable as profile), occurrence and restoration of tamper events along with the parameters (Table A5.1, A5.2 and A6.1 to A6.8 respectively of guideline document)
Detail of category wise parameters requirement suitable for specific location such as DT metering is given in following tables of guidelines document enclosed as annexure:

Category	Parameter	Annexure Table No. (may change as per final companion standard)
Distribution Transformer Meters	Instantaneous parameters	A2.1
	Block Load Profile parameters	A2.2
	Name Plate details	A5.1
	Programmable Parameters	A5.2
	Event Conditions	A6.1 to A6.7
Logging parameters for each of the event condition – shall be selected	Capture parameters for event as applicable (Event Log Profile)	A6.8

13.0 DEMAND INTEGRATION PERIOD

The maximum demand integration period may be set at 15 minute or 30 minute by purchaser as per requirement. **14.0 MD RESET**
It should be possible to reset MD by the following options:
a) Communication driven reset
b) Local push button
c) Auto reset at 24:00 hrs at the end of each billing cycle
15.0 MARKING OF METERS

The marking of meters shall be in accordance with IS: 14697 /1999 (reaffirmed 2004). The meters shall bear marking "Purchased under R-APDRP scheme".
The meter shall also store name plate details as given in the table A5.1 of annexure. These shall be readable as a profile as and when required.

16.0 COMMUNICATION CAPABILITY

The meter shall be provided with two ports for communication of the measured/collected data as per guideline document enclosed in the annexure, i.e. a hardware port compatible with RS 232 which shall be used for remote access through suitable Modem (GPRS/GSM/EDGE/CDMA/PSTN/LPR) and an Optical port complying with hardware specifications detailed in IEC-62056-21. This shall be used for local data downloading through a DLMS compliant HHU.
The RS 232 port shall be capable to transfer and export data to the remote end server through suitable communication mediums (GPRS/GSM/EDGE/CDMA/ PSTN/LPR). Both ports shall support the default and minimum baud rate of 9600 bps.

17.0 CMRI

To enable local reading of meters data a DLMS compliant CMRI shall be used. The CMRI shall be as per specification given in the enclosed guidelines document. It shall be compatible to the DLMS compliant energy meters that are to be procured/ supplied on the basis of this specification. 20 nos. CMRI shall be supplied by the meter manufacturer along with the meter in addition to their requirement for taking reading at site.

18.0 TAMPER & FRAUD MONITORING FEATURES

The meter shall work satisfactorily under presence of various influencing conditions like External Magnetic Field, Electromagnetic Field, Radio Frequency Interference, harmonic Distortion, Voltage/Frequency Fluctuations, and electromagnetic High Frequency Fields etc. The meter shall be immune to abnormal voltage/frequency generating devices and shall record the occurrence and restoration of such tamper events along with parameters such as current, voltages, kWh, power factor, event code, date & time etc. (listed in Table A6.1 to A6.7 in enclosed document).
Tamper details shall be stored in internal memory for retrieval by authorized personnel through either of the following:

i) CMRI
ii) Remote access through suitable communication network.
Minimum 200 numbers of events (occurrences & restoration with date & time) should be available in the meter memory.

19.0 TYPE TESTS

The meter offered should have successfully passed all type tests described in the IS 14697 and the meter Data Transfer and Communication capability as per enclosed guidelines document. Type test certificate shall be submitted along with the offer and the same shall not be more than 36 months old at the time of bid submission. Make & type of major components used in the type-tested meter shall be indicated in the QAP. The condition are to be relaxed by the purchasers (utilities) for the bids to be issued in next six months (i.e. upto Feb 2010) to accommodate design, development and testing of the new standard meters, conforming to the guidelines document enclosed as annexure, by manufacturers. The bidder shall have to submit the required type test certificate (as per bid requirement) to the purchaser (utility) at the time of meters delivery.

Further Purchaser shall reserve the right to pick up energy meters at random from the lots offered and get the meter tested at third party lab i.e. CPRI / agencies listed at Appendix-C of Latest – standardization of AC static electrical energy meters – CBIP publication NO.-304/ NPL / CQAL/ ERTL / ERDA at the sole discretion of the Purchaser. The supplier has no right to contest the test results of the third party lab or for additional test and has to replace/take corrective action at the cost of the supplier.
It shall be the responsibility of the supplier to arrange such tests and Purchaser shall be informed of the date and time of conduction of tests well in advance to enable him to witness such tests.

20.0 ACCEPTANCE & ROUTINE TESTS

Criteria for selection for such tests and performance requirements shall be as per IS 14697-1999 (reaffirmed 2004)
Additional acceptance shall include Surge withstand (SWC) for 6 kVp as per IEC 62052-11, Lightning impulse test and HF disturbance test as per IS 14697. One sample meter per order from one of the offered lot shall be subjected to these specific tests. Meters subjected to these tests shall not be used after tests.
Accuracy tests shall be performed at the beginning and at the end of the acceptance tests specified.

21.0 QUALITY ASSURANCE:

The manufacturer shall have a comprehensive quality assurance program at all stages of manufacture for ensuring products giving reliable, trouble free performance. Details of the bidder's quality assurance and test set up shall be furnished with the bid. A detailed quality assurance program shall be finalized with the successful bidder during the award stage. Bidder shall furnish following information along with his bid:

i) Organization structure of the manufacturer and his main sub-suppliers (PCBs, SMT cards, CT/PT) with details of 'QA' setup, overall workflow;

ii) Copy of system manual showing 'QAP' (Quality Assurance Plan) as actually practiced during manufacturing and final testing.

iii) List of raw materials and critical components (ASIC chip, crystal clock, memory register Chip, transformers, optical ports etc.) with their suppliers;

iv) Stage inspection of product before final testing;

v) Procedure adopted for 'In-situ' testing of PCBs, after placement of surface mounted component, for quantitative parametric variation of tolerance by self or sub-contractor.

vi) Testing and calibration facility, date of calibration of test bench, manpower data of bench operators;

vii) Sample copies of test certificate of bought out components.

23.0 GUARANTEE

Equipment (Meter) supplied shall be guaranteed for a period of 60 months from the date of supply. Bidders shall guarantee to repair or replace the meters and meter boxes (if supplied), which are found to be defective/ inoperative at the time of installation, or become inoperative/ defective during guarantee period. Replacements shall be effected within 1 month from the date of intimation. The bidder shall extend the guarantee of 5 years. However the backup bank guarantee provided by the bidders shall be valid for 2 years only.

The supplier will keep extra 1% stock as reserve in JSEB of supplied items for quick warranty replacement.

24.0 FIXING & CONNECTION ARRANGEMENT

Manufacturer shall ensure following technical points:

i) Meter shall be suitable for mounting on Simplex type vertical panel with front door; CAT-M4 disconnecting type TBs to be used for Current circuit; Panel wiring to be properly dressed and harnessed; External cables to enter panel from bottom gland plate using double compression glands.
ii) Meter installation & Inter-connection from existing CT/PT connections to energy meters in the panel shall be in the scope of purchaser. The external cabling from existing CT/PT to Energy Meter panel shall be in the scope of purchaser.

iii) Energy Meter terminals block shall be adequately sized with regard to maximum conductor dimension, commensurate with current rating of Energy Meter.

ENERGY METER'S SERVICE CONDITION IN JSEB

The meter shall be suitable for satisfactory continuous operation under the following tropical conditions:-

a)	Maximum ambient temperature	:	50 °C
b)	Maximum ambient temperature in shade	:	45 °C
c)	Relative Humidity	:	10 to 95%
d)	Maximum annual rainfall	:	1450 mm
e)	Maximum wind pressure	:	150 Kg/m. sq.
f)	Maximum altitude above mean seal level	:	1000 meters
g)	Isoceraunic level	:	50 days/year
h)	Seismic level (Horizontal acceleration)	:	0.3g
i)	Moderately hot and humid tropical climate		

The energy meter shall be of accuracy Class 0.5 for active/ reactive / apparent energy and conform to relevant clauses of following standards or report: -

1.	IEC 62053-22	AC Static Watt-hour Meters for Active Energy, Class 0.5S
2.	IS 14697-1999	AC Static Transformer Operated Watt-hour and VAR-Hour Meters, class 0.5S.

3.	CBIP-88 Technical Report No. 88	Specification for AC Static Electrical Energy Meters
4.	CBIP Technical report no. 111	Specification for common Meter Reading Instrument
5.	IS :9000	Basic Environmental Testing Procedures for Electronic & Electrical Items.
6.	Standard Technical specification for R-APDRP	Standard technical speciciation , Indian Companion Specification : R-APDRP
7.	IS-15707	Specification for testing,evvaluation etc.

PRORITY: Technical specifications to be followed should basically conform to latest guideline documents/ Indian Companion standards ICS – BIS-ETD 13 – 6211 – April 2010.

Technical requirements of Energy Meters in JSEB

(To be complied to a limitation of any contravention to latest Indian companion standards of R-APDRP)

1. Application 3Ph 4Wire

1.1. Rated secondary voltage 230V phase to neutral.
1.2. Rated secondary current (Ibasic) 5Amp
1.3. Rated secondary current (Imax) 2Ib
1.4. Rated frequency 50Hz
1.5. Accuracy class 0.5s
1.6. Power factor unity to zero(all Power factor Lag or Lead)
1.7. The meter shall start and continue to register on application of 0.1% of basic current at unity power factor as per relevant standards and shall work satisfactory up to maximum continuous current of two times rated basic current with the following supply system variations.
Voltage: Vref + 20% to – 30%
Frequency: 50Hz $\pm$ 5%
1.8. Temperature
The standard reference temperature for performance shall be 27 °C. The mean temperature co-efficient shall not exceed 0.03%.
1.9. Meter should have TOD measuring capacity.
1.10. During guarantee/service guarantee period the supplier will extend software and shardware support to maintain meter MRI, BCS, AMR communication.
1.11. The supplier will impart training to Board's engineers time to time.

2. INFLUENCE QUANTITIES:

The meter should be designed and protected such that all external effects and influences shall not change its performance & shall work satisfactorily within guaranteed accuracy limits, as specified in IS 14697:1999 / CBIP technical report – 88, under the presence of influence quantities.
The accuracy of the meter would not be affected with the application of abnormal voltage/frequency generating device having spark discharge of approximately 35KV on vulnerable points of the meter body.

3. DESIGN & CONSTRUCTION

Meter shall be designed with application specific integrated circuit (ASIC) or micro controller; shall have no moving part; electronic components shall be assembled on printed circuit board using surface mounting technology; factory calibration using high accuracy (0.05 class) software based test bench.

The case, winding, voltage circuit, sealing arrangements, registers, terminal block, terminal cover & name plate etc, shall be in accordance with the relevant standards. The meter should be compact & reliable in design, easy to transport & immune to vibration & shock involved in the transportation & handling. The construction of the meter should ensure consistence performance under all conditions especially during storms/heavy rains/very hot weathers. The insulating materials used in the meter should be non-hygroscopic, non-ageing & have tested quality. The meter should be sealed in such a way that the internal parts of the meter become inaccessible.

The meter should employ latest technology such as Application Specific Integrated Circuit (ASIC) to ensure reliable performance. The mounting of the components on the PCB should be Surface Mounted Technology (SMT) type except some power supply related component. The electronic components used in the meter should be of high quality.

4. MECHANICAL REQUIREMENTS

The construction of the meter shall be rigid & suitable to withstand shock & vibration involved in transportation & handling, as specified in CBIP technical report – 88. Meter shall be designed and constructed in such a way as to avoid introducing any danger in normal use and under normal conditions, so as to ensure especially personal safety against electric shook, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water. The design of meter shall conform to IP-51 class degree of protection against dust and moisture as per relevant standards.

5. TROPICAL TREATMENT

All parts, which are subject to corrosion under normal working conditions, shall be protected effectively. Any protective coating shall not be liable to damage by ordinary handling or damage due to exposure to air, under normal working conditions. Meters shall withstand solar radiation. The meters shall be suitably designed and treated for normal life & satisfactory operation under the hot and hazardous tropical climatic conditions as specified in clause no. 2. The meter shall work from -10°C to +55°C and RH 95% non-condensing type.

As per IS 14697-1999 (reaffirmed 2004). Meter to perform satisfactorily under Non-Air Conditioned environment (within stipulations of IS)

Meter body will conform to IP51 degree of protection. For outdoor use meter shall be installed in sealed enclosure conforming to IP 55.

The meter shall be suitably designed for satisfactory operation under the hot and hazardous tropical climate conditions and shall be dust and vermin proof. All the parts and surface, which are subject to corrosion, shall either be made of such material or shall be provided with such protective finish, which provided suitable protection to them from any injurious effect of excessive humidity.

6. METER CASE

The housing of the meter shall be safe high-grade Engineering plastic or any other high quality insulating material and shall be very compact in design. All the insulation materials used in the construction of meter shall be non-hygroscopic, non ageing & of tested quality, capable of withstanding resistant to heat & fire. The construction of the meter offered shall be such that it can be sealed independently and the cover cannot be removed with the use of a tool, without breaking the seal. The case of offered meters shall be so constructed that any non-permanent deformation shall not prevent the satisfactory operation of the meter.

The meter cover should have ultra sonic welding with the meter case preferably seamless as break to open system.

Holographic seals to be provided at front and side joints. Polycarbonate seals have to be provided two numbers at the meter body, two numbers at terminal cover, two numbers at meter box, one number at optical port, one number at RS232 port and one number at MD reset point for all categories of meters.

7. TERMINALS -TERMINAL BLOCK

The base of the meter shall have a terminal block E.T.B.C. at the bottom made out of high grade engineering plastic so as to facilitate bottom connection and houses solid nickel plated brass terminals having capability to carry maximum value of current.

The material of the terminal block shall be capable of passing the tests given in IS 14697: 1999/ CBIP technical report – 88.

The terminal holes in the insulating material shall be of sufficient size to accommodate the insulation of the conductors. The diameter of the terminal hole for current terminals shall not be less than 5.0 mm & shall be of adequate length in order to have proper grip of conductors / crimping pins with the help of two screws.

The terminal block shall satisfy all the conditions such as clearance & creepage distance between terminals & surrounding part of the meter as specified in relevant clause of IS 14697: 1999/ CBIP technical report - 88.

The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall have no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure shall not be transmitted through insulating material. For current circuits, the voltage shall be considered to be at the same potential as for the related voltage circuit.

8. TERMINAL BLOCK COVER ETBC

The terminals block cover for the energy meters shall be extended transparent type, which can be sealed independently of the meter cover. The terminals, their fixing screws and the insulated compartment housing them shall be enclosed by extended terminal cover in such a way that no part of meter or accessories at terminal block shall be accessible from the front of the meter.

The terminals shall not be accessible without removing the seal (s) of terminal cover when energy meter is mounted on the meter board.

9. WINDOW IN OPAQUE METER COVER

The energy meter cover shall be made of high-grade engineering plastic with one window.

The window shall be of transparent material ultrasonically welded with the meter cover such that it cannot be removed undamaged without breaking the meter cover seals.

JSEB may add specific sealing requirements and meter COVER constructions required on verification of the samples. Wherever poly carbonate cover is specified, it shall conform to IS 11731 (FH-1category) besides meeting the test requirement of heat deflection test as per ISO 75, glow wire test as per the IS: 11000 (part 2/SEC-1) 1984 OR IEC PUB, 60695-2-12, Ball pressure test as per IEC--60695-10-2 and Flammability Test As per UL 94 or As per IS 11731(Part-2) 1986.

9.1 Meters shall be manufactured using latest and 'state of the art' technology and methods prevalent in electronics industry. The meter shall be made from high accuracy and reliable surface mount technology (SMT) components. All inward flow of major components and sub assembly parts (CT, PT, RTCs/Crystal, LCDs, LEDs, power circuit electronic components etc.) shall have batch and source identification. Multilayer 'PCB' assembly with 'PTH' (Plated through Hole) using surface mounted component shall have adequate track clearance for power circuits. SMT component shall be assembled using automatic 'pick-and-place' machines, Reflow Soldering oven, for stabilized setting of the components on 'PCB'. For soldered PCBs, cleaning and washing of cards, after wave soldering process is to be carried out as a standard practice. Assembly line of the manufacturing system shall have provision for testing of sub-assembled cards. Manual placing of components and soldering, to be minimized to items, which cannot be handled by automatic machine. Handling of 'PCB' with ICs/C-MOS components, to be restricted to bare minimum and precautions to prevent 'ESD' failure to be provided. Complete assembled and soldered PCB should undergo functional testing using computerized Automatic Test Equipment.

Fully assembled and finished meter shall undergo 'burn-in' test process for 12 hrs at 55 degree Celsius (Max. temperature not to exceed 60 degree Celsius) under base current (Ib) load condition.

Test points should be provided to check the performance of each block/stage of the meter circuitry. RTC shall be synchronized with NPL time at the time of manufacture. Meters testing at intermediate and final stage shall be carried out with testing instruments, duly calibrated with reference standard, with traceability of source and date.

10. QUALITY

Overall the quality of the meter should be good and the service life of the meter shall be more than the guarantee period. The material, components used for manufacturing the meter shall be of premium quality. The LCD display shall not fade with time and the display annunciators should be visible. Functionality of the meter shall not be affected by the harsh environmental conditions. Quality meters shall be given preference and the performance of previous installed meters shall be analysed before awarding the tender. Aesthetically, the meter shall be of premium quality.

11. COMMUNICATION PORT

The meter shall be provided with two ports for communication of the measured/collected data as per guideline document i.e. a hardware port compatible with RS 232 specifications which shall be used for remote access through suitable GPRS Modem and an Optical port complying with hardware specifications detailed in IEC-62056-21. This shall be used for local data downloading through a DLMS compliant HHU.

a) LOCAL COMMUNICATION PORT

The energy meter shall have a galvanically isolated optical communication port located in front of the meter for data transfer to or from a hand held Data Collection Device.

b) REMOTE COMMUNICATION PORT

Meter shall have an additional communication port (RS 232) in the form of RJ11/DB 9 port to interface external modem for remote data collection.

Both the ports will support communication on DLMS and should be accessible through a DLMS compliant HHU. Details given in the Annexure as per requirement in R-APDRP Project which follow the guideline given in RFP for ITIA.

12. DATA DOWNLOADING CAPABILITY

Meter shall support a minimum baud rate of 9600 on optical port as well as RS 232/ RS 485 remote communication port. It shall be possible to read selective data from the meter as specified in the companion standard.

13. DISPLAY OF MEASURED VALUE:

The meter shall have 7 digits (with ±indication), parameter identifier, backlit Liquid Crystal Display (LCD) of minimum 10 mm height, wide viewing angle. Auto display cycling, push button, required with persistence time of 10 Seconds. LCD shall be suitable for temperature withstand of 70 deg C; Sequence of display of various instantaneous electrical parameters shall be as desired by Purchaser at the time of order.

The data stored in the meters shall not be lost in the event of power failure. The meter shall have Non Volatile Memory (NVM), which does not need any battery backup. The NVM shall have a minimum retention period of 10 years.

It should be possible to easily identify the single or multiple displayed parameters through symbols/legend on the meter display itself or through display annunciators.

Meter shall have Scroll Lock facility to display any one desired parameter continuously from display parameters.

The register shall be able to record and display starting from zero, for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register should not roll over in between this duration.

The principal unit for the measured values shall be Wh/ kWh/ MWh for active energy, VArh/ kVArh/ MVArh for reactive energy & VAh/ kVAh/ MVAh for apparent energy. Bidder shall mention the scale in which the meter displays the energy values.

Required display list will be given at the time of order. However it will be in line with companion standard Table ref for display of parameters and the assigned OBIS code of the electrical and non- electrical parameters should be as under A.2 to A.6 as applicable

Parameter value with relevant OBIS code should be made available on display and logged in memory.

14. IMMUNITY TO ELECTROMAGNETIC DISTURBANCE

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or substantially influence the meter and meter shall work satisfactorily under these conditions as per relevant standards

NOTE: The disturbances to be considered are: -

(a) Harmonics
(b) Voltage dips and short interruptions
(c) Conducted transients
(d) D.C. and A.C. magnetic fields
(e) Electromagnetic fields
(f) Electrostatic discharges

15. RADIO INTERFERENCE SUPPRESSIONS

The meter shall not generate noise, which could interfere with other equipment, and meter shall work satisfactorily as per relevant standards

15.1 INFLUENCE OF HIGH MAGNETIC FIELD

The meters shall be provided appropriate magnetic shielding so that any external magnetic field (AC/DC electromagnet) as per CBIP Technical Report no. 88 (amendment Aug '99 & September '99) applied on meter would not affect the proper functioning of the meter and meter shall work satisfactorily as per relevant standards.

15.2 ELECTROMAGNETIC COMPATIBILITY

The meters performance under influence quantities shall be governed by IS 14697-1999 (reaffirmed 2004). The accuracy of meter shall not exceed the permissible limits of accuracy as per standard IS: 14697 (latest version). The static energy meters shall conform to requirements listed in relevant standards and shall also be protected against radiated interference from either magnetic or radio-frequency source. Meter should be immune to minimum 0.27 Tesla of A.C and 0.5 Tesla of D.C injection.

15.3 The meters function should not be affected by application of AC and DC chopped signals through its neutral.

16. STARTING CURRENT

The meter shall start and continue to register at the current 0.1% of Ib OR as per reference standard.

17. RUNNING WITH NO LOAD

When the 115% of rated voltage is applied with no current flowing in the current circuit, the meters shall not register any energy and test output of the meter shall not be more than one pulse/count on "no load" or as per reference standard.

18. POWER CONSUMPTION

1. The active and apparent power consumption in each voltage circuit of the CT Operated meters at reference voltage; temperature and frequency shall be less than 1.5 W and 8 VA per phase respectively or as per latest amendment of relevant IS.

2. The apparent power consumption in each current circuit for the CT Operated meters at basic current, reference frequency and reference temperature shall not exceed 1.0 VA per phase or as per reference standard.

19. CALIBRATION & TEST OUTPUT

Energy Meter shall have test output, accessible from the front, and be capable of being monitored with suitable testing equipment while in operation at site. The operation indicator must be visible from the front and test output device shall be provided in the form of LED. Resolution of the test output device shall be sufficient to enable the starting current test in less than 10 minutes.

20. All the meters shall be tested, calibrated and sealed at works before dispatch. Further, no modification of calibration shall be possible at site by any means.

However, it shall be possible to check the accuracy of energy measurement of the meter in the field by means of LED output on meter as well as through high-resolution display on Common meter reading instrument using suitable test equipment as per CBIP Report 111.Resolution of the test output shall be sufficient to enable the starting current test in less than 10 minutes.

21. REAL TIME INTERNAL CLOCK (RTC)

RTC shall be pre-programmed for 30 Years Day/date without any necessity for correction. The maximum drift shall not exceed +/- 300 Seconds per year. The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:

a) Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;

b) From remote server through suitable communication network or Sub-station data logger 'PC'.

22. CONNECTION DIAGRAM

The connection diagram of the meter shall be clearly shown for 3 phase 4 wire system, on inside portion of the terminal cover. The meter terminals shall also be marked and this marking should appear in the above diagram.

23. ABNORMALITY EVENTS DETECTION:

Meter should be capable of detection of abnormalities as mentioned in table A6.1 to A6.8. The meter preferably shall work satisfactorily under presence of various influencing conditions like External Magnetic Field, Electromagnetic Field, Radio Frequency Interference, harmonic Distortion, Voltage/Frequency Fluctuations, and electromagnetic High Frequency Fields etc. The meter shall be immune to abnormal voltage/frequency

generating devices and shall record the occurrence and restoration of such tamper events along with parameters such as current, voltages, kWh, power factor, event code, date & time etc. (listed in Tables of reference standard) Tamper details shall be stored in internal memory for retrieval by authorized personnel through either of the following:

i). HHU.

ii). Remote access through suitable communication network.

The meter shall function properly under following common abnormal conditions:

1. Phase sequence reversal	The meter shall keep working accurately irrespective of the phase sequence of the supply.
2. External magnetic influence	The metering system shall be provided with adequate magnetic shielding so that any external magnetic field (AC Electro Magnet or DC Magnet) as per the values specified in CBIP Technical Report No.88 (with latest amendments) applied on the metering system shall not affect the proper functioning and recording of energy as per error limits prescribed by CBIP.
3. Current reversal/ CT polarity reversal	The meter shall be capable of detecting and recording occurrence and restoration with date and time if the current is flowing in reverse direction in one or more phases. The meter shall continue to record in forwarded direction even in case of CT reversal.

Beside this the meter should have features to detect the occurrence and restoration of, at least, the following common abnormal events:

a) **Missing Potential:** The meter shall be capable of detecting and recording occurrence and restoration with date and time the cases of Potential failure (one phase or two phases). All potential missing cases shall be considered as power failure.

b) **Current imbalance**: The meter shall be capable of detecting and recording occurrence and restoration with date and time of Current unbalance (30% or more for more than a defined persistence time).

c) **Power on/off**: The meter shall be capable to record power on /off events in the meter memory. All potential failure should record as power off event.

d) **Magnetic Influence -** The Meter shall be capable of detecting and recording of presence of abnormal magnetic influence near the meter, if the magnetic influence affects the meter functionality.

The meter should record the presence of abnormal external magnetic fields along with date and time. Snap shots (numeric values) of voltage, current, power factor and energy(KWh) readings as well as the date and time of logging of the occurrence and restoration of all tamper events, subject to meter memory space as described here in under, should be logged in the meter memory and available for retrieving through the meters optical port via CMRI and downloading to the BCS.

The accuracy of the meter should not be affected with the application of abnormal voltage/ frequency generating device such as spark discharge of approximately 35 kv. The meter shall be tested by feeding the output of such device (s) to meter in any of the following manner for 10 minutes:-

i) On phase or neutral terminals
ii) On any connecting wires of the meters
iii) Voltage discharge with 0 to 10mm spark gap.
iv) Spark on meter body
v) At any place in load circuit.

The accuracy of the meter shall be checked before and after the application of above device(s) with site condition.

Cover open Tamper- The meter should be provided with a counter to mention the number of times meter case has been open.
Tamper Logic:- a properly designed meter tamper logic should be provided. Tamper logic should be capable of discriminating the system abnormalities from source side and load side and it should not log / record tamper due to source side abnormalities.
In general there should be three separate compartments for logging of different types of tamper as follows:-
Compartment No 1:-

i) 40% (approx.) of total memory space shall be allocated for the following current related tampers.
- CT polarity and current circuit reversal
- Current circuit Short (Bypass)
- Current circuit open (failure)
- Current unbalance

Compartment No 2:-

ii) 30% (approx.) of total tamper memory space shall be allocated for potential related tampers including missing potential.

Compartment No 3:-

iii) 30% (approx.) of total tamper memory space shall be allocated for neutral disturbance and magnetic influence related tampers.

Minimum 200 events (occurrence & restoration as one event)of all types of tamper with date and time shall be available in the meter memory on first- in, first- out basis(one event means occurrence and restoration). It shall be possible to retrieve the tamper data along-with along with date and time of logging through the meters optical port with the help of a CMRI and download the same to BCS where it shall be available for viewing. All this information shall be available in simple and easily understandable format. It should not be possible to reset the tamper data through CMRI or BCS software.

The logging of various tampers in each compartment should be as under:

The first tamper event of each compartment should always remain in the memory and should not get overwrite. Once one or more compartments have become full, the last tamper event pertaining to the same compartment will be entered and the earliest (second one) tamper event

should disappear. Thus, in this manner each succeeding tamper event will replace the earliest recorded event (second one), compartment wise. Events of one compartment/category should overwrite the events of their own compartment/category only.

The bidder should furnish the details as to how the tamper logic is able to detect and protect the meter against the above mentioned tamper and fraud with sketches and phasor diagram wherever necessary. If a bidder has any better proposal for tamper logic, the same may be submitted along with the offer for purchaser's considerations. Bids without such details shall be considered as non-responsive. Additional features, if any, in their meter may also be clearly indicated for purchaser's consideration.
Tamper count should increase as per occurrence (not restoration) of tamper events. The total number of tamper counts should also be provided on the meter display as well as at the BCS end.

Tamper Persistence Time: the persistence time for logging /registration of an occurrence of a tamper should be 5minutes +/- 10 seconds. The persistence time for logging of restoration of tamper should not be more than 120seconds

e) **Phase wise current circuit reversal -** meter shall detect reversal of polarity provided the current terminals are reversed.

f) **Voltage unbalance** – Meter shall detect voltage unbalance if there is unbalance in voltages.

g) **Over Current** – When load condition at any phase i.e. Line current at any phase goes more than defined limit , this will be detected as Over current condition.

h) **Over Voltage** – When voltage of any phase goes more than defined limit, this will be detected as over voltage condition.

i) **CT Open** – The meter should detect current circuit open when the circuit is opened from meter side and primary side

j) **CT Bypass** – The condition should be detected whenever the current terminal is bypassed in the meter

k) **Neutral Disturbance** – The meter should detect neutral disturbance if any spurious signal is applied at the meters neutral. The meters recording should not get affected by neutral disturbance.
The meter shall keep records for the minimum last 200 events (occurrence + restoration) for above abnormal conditions. Each event shall be logged with date and time of occurrence/restoration with snapshot of voltage, current power factor and active energy. It shall be possible to retrieve the abnormal event data locally using a hand held unit (HHU) through the meter's optical port & same can be viewed / analyzed at base computer end in simple and easily understandable format.

The above shall be selectable and will be in line with Table A 6.8 of GUIDELINE DOCUMENT: Data Exchange for Electricity Meter Reading, Tariff and Load Control – Companion Specification.

The above indications will be as per the relevant standards and selectable at time of placing of order.

24. BILLING HISTORY & LOAD SURVEY: -

The meter shall have sufficient non-volatile memory for recording history of energy parameters for minimum last twelve billing cycles (where applicable bill date shall be 00 hrs of the 1st date of the calendar month by default – programmable)

Meter shall log minimum 10 parameters with 45 days and 30 min Integration period. The load survey and instantaneous parameters shall be selectable from below energy/demand parameters and instantaneous parameters.

Any four energy/demand parameters shall be selectable from Active, Reactive and Apparent Energy.

The instantaneous parameters shall be selectable from phase wise currents and phase wise voltages.

It shall be possible to select the desired set of bill point registers, load survey parameters and event logs in order to reduce the reading time while the meter is read through local communication port.

These load survey and history data can be retrieved with the help of Meter Reading Instrument on local interrogation or remotely using the remote communication interface within three minutes. Load profiles can be viewed graphically / analytically with the help of meter application software. The offered meter application software shall be capable of exporting these data for analysis to other user software in spreadsheet format.

25. MD REGISTRATION

The meter shall continuously monitor and calculate maximum demand for each interval of time, which may be programmable as a block of 30 minutes (30 minutes by default). At the end of every demand integration period the new calculated MD shall be compared with the previous MD and meter shall store whichever value is higher.

26. MD RESET

It should be possible to reset MD by the following options:

a) Communication driven reset
b) Local push button
c) Auto reset at 24:00 hrs at the end of each billing cycle

27. SELF DIAGNOSTIC FEATURE

The meter shall be capable of performing complete self-diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of data memory location at all time. The meter shall have indication for unsatisfactory/non-functioning/malfunctioning of the following:

a) Time and date on meter display
b) All display segments on meter display
c) Real Time Clock (RTC) status in meter reading prints out at BCS end
d) Non-volatile Memory (NVM) status in meter reading prints out at BCS end

28. OTHER SALIENT FEATURES OF METERS

1) It should be possible to check the healthiness of phase voltages by phase indicator available on meter display.

2) The meter shall have provision of reading in the absence of power through an external source. An inductive coupling arrangement shall be provided so that it should not be possible to damage the circuit of the meter by applying excess voltage directly in the meter. The meter should be powered up using an external battery pack only in absence of power supply to the meter to enable taking of meter readings through display.

3) The meter should work accurately irrespective of phase sequence of the supply.

29. TEST AND TEST CONDITIONS

- Acceptance test: All acceptance tests as per relevant standards shall be carried out in the presence of utility representatives.

- Routine Test: All the routine tests as per IS-14697 shall be carried out and routine tests certificates shall be submitted for approval of purchaser.

- Criteria for selection for such tests and performance requirements shall be as per IS 14697-1999 (reaffirmed 2004).
  Additional acceptance shall include Surge withstand (SWC) for 6 kVp as per IEC 62052-11, Lightning impulse test and HF disturbance test as per IS 14697. One sample meter per order from one of the offered lot shall be subjected to these specific tests. Meters subjected to these tests shall not be used after tests.

  Accuracy tests shall be performed at the beginning and at the end of the acceptance tests specified.

30. MARKING OF METERS

The marking of meters shall be in accordance with IS: 14697 /1999 (reaffirmed 2004). The meters shall bear marking "Purchased under R-APDRP scheme".

The meter shall also store name plate details as given in the table A5.1 of annexure. These shall be readable as a profile as and when required.

TECHNICAL SPECIFICATION FOR TAMPER PROOF METER BOX OF LT-CT-DISTRIBUTION TRANSFORMER METERS

The material of meter box shall conform in all respects to high standards of engineering design and workmanship and shall also be capable of performing in continuous commercial operation in a manner acceptable to the purchaser.

The Meter box shall be suitable to house one three phase four wire LTCT energy meter and GPRS modem.

The meter box shall be made of high grade, fire resistant Poly Carbonate/SMC of relevant IS material. It shall be capable of withstanding temperatures of boiling water for 5 minutes continuously without distortion or softening. Meter box shall have roof tapering down to both sides for easy flow of rainwater. The thickness of box shall not be less than 3mm on the load bearing side (i.e. backside of the box) and other sides, door and roof shall not be less than 2.5mm.

The meter box shall contain a door, which shall be provided with a window for taking the readings of the meter. The window shall be made of scratch and break resistant, UV stabilized, transparent polycarbonate of minimum 2.0 mm thickness. Window shall be ultrasonically welded with meter box from inside. The viewing window shall have a proper shade /arrangement to protect meter display from direct sunlight.

A general arrangement for fixing the meter shall be made inside the box. Meter box cover shall be fixed on minimum two concealed hinges. The meter box cover shall be able to open by a minimum of 120°. Soft rubber gasket for protection from ingress of dust and water shall be provided on all around meter mounting box cover. Suitable handles shall be provided on the meter box for opening of the box's door.

The door of the box shall be provided with 2 nos of U-shaped latches with one hole for riveting on the base and other for sealing the meter box.

Color: - The base and cover of meter box shall be of dark off white color with transparent window on the cover. Window should not allow ingressel of dust vermin, water etc. inside. The cover shall be provided with a rain guard projection over the window.

For earthing of all metal parts, earthing bolt and nut with washer minimum M6 shall be provided. Box shall be provided with 4 nos. fixing holes of minimum 6 mm dia with washer at four corners of meter box.

The overall dimensions (in mm) of the box shall be provided along with drawing. Meter Box shall have minimum air gap of 50 mm in the front both sides and top of energy meters and air gap from back side shall be minimum 20 mm. It should be suitable for accommodating GPRS modem also.

For cable entry one number HDPE gland shall be provided in the bottom of meter box.

The meter box shall have suitable mounting arrangement for meter inside and arrangement for mounting of meter box suitable for outdoor site condition.

IP protection shall be IP: 55. Or better/ equivalent.

Name plate: The Purchase order No. & Date shall be engraved/printed/metallic or marked on the top cover of the box. The manufacturer's name, CT Ratio, Purchase under R-APDRP, Owners identity: JSEB and Danger Mark shall be engraved/ printed or marked on the bottom half of the box such that it shall not remove easily. Drawing & T.S may be approved by the R-APDRP cell before placing order.

TECHNICAL SPECIFICATION FOR RESIN CAST RING TYPE CURRENT TRANSFORMERS

Resin cast current transformers (CT) of accuracy class 0.5 with Ring type CT's for low tension energy metering shall be supplied with each meter. These CTs shall be mounted in CT mounting box with set of 4 nos. for each meter.

1. GENERAL TECHNICAL REQUIREMENT:

Rated Voltage	230 Volts (Phase to Neutral), 440V (ph-ph)
Rated Current	5 Amps. Balanced & unbalanced load
Rated Frequency	50 Hz
Accuracy Class	0.5
Power Factor	Unity to Zero (all power factor lag/or lead)
Temperature	The standard reference temperature for performance will be 40°C (As per relevant standard)
Supply system variation	Voltage Vref + 20% to -30% Frequency 50 Hz ±5%
Highest system voltage	660 V
Current Transformer Ratio	Ring type-800/5A, 400/5A, 200/5A

2. CONSTRUCTION:

CORE MATERIAL: Basis for material/insulation etc. shall be as per reference standards.

Material: Low loss, CRGO M4 or better grade (core losses should not exceed 0.8 Watts/kg at 1.5 tesla).

Thickness: Less than or equal to 0.27 mm

3. COPPER WIRE:

Material Enameled wire as per IS 4800 Part IX/IEC 317.

4. INSULATION:

a. Coil shall be insulated with Electrical grade polyester tape.
b. Outer insulation shall be with vacuum mixed, homogenous Resin casting.
c. Minimum 2 mm thickness of resin above the coil of the CT shall be provided.

5. SECONDARY TERMINAL:

Two brass terminals with nut and washer with proper selling arrangement shall be provided with proper identification.

6. MOUNTING CLAMP:

1. M.S. (minimum 1.6 mm thick) uniformly hot dip galvanized or on duly powder coated M.S. Sheet.
2. It shall be properly tightened to secure CT against vibration.
3. It shall have suitable insulation distance from primary

7. RATING PLATE:

Self adhesive, laminated, printed label shall have following details:

1. Manufacturer's name
2. Manufacturing month and year
3. Batch NO
4. Property of ….
5. Ratio, Burden & Accuracy Class
6. Applicable Standard
7. I.L.
8. STC Rating
9. Continuous thermal current
10. Caution against open secondary
11. Guarantee Period

a. DRAWING APPROVAL:

We shall get final drawing approval before commencement of commercial production/supply.

b. TEST AND TEST CONDTIONS:

8. ROUTINE & ACCEPTANCE TESTS: LT CT

Type Test:

The CT offered shall be fully type tested at any of the NABL accredited test laboratories as per relevant standards.

Schedule of type test for CT (As per Reference Standard IS 2705) to be conducted and certified by NABL Certified Lab/test house:

a) Verification of terminal marking and polarity
b) High voltage power frequency test
c) Over voltage inter-turn test
d) Determination of error according to the requirement of appropriate accuracy class at 5%, 20%, 100% and 120% with Full and Quarter Burden
e) Short time current test and Peak dynamic current test
f) Temperature rise test etc.

Schedule of routine & acceptance test for CT:

a. Verification of terminal marking and polarity
b. Determination of error according to the requirement of appropriate accuracy class at 20% and 120% with full and quarter burden
c. Any other test as per reference standard such as physical verification for any damage.

9. QUALITY ASSURANCE PLAN

The vendor shall furnish the following information along with his bid; failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.

i) The structure of Organization

ii) The duties and responsibilities assigned to staff ensuring Quality of work.

iii) The system of purchasing, taking delivery and verification of materials.

iv) The system for ensuring quality of workmanship.

v) The quality assurance arrangements shall conform to the relevant, requirement of ISO 9001 or ISO 9002 as applicable.

vi) Statement giving list of important raw materials names of sub-suppliers for the raw materials, list of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested. List of test normally carried out on raw materials in presence of vendor's representative, copies of test certificates.

vi) Information and copies of test certificates in respect of bought out accessories.

vii) List of manufacturing facilities available.

viii) Level of automation achieved and list of areas where manual procession exists.

ix) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

x) Lists of testing equipment available with the bidder for final testing of equipment specified and test plant limitation. If any, vis-à-vis the type, special acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

9.1. The vendor shall also submit following information:

i) List of raw materials as well as bought out accessories and the sub-suppliers selected from those furnished along with offers.
ii) Type test certificates of the raw materials and bought out accessories if required by the utility.
iii) Quality Assurance Plan (QAP) withhold points for purchaser's inspection. The quality assurance plan and purchasers hold points shall be discussed between the purchaser and vendor before the QAP is finalized.

10. GUARANTEE;

Manufacturer shall undertake a guarantee to replace the meters, meter boxes etc, up to a period of **60 months** from the date of supply. These defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters. The contractor shall maintain a stock of 2% of important items and also open an office at Ranchi for quick warranty replacement purposes.

11. SERVICES

Manufacturer shall also extend services to repair the meters & boxes on chargeable basis, up to a period of **60 months** from the date when the guarantee period is over i.e. after 60 months of date of supply. These defective/inoperative meters shall be repaired within a month time at reasonable charges for which Supplier shall open a Customer Support Office at Ranchi. The contractor will maintain a ready stock of 1% of ordered quantity at Ranchi for this purpose.

12. The successful tender shall submit the sample meter box before commencement of bulk production. The bulk production and supplies shall commence only after approval of sample by Superintending Engineer (Elecl.) (Tech), Corporate Office, JSEB. Modifications suggested during inspection shall be done free of cost.

LOW TENSION CURRENT TRANSFORMERS

1.00.00 GENERAL:

This specification covers manufacture, test and supply of L.T. Current transformers of class 1.0 & 0.5 accuracy. The CT's shall be suitable for metering purpose.

1.01.01 **TYPE:**

The CT's of all the ratios shall be of bar primary type (Ring type).
The secondary leads shall be terminated with Tinned copper terminals
Polarity (both for primary and secondary leads) shall be marked.
The CT's shall be varnished fiberglass tape insulated air cooled type.

The CT's shall conform to IS 2705 Part-I and II of 1992 with latest amendments if any. The CT's shall have markings and name plate as per IS 2705 of 1992 in addition to the works JSEB and Sl. No. and name of the manufacturer.

1.02.01 **TECHNICAL DETAILS:-**

Shall be as per the following technical details

a)	Ratio	50/5	100/5 & above
b)	Class of Accuracy	1.0	0.5
c)	Burden	3.75VA	3.75VA
d)	Insulation Level Voltage	3KV	3KV
e)	Highest System voltage	1.1KV	1.1KV
f)	Nominal System Voltage	440V	440V
g)	Frequency	50Hz	50Hz
h)	Supply System	3Ph. Solidly grounded Neutral system	3Ph. Solidly grounded Neutral system
i)	Transformation Ratio	As in the schedule of requirement	As in the schedule of requirement

1.03.01 **The bore diameter of the CT shall not be less than 30 mm. The ring type CT's shall have suitable clamp to fix the CT to panel Board.**

1.04.01 **Class-I for current transformers of ratio 50/5A**
Class-0.5 for current transformers of ratio 100/5A and above.

1.05.01 The limits current error and phase angle displacement as per IS at several defined percentage of rated current are.

Accuracy Class	% Ratio error at % of rated current				Phase displacement in minutes at % rated current			
	5	20	100	120	5	20	100	120
0.5	1.5	0.75	0.5	0.5	90	45	30	30
1.0	3.0	1.5	1.0	1.0	180	90	60	60

1.06.01 **The current error and phase displacement at rated frequency is required to be as above when the secondary burden is any value from 35% To 100% of the rated burden i.e. 1.25VA to 3.75VA.**

1.07.01 **TESTS:**

TYPE TESTS:

Copes of all the type test conducted as per IS : 2705 Part-I and II of 1992 in a recognized laboratory shall be submitted along with the tender. In case the type tests have not yet been got conducted, the tenderer shall agree to get the tests conducted at his cost before taking up the manufacture.

ROUTINE TESTS:

In case an order is placed, the tenderer shall conduct all the routine tests such as Ratio test, phase angle error test (for accuracy class 1.0) etc., as per IS 2705 Part-I and II in presence of JSEB representative. The CT's, which have been tested satisfactory in the presence of our representative, shall be supplied to the destination stores.

1.08.01 **Only manufactures having required testing facilities as stated above and as per IS 2705 Part -I and II are eligible to quote against this tender.**

1.09.01 **PACKING:**

Each CT shall be securely packed so as to withstand rough handling during transit and storage.

TECHNICAL SPECIFICATION FOR L. T. PVC INSULATED SINGLE CORE ALLUMINIUM CABLES

1. The PVC insulated aluminum cables shall be of 1,100 volts grade and shall be single core.

1.1. The cables shall be manufactured, tested and supplied as per IS-694 of 1990 with latest amendments if any.

1.2. The conductors shall be composed of Aluminum Wires complying with IS-8130 of 1984 with latest amendments, if any. The conductor particulars shall be as noted below:

Note: The conductor shall satisfy the requirement of resistance as per IS-8130 and also the nominal cross section specified below:

Sl. No.	Cable	Conductor	Weight of Aluminium in kgs per 100 Mtr	Remarks
a)	50 Sq.mm	19/1.78mm	13.70	Unsheathed
b)	120.0 Sq.mm	37/2.06mm	33.60	Unsheathed
c)	240.0 Sq.mm	37/2.85mm	70.30	Unsheathed

(The weights of aluminum conductor given above are as per IEEMA Circular)

1.3. The conductor shall be provided with PVC Insulation applied by extrusion and PVC compound shall be type "A" of IS-5831 of 1984 with latest amendments, if any.

1.4. The colour of the cable shall be black.

1.5. In addition to the identification markings as per IS-694 of 1990 the letters "JSEB" shall be marked all along the cables at regular intervals of 1 Mtr on the outer surface.

1.6. The Kit shall be packed in suitable polythene bag duly indicating the contents on the bag and further packed in a suitable gunny bag or manufacture standard packing shall be provide.

1.7. The cross section of the cable used will have to be checked at random in every section. This is in addition to inspection/dispatch instructions by the buyer. The cables found not as per standard will have to be completely replaced, in addition to a penalty of Rs. 2500.00 per Transformer Center will be levied in such cases and the deducted in the bills/bank guarantee.

1.8. TEST CERTIFICATES:

a) All the type Test Certificates stipulated in IS 694 of 1990 with latest amendments, if any shall be produced for verification and approval.
b) In case of an order, all the acceptance tests stipulated in IS-694 shall be conducted in presence of company representatives.
c) Routine Tests shall be conducted and test reports in the form of the Test certificates signed by a responsible person of the firm hall be submitted to this office for approval before dispatch of the material.

TECHNICAL SPECIFICATION FOR COMPRESSION TYPE ALUMINUM TUBULAR TERMINAL ENDS/LUGS

1. Compression type Aluminum tubular terminal ends/lugs shall be suitable for receiving aluminum conductor. They shall be capable of being terminated in transformer bushing and switches etc.

   "Solderless Aluminum tubular terminal ends/lugs long barrel conforming to ISS suitable for:
   1) 50 Sq.mm conductor.
   2) 120 Sq.mm conductors
   3) 240.00 Sq, mm conductor

TECHNICAL SPECIFICATION FOR INSTALLATION OF DISTRIBUTION TRANSFORMER METERS

1. **Scope of work:**
   1.1. The metering system is being installed for measuring energy drawals at the LT side of the 11/0.4kV Distribution Transformers. Majority of these transformers are outdoor type, oil cooled, mounted on steel pole structures or plinth. Normally, 3 ½ core / 4 core / 1 Core PVC cable are used to connect the LT terminals of the transformer to the overhead LT distribution lines. It is intended to provide meters and lay cable in all the connected DTs of a particular feeder.

2. **Transportation & handling upto erection site:** The Contractor/Agency shall arrange to transport the meters along with other associated material like Meters, Boxes, CTs, seals and other miscellaneous items from JSEB stores upto the erection sites and shall ensure proper loading & unloading, handling, storage at site, unpacking and inspection upto the erection site. In case of any existing meter on any DT is found unsuitable by the JSEB, the same shall also be replaced with new meters as per specification and the replaced meters shall be brought back and handed over to nearest store centers of JSEB.

3. **Material to be arranged :-**
   3.1. For Installation of meters, the Contractor/Agency shall arrange/procure following materials.
   (i) 1-Core un-armored Power Cable for Connection of LT side of DT to LTCT Unit
   (ii) All Aluminum Power cable lugs of required size
   (iii) Other miscellaneous installation hardware required for installation of DT meters.

4. **Erection of metering system :-**
   4.1. Quality Work shall be carried out. The Contractor/Agency shall make all necessary arrangement & liaison / follow-ups with JSEB site engineers /officials for obtaining shutdowns.

5. **MOUNTING**
   5.1. Combined CT Box:- These boxes having CTs, Meters and control harnessing pre-installed inside the box, containing 4 nos. of CTs of different sizes/ ratings depending on the DT KVA Rating.

   These combined CT boxes shall be firmly fixed on the existing Pole structure on which DT is mounted by projecting them on the LT terminal side of DT using the mounting frame/clamps.

In case of Plinth Mounted DTs, a separate arrangement to mount the combined CT Box shall be provided in the vicinity of the DT.

The rating of the box should be selected as per the KVA capacity of transformer & our standard guidelines.

Care should be taken that the meter box remains free from other wires/conductors & visible from a distance & can be accessed without taking shutdown by an authorized person.

6. CONNECTION :

6.1. Primary cable: - The existing 3 ½ / 4 core power cables/conductor have to be removed. New single core cable (Size depending upon the KVA Rating) shall be drawn from DT LT & neutral Terminals and passed through the meter box cable holes in accordance with phase & neutral sequence & brought up to the meter terminal in flexible pipe . All the cable terminations at DT LT Terminals are to be done with bimetallic lugs of proper size.

A small portion (20 mm approx) of insulation over each core inside the combined CT box shall be removed for connecting the potential clips which is a part of control harnessing.

Care shall be taken for proper crimping / tightening of the lugs / clamps to avoid any overheating, damage /malfunctioning during normal operation.

Cable & cores are to be dressed & routed properly with cable separators/ cable holding clamps to minimize the mechanical load of the cable cores on combined box, to maintain proper clearance between cores and to ensure asthetics.

6.2. Control Harnessing: - It is an integral part of the combined box. The harnessing leads existing in the box are to be connected as per the connection diagram at the CT terminals / potential clip in the CT box & meter end.

The leads are to be properly bunched & dressed using ties & routed properly inside the combined box.

Fuse unit shall be required in between outgoing terminals & connected load, existing fuses shall be used. In the absence of existing fuse/ damaged fuse units, JSEB shall provide the desired fuses.

7. MARKING OF METER BOX:-

On the front cover of the installed meter box, the last 5 digits of the meter serial number shall be marked with white enamel paint.

7.1. Installation Checks & verification:-

On completion of the erection activity, a physical verification of the installation shall be carried out by the agency's supervisor/technician before returning the shutdown & restoring the power supply.

7.2. Erection Report & Commissioning certificate :-

On completion of the installation work, one installation/ commissioning / taking-over report (in the prescribed format) shall be filled and these reports be duly certified by the JSEB's authorized engineer

8. SPECIAL TERMS & CONDITIONS

8.1. Adequate number of Supervisors, Technicians and Helpers, Vehicles etc. shall be deployed to get the desired output to meet the target. A list of manpower deployed shall be given by the Contractor/Agency to the JSEB's Engineer-in-charge before commencement of work.

8.2. The Contractor/Agency shall arrange to take advance approval from JSEB officials for shutdown and work permission. However JSEB will provide necessary support for the same. An authorization letter shall also be provided to the agency.

8.3. Work should be managed within the allowed shut down schedule to minimize power interruption & adequate safety must be taken to avoid any accident or public inconvenience

8.4. All the manpower deployed by the Contractor/Agency shall carry the Photo identity card issued by JSEB while on work. The Contractor/Agency shall provide all the desired details of the personnel engaged in the project for issuing the Identity cards.

8.5. Any minor modification, rearrangement works in existing installation/wiring, which does not require any new material (except for small quantities of fasteners & other miscellaneous Items) for fixing of these boxes is also included in the scope.

8.6. In case any major dismantling / modification , extra foundation / civil work (which is not covered in the scope) is needed to be carried out for fixing the CT or Meter box, an estimate shall be submitted & work shall be carried with prior permission/approval of Engineer-In-Charge.

8.7. All necessary tools/tackles, testing, safety devices, ladders/ platforms/ support required for carrying the work at site shall be arranged & managed by the Contractor/Agency. All Conveyance / transportation / accommodation / lodging of the Contractor/Agency personnel shall be arranged by the Contractor/Agency only.

8.8. The Contractor/Agency shall be responsible for Cleaning up of Site after carrying out the work.

9. TERMS AND CONDITIONS FOR INSTALLATION AND COMMISSIONING

9.1. The terms and conditions of scope of installation, commissioning of meters and services are as detailed below:

9.2. JSEB shall appoint a Project Coordinator/ Nodal officer (also called as Engineer-in-charge) for day to day activities.

9.3. Contractor shall carry out installation of meters under scope of this specification.

9.4. JSEB shall give written permission to Contractor's staff to store material to the nearest store / office of JSEB, during installation.

9.5. Any replaced meters/power cable shall be brought back and handed over to concerned stores centers of JSEB.

9.6. Contractor shall provide identity card to each person under signature of Engineer-in-charge as nominated by the JSEB. The Agency's workforce/representatives shall disclose their identity to consumer representative/JSEB Representative at site by showing identity card on demand.

9.7. Contractor shall have valid Class A contactor license and relevant experience in installation of metering systems.

9.8. The Meter shall be fixed/ installed on the pole at suitable height from ground level or more depending upon the site condition & space available. A danger board has to be provided and fixed by the Bidder.

9.9. Where ever it is possible, the existing cable of the DT shall be used for installation. In case, the cable is found not suitable/ damaged, contractor shall replace the existing cable by standard cable as specified above.

9.10. Earthing of box shall be connected to the existing nearest earth connection available on pole. If earthing is not available the same shall be provided by JSEB. Preparation / arrangement of earthing connection / earth pit are not covered in the scope of this contract and the contractor is not bound to arrange the same.

9.11. Functional testing of meters at site shall be done by the agency to check the functionality, so that mal-operation / defects which arise in transit are detected.

9.12. All other Hardware for installation of meter on pole like Clamps, fasteners, Putty for sealing both ends at supply side & load side of meter shall be managed/ arranged by Contractor.

9.13. Contractor would maintain quality of installation and the installation would have neat, clean and proper elevation of meter.

9.14. Observation of safety rules shall be ensured by the Contractor/Agency.

9.15. JSEB shall inform its staff in advance regarding the installation program & Line Disconnection and ensure that all necessary cooperation is given by their staff to Contractor's staff.

9.16. All Tools required for completion for work shall be arranged at Contractor's own cost and no extra payment shall be made for the same.

9.17. The complete list of DT along with Towns and quantity breakup, DT rating shall be provided by JSEB along with L.O.I (Letter of Intent).

9.18. The respective operational authorities of JSEB shall issue line clear permits well in advance as per schedule of work submitted to them so that delay in execution of work is avoided.

9.19. Necessary shut downs shall be arranged by JSEB and a line man for this purpose shall accompany each of Contractor's team. JSEB shall ensure to provide support in identifying the consumers and getting access to the installation sites/ location.

9.20. JSEB shall ensure that advance information about the shutdown and installation work is circulated to their consumers to avoid disputes and delays during the installation activity.

9.21. Contractor shall supply material to JSEB's stores, which shall be issued to them according to installation schedule.

9.22. If Distribution Box, Fuse Box, Fuses & GO switch provided at each site is found damaged then rectification/replacement of the same shall be in the scope of JSEB. Contractor shall in no way be responsible for any renovation activity to be carried out other than those specified in this specification. In addition, if there is any delay in installation due to this work then the same shall not be in Contractor's account & Liquidated Damages shall not be applicable on remaining quantity.

9.23. Installation shall be done in sequential fashion to maximize the output.

9.24. JSEB shall issue circular for general public for installation schedule & applicable area wise shutdown.

Annexure C-1

GUARANTEED TECHNICAL PARTICULARS FOR 3 PHASE 4 WIRE LT- CT OPERATED TRIVECTOR ENERGY METER (DT Meters)

Sl. No.	Item	Bidder's data
1	Type	
2	Application	
3	Rated Voltage	
4	Rated Current	
5	Frequency	
6	Overload capacity	
7	Minimum starting current in % of base current	
8	Power loss in potential circuit	
9	Power loss in current circuit	
10	Change in error due to	
	a. Variation in frequency	
	b. Variation in temperature	
	c. Variation in voltage	
11	Accuracy Class	
12	Total Weight of meter	
13	Details of case	
14	H.V. withstand	
15	Insulation Resistance	
16	Standard to which the meter confirm	
17	Type of Energy Registration Mechanism.	
18.	MD Reset Mechanism	
19	Insulation Test (Voltage 50Hz for 1Min)	
20.	Temperature co-efficient from 10% of rated load to 100 % rated load (5°C to 45°C)	
21.	**Working range**	
	Voltage	
	Current	
22.	Type of load (linear, non linear, balanced/ unbalanced at any P.F.)	
23.	**Display details**	
	i. Display Cycle (descriptive In order of display)	
	v. Period of display of each parameter	
	vi. Display scroll-lock facility	
	vii. Backlit LCD	
24	Memory	
26	Power on in absence of mains	
27	Tamper data preservation capacity	

28	Load Survey	
a.	Parameter Logged	
b.	Logging interval	
c.	No. of days of Load Survey	
29	Time of the day Zone	
30	Capability for fraud Prevention & detection	
31	Sealing and Locking Arrangement	
32	Type of communication Local- Optical port	
	Additional Communication port	
33	Real Time Clock	

GUARANTEED TECHNICAL PARTICULARS OF METER BOX
(for DT Meters)

SL. No.	Characteristics	Bidder's data
1	Name of manufacture's	
2	Material used for box body	
3	Material withstanding temperature	
4	Dimensions of box (LxWxH)	
5	Thickness (mm)	
6	Color of Meter Box Base : Fully Transparent Cover : Gray	
7	No. of Hinges	
8	Handle provision	
9	Earthing provision	
10	Sealing arrangements	
11	Inlet and outlets	
12	Gasket	
	Whether gasket is provided for (each) door	
	Material the gasket	
13	Suitable for out door installation	
14	Conformance standards	
15	IP : 55	

GUARANTEED TECHNICAL PARTICULARS OF LT CT BOX

Sl. No.	Characteristics	Bidder's data
1	Name of manufacture's	
2	Material used for CT box	
3	Dimensions of box (LxWxH)	
4	Thickness in(mm)	
5	Color of CT Box	

6	No. of Hinges	
7	Bus Bar arrangement	
8	Size of bus Bar	
9	Handle provision	
9	Earthing provision	
10	Sealing arrangements	
11	Inlet and outlets for control cable	
12	Gasket	
13	Whether gasket is provided for (each) door	
14	Material the gasket	
15	Suitable for out door installation	
16	Conformance standards	
17	IP : 54	

GUARANTEED TECHNICAL PARTICULARS FOR LT CTs

SL. No.	Characteristics	Bidder's data
1	Maker's Name & Address	
2	Type/Capacity	
3	Rated voltage	
4	Highest System voltage	
5	Rated Primary Current	
6	No. of cores	
7	Rated output	
8	Rated continuous Thermal Current Temperature rise over ambient	
9	One minute withstand Power Frequency Voltage	
10	Class of Accuracy	
11	Dimension in mm	
	i) Inner dia of CT	
	ii) Outer dia of CT	
	iii) Height of Center of CT from base	
11	Secondary Termination	
12	Conformance standards	

ANNEXURE–A

Specification of Poly Carbonate seals required for sealing of Energy Meters

(The bidder shall provide 2 numbers of polycarbonate seal on the meter body and will supply extra 9 number seals for use on terminal cover, meter box, optical port, RS232 point, MD reset button etc at the time of meter installation**)**

1.01 Seal shall be made of polycarbonate with ultra violet additive &, shall not be affected by boiling water, muriatic acid etc.

1.02 The seal should withstand temperature up to 147 °C.

1.03 Seal shall be available in Clear/Red/Blue/Yellow/Amber/Green/Grey colour and should be transparent.

1.04 Every seal should have 6 " twisted" strand stainless steel wire.

1.05 Seal shall have printed mono gram of JSEB.

1.06 Every Seal shall have a unique seven-digit number. Numbers shall be printed on

seal including the anchor cap-using laser marking which shall not be erased using any tool or by any chemical reaction. ..Both the seven digit seal numbers shall be visible separately after closing the seal.

1.07 Seals shall have tamper proof, internal "anchor" double locking mechanism that will permanently secure the wire upon closing. The mechanism should be designed in such a way that its original position can't be restored after any effort of tamper or breaking of seals

1.08 Sealing mechanism shall be designed in such a way that it can be sealed without using any pliers or tools.

1.09 Seal shall be constructed in two parts, first the main body (female type) & second the anchor (male type) having double locking mechanism. Both the parts shall be designed in such a way that once the seal is closed the two parts can't be separated. The anchor seal cap should be integral with main body through an unbreakable steel wire reinforced plastic link both in open or closed condition.

2.01 Seals shall be patented. Copy of patent shall be submitted along with offer.

2.02 Packaging: Seals shall be supplied in packet of 100 seals.. Each packet shall be labeled for following information.

- Client Name
- Purchase order number &date
- Serial number range in the form of bar. coding.

2.03 Seals shall be provided with tracking & recording software. The software shall have following features:-

- Software shall have facility of defining the system controller.
- Facility to enter serial number of seals with the help of bar code scanner.
- Receiving of seal in the system and with authentication like signature.
- Facility to identify the concern who is responsible for receiving of seals and nominated by system supervisor.
- Provision to define different type of seals for various uses.
- Software should have facility of report generation for inventory & issue records.
- Facility to track for relevant data for individual seal entered in the system.

Guarantee Technical Particulars for Poly carbonate Seals

Sl. No.	DESCRIPTION	REQUIRED SPECIFICATION	MANUFACTURER'S PARICULARS
01.	Manufactures Type and Model	Twist tight wire seals Having a highly visible clear plastic body.	
02.	Durability of seals in use	15 years	
03.	Wire No. and Diameter	7X0.68mm stranded stainless steel wire with high corrosion resistance, strength and flexibility.	
04.	Body	Clear body, made of acrylic.	
05.	Purpose of use	Suitable for sealing of meters having screw holes 3mm diameter.	
06.	Required colour with identification number	Logo shall be imprinted in black color on the one side and the seven digit number on other side & anchor cap by laser marking.	
07.	Tracking software & bar code scanner	Software for tracking the seals and bar code scanner. Specify detail features.	
08.	Packing	Packing shall be done in boxes of 5,000 units and 50 bags of 100 seals inside the boxes. Each box shall have Bar coding to enter the serial number in tracking software.	

Standard formats for deviations delivery schedule & past experience ETC.

DEVIATIONS FROM SPECIIFICATION

Sl. No.	CLAUSE NO.	DETAILS OF DEVIATION

NAME OF FIRM _____

NAME & SIGNATURE OF BIDDER_____

DESIGNATION _____

DATE: _____

DEVIATIONS FROM TEST REQUIREMENTS SPECIFIED IN RELEVANT AND PRESENT SFECIFICATIOS

Sl. No.	Name of Test	Standard No. & Cl. No.	Requirement of Standards	Proposed deviation	Reasons for deviation
1.	TYPE TEST				
2.	ADDITIONAL TEST				
3.	ACCEPTANCE TEST				
4.	ROUTINE TEST				

NAME OF FIRM _____

NAME & SIGNATURE OF BIDDER_____

DESIGNATION _____

DATE: _____

SCHEDULE OF DEVIATIONS FROM SPECIFIED STANDARDS

Sl. No.	Particulars	Stipulation of Specified Standards		Stipulation of Standard adopted By tenderer		Remarks
		Standard	Stipulations	Standard ref.	Stipulations	

NAME OF FIRM _____

NAME & SIGNATURE OF BIDDER_____

DESIGNATION _____

DATE: _____

SCHEDULED OF BIDDER'S EXPERIENCE

Tendered shall furnish here a list of similar orders executed/under execution by him to whom a reference may be made by purchaser in case he considers such a reference necessary.

Sl. No.	Name of Client & description order	Quantity	Value of order	Period of supply and commissioning	Name & Address to whom reference may be made
1	2	3	4	5	6

NAME OF FIRM _____

NAME & SIGNATURE OF BIDDER_____

DESIGNATION _____

DATE: _____

10. PROFORMA FOR MONTHLY SCHEDULE OF SUPPLY OF 3-Ph, 4W, STATIC TRIVECTOR METER COMPLETE WITH CT'S AND REQUIRED INTERFACING MATERIAL AS APPLICABLE

Sl. No.	Supply	Quantity		Commencement from the LOA date	Monthly Schedule			
		Tendered	Offered		1st	2nd	3rd	4th
1.	Supply							

Signature of Tendered/
Authorized Signature
with Name, Designation & Seal

11. LIST OF PREFERRED MAKES FOR MAIN EQUIPMENT (As per JSEB)

Sl. No.	ITEM	MAKE
A	**OUTDOOR EQUIPMENT**	
1.	**Lightning Arrestor**	ALSTOM/ RAYCHEM/ OBLUM/ CROMPTON GREAVES/ JAYASHREE
2.	**11 kV & 33 kV C.T., P.T., Metering Unit, LTCT (Cu)**	BHEL/ ABB/ VIDYUT CONTROL SYSTEM/ KAPPA/ VISHAL TRANSFORMERS & SWITCHGEARS (P) LTD. / ADHUNIK/ GURUSON, Bangalore/ APE Power Pvt. Ltd, Kolkata
3.	**PSC Poles**	PK PRESS METAL/JHARKHAND INDUSTRIES/ SUNRISE INTERNATIONAL/ CHOTTANAGPUR URJA LAGHU UDYOG/ OR Any SSI units of Jharkhand
4.	**ACSR Conductor**	LUMINO/ VENKATESWARA/ SHARAVATHY/ HINDUSTAN VIDYUT/ SIMTA/ TRANS/ MODERN / ESSAR/ STERLITE/ HVPL/ DEEPAK CABLES/ MEHRA ELECTRICAL/ PRATEEK WIRES/ BINDAWALA CABLES/ RALLISON, Delhi OR Any SSI units of Jharkhand
5.	**XLPE Cable, Power Cable, Control Cable**	POLYCAB/ SHAKTI CABLES/ RPG/ CENTRAL CABLES/ ROLLEX/ NICCO/ INDUSTRIES CABLES/ UNIVERSAL CABLES/ APAR INDUSTRIES/ ELECTRICAL MFG CO./ HAVELL'S INDIA LTD./ KRISHNA CABLE/ PARAMOUNT/ RALLISON, Delhi
6.	**PVC Cable**	RUCHIKA CABLES KRISHNA ELECTRICAL INDUSTRIES/ HAVELL'S INDIA LTD./ UNISEF CABLES/ UNIVERSAL CABLES
7.	**Cable Jointing & Termination Kit**	BIRLA 3M/ MSEAL/ RAYCHEM/ MAHINDRA ENGG & CHEMICALS PRODUCTS LTD.
8.	**Insulators (With Hardware Fitting)**	MAYUR ELECTRO CERAMICS/ SUPREME AND CO./ ALLIED CERAMICS/ BIRLA NGK INSULATORS/ BHEL/ BHATINDA CERAMICS/ JAYASHREE INDUSTRIES/ LAMCO LIGHTNING ARRESTOR MFG/ MODERN INSULATORS/ ASSOCIATED PORCELAIN/ HIGH TENSION INSULATOR FACTORY

Sl. No.	ITEM	MAKE
9.	**DISK Fittings B & S, 33KV GI PIN with Nuts**	S.K. ENTERPRISE/ SUPREME CO. / J. K. INDUSTRIES
10.	**Manufactures of Steel Items**	BANSAL/ SAIL/TATA STEEL
11.	**M S & G.I. Fabricated Material**	S.K. ENTERPRISE/ SUPREME CO. / J. K. INDUSTRIES/
12.	**G.I. Wire**	RAMSARUP INDUSTRIAL CORP/NIRMAL WIRES PRIVATE LTD./ SWASTIC WIRES/ CEEBUILD CO PVT LTD/ UIC WIRE LTD/ S.K. ENTERPRISES
13.	**Electronic Meter**	EMCO LTD/ GENUS OVERSEAS ELECTRONICS LTD/ SECURE METERS LTD/ L & G/L&T/BIDDER MANUFACTURING THE METERS
14.	**Meter Box**	ELECTRO ALLIED / A.C. POWER /SINTEX /TYCO/MACEDON VINIMAY AND ABOVE REFERED LIST OF METER PROVIDING COMPANIES.

12. GUARANTEED TECHNICAL PARTICULARS TO BE SUBMITTED BY THE TENDERER (To be submitted for approval after award of work)

1.	**33 kV/11 kV Current Transformers (Outdoor)**			
1.	Name of manufacturer			
2.	Manufacturer's types designation			
3.	Type			
4.	Standards followed.			
5.	Rated Voltage(kV)			
6.	Rated primary current/voltage			
7.	Rated secondary current/voltage			
8.	Number of cores	Rated out put	Class of accuracy	Accuracy limit factor
	Core I			
	Core II			
	Core III			
9.	Short time current rating			
	i) 1 second, kA (rms)			

	ii) 3 seconds, kA(rms)	
10.	Dynamic current kA(peak)	
11.	Temperature rise over max. site ambient °C	
	i) Oil at top of housing(° C)	
	ii) Winding (° C)	
12.	Class of insulation	
13.	Current/voltage and phase errors at rated burden and frequency	
14.	Confirm that all particulars given in technical data sheet are acceptable.	Yes/No
15.	If answer is 'NO' in 14, indicate point wise deviation.	
2.	**33 kV /11 kV Potential Transformers**	
1.	Manufacturer's name & type designation	
2.	Type	
3.	Rated voltage	
4.	Rated primary voltage (kV)	
5.	Rated secondary voltage (V)	
	Winding – I	
	Winding – II	
6.	Rated burden (VA)	
	Winding – I	
	Winding – II	
7.	Accuracy class	
	Winding – I	
	Winding – II	
8.	Maximum ratio error with rated burden and 5% normal primary voltage	
9.	Maximum phase angle error with rated burden and 5% normal primary voltage	
10.	Variation in ratio and phase angle error for varistion in	
	a) Voltage by 1%	
	b) Frequency by 1 Hz	

11.	Temperature rise at 1.1 times rated voltage with rated burden	
12.	Rated voltage factor and time	
13.	1.2 / 50 micro second impulse wave withstand test voltage (kV peak)	
14.	One minute power frequency withstand test (dry) voltage – kV rms.	
15.	One minute power frequency withstand test (wet.) voltage – kV rms.	
16.	One minute power frequency withstands voltage on secondaries (kV rms.)	

17.	Minimum creepage distance (mm)	
	a) Moderately polluted atmosphere	
	b) Heavily polluted atmosphere	
	i) Total	
	ii) Protected	
18.	Whether corona shield provided or not	
19.	Weight of oil (KG)	
20.	Total weight (KG)	
21.	Overall dimensions	
22.	Mounting details	
3.	**Insulators**	
1.	Make	
2.	Type	
3.	Material of insulator	
4.	Colour	
5.	Insulation level: Dry (PF) Wet (PF) Impulse	
6.	Creepage distance	
	a) Total (mm)	
	b) Protected (mm)	
7.	Power freq. Puncture test	

8.	Visible discharge test volt	
9.	Suitable to connect	
10.	For support insulators minimum height of base from ground	
11.	Number of disc in string insulators.	
12.	Rated voltage for disc in kV	
13.	Deviation if any from the data sheet.	

4.	**ACSR Conductors**	
1.	Make	
2.	Type	
3.	Size	
4.	Nominal current rating at maximum site ambient	
5.	Short time rating for 3 sec. (in kA)	
6.	Rated dynamic stability current kA (peak)	
7.	Weight per mtr in kg	
8.	Clearance	
	Phase to phase	
	Phase to earth	
5.	**Supporting Structures**	
1.	Make	
2.	Type	
3.	Material used	Steel/RC
4.	Thickness of galvanizing (for GI)	
5.	Designed for wind load	
6.	Designed for earth quack load	
7.	Matching with equipment arrangement	Yes/No
8.	Design calculations for sizing	Will be as per approved calculations for each structures

9.	Scope of work	Support for the equipments bus wires etc. as per approved equipment layout
10.	Foundation bolts and base bolts (bolts shall be projected. Min. 75 mm above the base plate)	Included
11.	Standard followed for fabrication (for steel structures)	
12.	Approach ladder provision	
13.	Deviation if any on technical data sheet	

6.	**Earthing**	
	Size of earth strip for the yard	
	Gap between earth mat conductors	
	Size of main outer strip	
	Galvanizing content on above	
	Value of earthing resistance (proposed to be achieved)	
	Standard to be followed for galvanizing	
	Type of electrodes	
	Construction of earthing pit as per IS	Included
	Deviations if any on technical data sheet, Cable Identification Tag, Material, Thickness, Binding wire material	
	Buried cable markers/ covers Applicable Standards Material of Protective Covers HV Cables, LV Cables	
	- Conduit & floor openings sealing compounds	
	Material & composition for:	
	i.) Water proofing	
	ii) Fire proofing	
	- Grounding for cable armour/sheaths	
	i) Material of conductor	
	ii) Size	

	- Structural Steel	
	a) Painting of fabricated Steel	
	i) Type of paint and no. of coats of primer	
	ii) Type of paint, no. of coats and colour of finish paint.	
	- Tools provided.	
	i) All necessary tools, tackles, crimping tools etc.	Yes/No
	ii) Welding equipment	Yes/No
	iii) H.V. Cable Testing Equipment	Yes/No

7.	**Cables**	
1.	Manufactures Name & Address	
2.	Country of manufacturer	
3.	Type of cable	
4.	Applicable standards for manufacturing	
5.	Applicable standards for testing	
6.	Rated voltage	kV
7.	Maximum service voltage	kV
8.	Maximum continuous current carrying capacity per cable when lain in air at an ambient air temperature of 50 ° (single core cables solid bonded)	A
9.	Maximum continuous current carrying capacity per cable when lain in ground at a depth of 1.0 m (ground temp. 40 °C and soil thermal resistively of 150 °/ watt/ cm max. Conductor temp. 90 °C)	A
10.	Maximum continuous current carrying capacity per cable when drawing into duct./ pipes (single core cables solid bonded)	A
11.	Maximum continuous current carrying capacity per cable when lain in covered RCC trenches at an ambient temperature of 50 Deg. C laying conditions to be specified (Single core cables solid bonded)	A

7.	**Cables**	
12.	Short circuit withstand capacities for 1 second of (With a conductor temperature of 90 Deg. C at the commencement	
	i) Conductor	kA
	ii) Screen	kA
	iii) Armour	kA
13.	Conductor	
	i) Material & Grade	
	ii) Nominal cross – sectional area	Sq.mm
	iii) No. of strands	
	iv) Diameter of each strand (Nominal)	mm
	v) Max. DC resistance of conductor at 20 Deg. C	Ohm/km
	vi) Max. AC resistance of conductor at 90 Deg. C	Ohm/km
	Reactance of cable at normal frequency (Approx.)	Ohm/km
	Electrostatic capacitance at normal frequency	Mircorfarads per km
	Charging current	mm
	Loss tangent at normal frequency at Uo	
14.	Conductor screen	
	i) material	
	ii) Nominal thickness	mm
15.	XLPE Insulation	
	i) Composition	
	ii) Type of curing	
	iii) Thickness of insulation (nominal)	mm
	iv) Tolerance on thickness	
	v) Dielectric constant at normal frequency	
	vi) Specific insulation resistance at 20 Deg. C	ohm/km
	vii) Min. volume resistively at 20 Deg. C	

7.	**Cables**	
	viii) Min. volume resistively at 90 Deg. C	
	ix) Min. Tensile strength	kg/sq.mm
	x) Min. Elongation percentage	%
	xi) Identification of cores	
16.	1.2/50 microsecond impulse wave withstand voltage	kVp
17.	5 min. power frequency withstand voltage	kV
18.	Max. Dielectric stress at the conductor	kV/cm
19.	Max. Dielectric stress at the conductor screen	kV/cm
20.	Insulation screen	
	i) Material	
	ii) Extruded/ wrapped	
	iii) Nominal thickness	mm
	iv) Colour	
21.	Nominal diameter over metallic screen	mm
22.	Nominal radial clearance allowed under metal sheath	mm
23.	Type and material of filler	
24.	Armour	
	i) Material and type	
	ii) Dia	
25.	Outer sheath	
	i) Material	
	ii) Type	
	iii) Colour	
	iv) Minimum radial thickness	mm
	v) Tolerance on nominal thickness of sheath	
	vi) Minimum tensile strength	Kg/sq.mm
	vii) Minimum elongation percentage at rapture	

7.	**Cables**	
	viii) Oxygen index	
	ix) Temperature index	
	x) Accelerated water absorption	Mg/cm-sq
	xi) Dielectric constant after 24 hours for	XLPE insulation
	xii) Increase in capacitance for XLPE insulation	
	a. 1-14 Days	
	b. 7-14 Days	
	xiii) Retention of dielectric strength of XLPE insulation	
	xiv) Acid gas generation	
	xv) Smoke density generation	
26.	Method of application	
	i) Insulation	
	ii) Inner sheath	
	iii) Outer sheath	
27.	Nominal overall diameter of completed cable	mm
28.	Nominal weight of complete cable	Kg/m
29.	Min. bending radius of the cable	m
30.	Standard drum length of cable	
31.	a) Approx. Drum Size (Flange die)	
	b) Approx. Shipping weight	
32.	Charts for de-rating factors enclosed	
	i) Variation in ambient temperature	
	ii) Variation in ground temperature	
	iii) Variation in ground resistively	
	iv) Spacing factors	
	a. Cable laid in ground	
	b. Cables laid on racks in RCC trenches with covers	

7.	**Cables**	
	c. Cables laid in Air	
	d. Cable laid in pipes/ ducts.	
8.	**Structural Steel**	
1.	a) Painting of fabricated Steel	
2.	i) Type of paint and no. of coats of primer	
3.	ii) Type of paint, no. of coats and colour of finish paint.	
9.	**Tools & Tackles**	
1.	i) All necessary tools, tackles, crimping tools etc.	Yes/No
2.	ii) Welding equipment	Yes/No

The tools & tackles mentioned in the bid and using in this project may be handed over to the JSEB authorized official i.e. EEE/ MRT division concern.

13.0 CHECKLIST FOR DOCUMENTS SUBMITTED BY THE TENDERER

The tenderer shall answer to all the following questionnaire and enclose with his offer:

1.	Have the tenderer submitted details of his credentials with experiences for similar type job for last 5 (Five) years.	Yes/No
2.	Has the tenderer visited the site and fully Acquainted with the site conditions	Yes/No
3.	Has the tenderer got HT/LT licence issued by the electrical authorities of Jharkhand State.	Yes/No
4.	Has the tenderer furnished all details, as asked for in the "details to be furnished in the offer".	Yes/No
5.	Has the tenderer gone through all the clauses of this specification and confirm each clause of this specification.	Yes/No
6.	Has the tenderer submitted the Bar-chart indicating different activities to complete the work.	Yes/No
7.	Does the tenderer agree to co-ordinate with other agencies/JSEB/ other statutory authorities for smooth interface of various packages and timely implementations.	Yes/No
8.	Has the tenderer furnished guaranteed Technical particulars and makes of all equipment/ Accessories	Yes/No

14.0 LIST OF INDIAN STANDARD FOR MAIN EQUIPMENT

Sl. No.	Description	IS No
1.	Control relay and metering panel	IS: 13947
2.	Current Transformer	IS: 2705 (Part I, II, III, &IV)- 1992, IEC: 185 (1987)
3.	Voltage Transformer	IS: 3156, IS: 3155, IEC-186 (1987)
4.	AC Meters	IS: 722(1991)
5.	Lightning Arrestor	IS: 3070(1993)
6.	33 kV Drop Out Fuse	IS: 9385(Part I to III)
7.	33 kV Isolator	IS: 9920(Part I to IV) IS: 295(Part 1 & III)
8.	Insulators and Fittings	IS: 731(1971), IS: 1248 IS: 2544
9.	Protection Relays	IS: 3231, IS: 722, IS: 1248
10.	Electrical Indicating Instrument	IS: 1248, IS: 722
11.	Transmission lines/Poles	IS: 4091(1987)
12.	Structural work	IS: 2026 (1992), IS: 7205(1991)
13.	Low voltage Switchgear	IS: 13947
14.	ACSR Conductor	IS: 2121 (1991)
15.	PVC Cables	IS: 1554 (1990)
16.	XLPE Cables	IS: 7098 (1988)
17.	11 kV Expulsion / Drop Out Fuse	IS: 5792
18.	11 kV Isolator (TPMO)	IS: 9920 (Part I to IV) IS: 295 (Part I to III)
19.	LT Capacitor	IS: 2834 (1986) IS: 13340 (1983)
20.	LT CT	IS: 2705 (Latest)

Remarks: - Other Equipments/ Materials will be guided by the relevant IS No.

15.0 SPECIFICATION FOR COMBINED CT, PT, unit, Outdoor type

15.1 POTENTIAL TRANSFORMER SHALL HAVE FOLLOWING RATING:

		For 33 KV/ 110 V	**For 11 KV/ 110 V**
1	Nominal system voltage	33 KV	11 KV
2	Highest system voltage	36 KV	12 KV
3	No of phases	03	03
4	Frequency	50 HZ	50 HZ
5	Ratio	33000/ 110 V	11000/ 110 V
6	Rated output	50 VA per phase.	50 VA per phase.
7	Impulse withstand voltage (on assembled CT,PT set)	150 KV (Primary)	70 KV (Primary)
8	Winding connection	Star / Star	
9	Class of accuracy	0.5 (As per IS 3156 with latest amendment	
10	Earthing	As per IS 3156, clause 5	
11	Rated voltage factor	1.2 times continuous and 1.5 times for 30 sec.	
12	Maxm. winding Temp. rise Over ambient	Within limit of IS:3156 with latest amendments / revision	
13	Maxm. ratio error	Within limit of IS3156 with latest revision	
14	Maxm. phase angle error	-----do----	
15	Marking	As per clause 8 of IS 3156	
16	Primary and Secondary winding	Good quality super enamel copper conductor	
17	Core of PT	Good quality CRGO silicon steel B.H curve of the core material to be used is to be provided.	
18	Class of insulation	Class-A moisture resistant.	
19	One minute power frequency dry withstand voltage (on assembled CT-PT sets)	Primary 30 kV rms Secondary 3 kV rms	

There shall be no fuse either in HT or LT side and core of the transformer shall not be subject to any type of shielding. The transformer oil provided by the manufacturer shall be of EHV grade and conform to the IS 335 / 1983 with latest amendment. Wherever, the pertinent parameter has not been mentioned in aforesaid table, the relevant section of IS 3156 shall apply as strict quality control measure. All clearances and safety measures shall be taken in compliance of relevant sections of IE rule, 1956.

The L.T terminal cover of the combined CT, PT unit shall be welded to the body of the CT, PT unit. The cover of L.T terminal shall be designed to carry colorless transparent glass, which when pushed, locks in helmet locking fashion. Holes shall be drilled sealing bolts for sealing purpose.

15.2 SPECIFICATION OF CURRENT TRANSFORMER

		For 33 KV	**For 11 KV**
1	Nominal system voltage	33 KV RMS	11 KV RMS
2	Highest system voltage	36 KV RMS	12 KV RMS
3	Frequency	50 HZ	50 HZ
4	No. of CT	Two	Two
5	Transformation ratio	30/5A, 60/5A, 100/5A, 200/5A, 400/5A,	20/5A, 30/5A, 60/5A, 100/5A,200/5A
6	Rated output	15 VA	15 VA
7	Class of accuracy	0.5	
8	Rated continuous thermal current	1.2 times of rated primary current	
9	Short time current rating for 1 sec.	13.1 K.A	
10	Rated dynamic current (peak)	2.5 times STTC rating	
11	Instrument Security Factor	5 (the supplier shall conduct instrument security current test as per clause 7.1.2 of IS2705.	
12	Impulse withstand voltage	150 KV (peak)	70 KV (peak)
13	One minute power frequency dry withstand voltage	30 KV rms (primary) 03 kV rms (secondary)	
14	Maxm. winding temp. rise above ambient	Within limit of IS:2705 / 1992 with latest amendments	
15	Maxm. ratio error	As per IS2705/1992	
16	Maxm. ratio error	As per IS2705/1992	
17	Winding (primary and Secondary)	Suitable size good quality, synthetic enamel copper conductor. Maxm. current density- 1.7A/mm².	
18	Class of insulation	Class A	
19	Core of CT	Good quality CRGO, silicon steel. B-H curve of the core material to be used to be provided. To be designed for Flux density of 0.1T (Maxm.)	

The primary and secondary of the current transformer must be placed symmetrically in both axial and radial direction. Whenever, the pertinent parameters have not been mentioned in aforesaid table, the relevant section of IS 2705 with latest amendment shall apply as quality control measure.
The core of the CT shall be good quality CRGO silicon steel and the supplier shall provide B.H. curve of the core material to be used. All clearances and safety measures shall be taken in compliance of relevant sections of IE rule, 1956.

- H.V winding of 33 kV/11 kV instrument T/F shall have proper DPC insulation.
- The core materials shall be high grade non aging laminations of low hysteresis loss and high permeability to ensure accuracy at normal and over current / voltage conditions. The excitation current shall be as low as possible and bidder will submit excitation current at rated and 110% of rated voltage with the commercial part of the bid. The C.T characteristic shall be such as to provide satisfactory performance for burdens ranging from 25% to 100% of rated burden. The PT characteristic shall be such as to provide satisfactory performance for burdens ranging from at least 25% to 100% of rated burden over a range of at least 80% to 120% of rated voltage at 0.8 p.f.
- The CP-PT unit shall be capable to withstand Electrical and mechanical stresses due to maxm. short circuit current to absorb operational shock and also take care of thermal expansion effect and Ferro resonance effect.
- Dimension and elec. characteristic of bushings shall be in accordance with IS 2099/1986, IS5621 /1980 and it's latest amendments. All routine and type test certificates for bushings should also be enclosed with the offer. All Horizontal and vertical clearance shall be in compliance of relevant IE rule 1956 and IGG**.** The transformer oil shall be used of best quality in strict compliance of IS:335:1983. Routine and type test report of transformer oil shall be submitted by the bidder before delivery the material.
- **Tank:** The tank shall be constructed to provide enough space for mounting of secondary windings and primary windings. It must be continuous welded and pressure tested to ensure proper welding in order to avoid leakage. Thickness of top and bottom plates shall not be less then 6mm and side plates shall not be less then 3mm.
- The secondary terminal shall be brought out in suitable compartment which shall have a removable transparent glass cover at the front and double compression cable glance suitable to house 2.5 mm^2, 7/c pvc wire armoured copper control cable. The removable glass cover shall be sliding type which when pushed, locks in helmet locking fashion and it will not be possible to remove the cover without breaking the gland. The LT compartment shall be built in front side of the metering unit and shall not be of detachable type. The terminal box with cover closed and cable in position shall have a degree of protection conforming to IS 2147:1962. There shall be provision for sufficient number and size of studs solidly welded to the tank body for sealing the terminal box. Sealing bolts will be drilled to provide check nuts/ sealing wire to seal the metering unit with appropriate seal bits. The studs/bolts shall be provided with sufficient nuts, washers. Spacing of secondary terminals shall be such that it gains maxm. clearance for connection.
- All nuts, volts & washers shall be phosphor bronze unless otherwise approved by the purchaser.

COMMERCIAL SPECIFCATION

DRAFT CONTRACT

CONTENTS

DRAFT CONTRACT

PREAMBLE

CONTRACT FOR

Manufacture, Supply & Project Management on F.O.R. site basis, unloading, handling, storage, erection, testing, commissioning & handing over of the following as per tender specification.

1. Design, manufacturing, testing, supply and delivery of AC, 3 Phase, 4 Wire, CT operated fully Static and AMR compatible Tri-Vector Energy Meters for measurement of different electrical parameters listed elsewhere in the document including Active Energy (KWH), Reactive Energy (KVARH), Apparent Energy (KVAH) etc.
2. Earthing of all equipment.
3. Co-ordination with the client / their consultant and local authorities.

1.1 The objective is to make the necessary metering infrastructure ready at the distribution substations and Distribution Transformers for implementation of R-APDRP projects. To this effect, the Agency shall

i) carry out a survey of metering systems available at the distribution transformers in all the 30 towns spread across 13 circles of JSEB to assess the availability and adequacy of metering systems
ii) supply and installation of Metering system in new DTs. Necessary meters, LTCTs for the Distribution transformers
iii) Replace old defective DT meters and CT Box
iv) Refurbishment of Primary and secondary side wiring of DT Meters
v) Repairing/replacement of structures of DT meters and aluminum painting
vi) Replace/Repairing/refurbishment of Feeder Meter and metering unit.

1.2 To start with, it has been viewed that the job of Site survey should be taken up first so that the quantum of meters which require replacement can be assessed. JSEB may also extend the scope of work for other urban/ rural areas on the same terms and conditions.

THIS CONTRACT NO. ----------made this ------- day of ---------- (Two thousand ----------) at ---------- .

BETWEEN

JHARKHAND STATE ELECTRICITY BOARD, a Body incorporated under the _____ Act, and having its head office at Engineering Building, HEC Dhurwa, Ranchi – 834004, Jharkhand (hereinafter referred to as the "PURCHASER" which term or expression unless excluded by or repugnant to the context or the meaning thereof shall be deemed to include its successors and permitted assigns), OF THE ONE PART,

AND

----------(CONTRACTOR'S name) a Company incorporated under the Companies' Act 1956 and having its Registered Office at ----------(hereinafter referred to as CONTRACTOR which term or expression unless excluded by or repugnant to the context or meaning thereof shall be deemed to include its successors and permitted assigns), OF THE OTHER PART,AND WHEREAS

a/ THE PURCHASER has decided to get the work of _____ done, hereinafter referred to as the PACKAGE, i.e. NIT No. _____/PR/JSEB/2011-2012

b/ The CONTRACTOR has declared that he has valuable and specialized knowledge and expertise for design, engineering, manufacture, procurement of the items which are in the scope of the Contractor in this Contract, dismantling, structural work, civil work, erection and commissioning of the PACKAGE as stated herein above, and

c/ The Contractor has obtained clarifications on technical and commercial aspects, inspected the site and surrounding of the Package, and has examined and considered all other matters, conditions and things, probable contingencies including delays, hindrances and interference and generally all matters incidental thereto and ancillary thereof, affecting the execution and completion of the Package, and

d/ The CONTRACTOR has agreed to undertake the aforesaid work as per the Specifications and the terms & conditions of the PURCHASER.

e/ The PURCHASER has accepted the tender of the CONTRACTOR for the aforesaid work and on the basis of above declarations of the contractor, has decided to enter into this agreement with the CONTRACTOR.

NOW IT IS HEREBY AGREED AND DECLARED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:-

Article-1

1.1 In consideration of the price of Rs. ____ (Rupees _____ only) as specified in Schedule-3 to be paid by the PURCHASER to the CONTRACTOR for scope of supplies and services as specified in Schedule - 2 and Technical Specification, the CONTRACTOR hereby covenants with the PURCHASER to perform the work detailed in Schedule-2 "Scope of Supplies & Services" and Technical Specification "Contract Specifications" of the Contract.

1.2 Subject to the provisions of this Contract, completion of the Package within the stipulated time is the essence of the Contract. The CONTRACTOR shall arrange to effect deliveries of the materials, Facilities and other services under this Contract within the time schedule and in such manner that the completion of all items of work shall be synchronized in such a way that the overall Schedule of the various items specified in the Contract is observed and adhered to.

1.3 The CONTRACTOR has very clearly understood the intents and purpose of this PACKAGE of the PURCHASER which envisages the following :

1. Design, manufacturing, testing, supply and delivery of AC, 3 Phase, 4 Wire, CT operated fully Static and AMR compatible Tri-Vector Energy Meters for measurement of different electrical parameters listed elsewhere in the document including Active Energy (KWH), Reactive Energy (KVARH), Apparent Energy (KVAH) etc.
2. Earthing of all equipment.
3. carry out a survey of metering systems available at the distribution transformers in all the 30 towns spread across 13 circles of JSEB to assess the availability and adequacy of metering systems
4. supply and installation of Metering system in new DTs. Necessary meters, LTCTs for the Distribution transformers
5. Replace old defective DT meters and CT Box
6. Refurbishment of Primary and secondary side wiring of DT Meters
7. Repairing/replacement of structures of DT meters and aluminum painting
8. After successful Completion of the job, the tenderer has to take the reading electronically as specified in the SRS published by the MoP/ PFC and submit the energy accounting town wise in format as **Annexure- IX** (in Vol.-II of TS) for consecutive three months.
8. Co-ordination with the client / their consultant and local authorities.

The CONTRACTOR has further understood the entire scheme of the PACKAGE and states that, he shall be keeping in view of the objectives as stated above, achieve the desired results for this Package without over-run of time and cost and also achieve the performance guarantees and also demonstrate & establish the performance guarantees.

1.4 It is clearly understood between the parties that the Contractor shall be solely responsible and liable for the successful completion of the work under the PACKAGE.

Article-2

2.1 The CONSULTANT in relation to the CONTRACTOR, shall have such functions as are delegated to him in the Contract or as may be delegated to him by the PURCHASER from time to time. PURCHASER shall keep the CONTRACTOR informed of such delegation.

The Contractor shall carry out the instructions issued by the CONSULTANT as if they were the instructions issued by the PURCHASER.

Article-3

3.1 Not withstanding the approval accorded by the PURCHASER to the appointment of any sub-contractors including those which may be specified in the Contract, the CONTRACTOR shall be solely responsible for the completion of the work as per specifications and within the time schedule agreed in this contract. Approval of any sub-contractor by the PURCHASER shall not relieve the CONTRACTOR from any of his liabilities or obligations under the Contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor as fully as if they were the acts, defaults or neglects of the CONTRACTOR.

Article-4

4.1 Not withstanding the dispatches made or services render under this Contract directly by the CONTRACTOR's sub-contractor, the CONTRACTOR shall remain wholly liable to perform, fulfill and discharge all the obligations and responsibilities under this Contract.

Article-5

5.1 The Contract price is inclusive of taxes and duties as specified in Schedule-4. Statutory variation and new imposition shall be borne by the Purchaser as per detail provisions in Schedule-4 of this Contract.

Article-6

6.1 This Contract shall come into effect from the date of issue of Letter of Work Order No. …… of the package.

Article - 7

7.1 All payments to the CONTRACTOR by the PURCHASER shall be governed by the terms and conditions enumerated in Schedule-7 of the Contract.

Article - 8

8.1 In case of any failure, whatsoever, in the contractual obligations, pertaining to timely completion of the package, the Contractor shall be liable to pay the Purchaser liquidated damages and not by way of penalty, a maximum sum as specified in Schedule - 8.

Article-9

The following Schedules appended to this Contract shall form and be read and construed as an integral part of this Contract.

Schedule-1 : Definitions

Schedule-2 : Scope of Supplies & Services

Schedule-3 : Contract Price

Schedule-4 : Taxes and Duties

Schedule-5 : Price Adjustment

Schedule-6 : Time Schedule

Schedule-7 : Terms of Payment

Schedule-8 : General Terms & Conditions

Schedule-9 : Technical Specifications

Article-10

In addition to the aforesaid, the following documents shall form and be read and construed as an integral part of this Contract :

Annexure-I	:	List of plant and equipment & supplies.
Annexure-II	:	List of commissioning spares.
Annexure-III	:	List of spares for three years operation and maintenance with quantities and item wised prices.
Annexure-IV	:	List of special tools, tackles and instruments.
Annexure-V	:	List of initial fill of oil and consumables with quantities.
Annexure-VI	:	Requirement of Contractor at site.
Annexure-VII	:	Obligations of the Purchaser.
Annexure-VIII	:	Resource Deployment Schedule.
Annexure-IX	:	Bar Chart and Overall Schedule
Annexure-X	:	Bank Guarantee Proforma for Security Deposit.
Annexure-XI	:	Bank Guarantee Proforma for Advance Payment.
Annexure-XII	:	Proforma for Custody-cum-Indemnity Bond
Annexure-XIII	:	Safety code for Contractors

(Annexures-I to IX shall be prepared after mutual agreement with the successful tenderer and shall form a part of the contract.)

(Note: Annexure III, VI & VII will be finalised during tendering process.)

Article-11

All the words and expressions used in this Contract shall, unless repugnant to the context, have the same meaning as are respectively assigned to them in Schedule-1. All headings to the Articles, Schedules, Clauses, Annexures, or to any other part of the CONTRACT DOCUMENTS are solely for the purpose of giving a concise indication and not a summary of contents thereof and they shall not be deemed to be part thereof or be used in the interpretation or construction thereof.

Article-12

The several Schedules listed in Article-9 and the Annexures listed in Article-10 here in above and the Articles herein and forming an integral part of this Contract, are to be taken as mutually explanatory to one another. However, in case of conflict between the Articles, Schedules and Annexures, the more stringent stipulation shall prevail.

Article-13

There are no understandings or agreements between the PURCHASER and the CONTRACTOR which are not fully expressed herein including the Schedules referred to in Article-9 and the Annexures mentioned in Article-10 hereof and no statement or agreement, oral or written made prior to the signing hereof shall have any validity. No modifications of this Contract including

Schedules and Annexures hereto shall be valid unless the same is agreed in writing by the Parties here to and issued as an amendment to the Contract.

Article-14

All notices under this Contract shall be given in writing and shall be deemed sufficiently given when delivered either in person or by telegram, telex/ telex or by registered mail addressed to the other party at its address set forth in the preamble to this Contract with a copy to the nominated representative at site.

Article-15

This Contract is executed in English language in 2 originals, each party receiving one set and both the sets will be authentic. Within thirty (30) days of signing the Contract, the CONTRACTOR shall submit Five (5) photocopies of the entire Contract Documents to the PURCHASER for his use.

Article-16

The Contractor will stand guarantee for the integrated operation of the system and equipment designed, supplied and erected by the Contractor. In case of unsatisfactory operation/ defects, rectification/ replacement thereof within the warranty period as specified in Schedule –8 from the date of commissioning will be done by the Contractor without any extra cost.

Article-17

The Contract shall be subject to the exclusive jurisdiction of Courts at Ranchi having jurisdiction on Ranchi (with the exclusion of all other Courts).

IN WITNESS HEREOF the Parties hereto by representatives duly authorised have executed the Contract on the day, month and the year first above written.

Name :	Name :
Designation :	Designation :
For & on behalf of (CONTRACTOR)	For & on behalf of Jharkhand State Electricity Board
(Seal of Office)	(Seal of Office)
In the presence of :	In the presence of ;
1.	1.
2.	2.

SCHEDULE-1 : DEFINITIONS

The following words and expressions as used in the Tender Document/Contract (as hereinafter defined) shall have the meaning hereof assigned to them except where the context otherwise requires:-

1.1 **"Approval of the Purchaser "** shall mean the written approval by the Purchaser/Consultant of a document or drawing or other particulars or matters in relation to the Contract.

1.2 **"Authorised Representative"/Engineer/Engineer-in-Charge/ Chief Executive Officer (CEO)** shall mean an Engineer or any officer deputed from time to time by the Purchaser to act as Engineer or authorised representative on behalf of the Purchaser for the purpose of the Contract.

1.3 **"Completion Time"** shall mean the period stated in the Contract for the completion of the works covered under the Contract upto and including successful commissioning, demonstration and establishment of performance guarantees and shall be calculated from the Date of Work Order.

1.4 **"Contractor"** shall mean the person, firm or company whose tender is accepted by the Purchaser and shall be deemed to include the Contractor's successors, heirs, executors, administrators, representatives and assigns approved by the Purchaser.

1.5 **"Contract"** shall mean and include the Contract between the Purchaser and the Contractor duly signed by the parties thereto, for the execution of the work together with all documents annexed/attached therewith.

1.6 **"Contract Drawings"** shall mean the designs, plans, drawings, sketches, tracings and prints thereof and details which have been supplied by the Contractor, as per the terms of the Contract, for the execution of the work and approved by the Purchaser/Consultant.

1.7 **"Delivery"** shall mean delivery of only such equipment, materials and supplies specified in the Contract and manufactured and/or supplied by the Contractor in accordance with the sequence of delivery schedule of the Contract and in case of construction and erection work, delivery shall mean the approval of the Purchaser to the said construction and erection work.

1.8 **"Dimensions"** shall mean the extent of a line, area, and volume
They are to be based on the metric system i.e.

- for length measurement in km.

  1 km = 1000 m
  1 m = 100 cm
  1 dcm = 10 cm
  1 cm = 10 mm
- for surface measurement, in sq. m
- for volume measurement in cu. m.

1.9 **"Purchaser", "Owner", "Client", "Customer", "Company", "the Board"** shall mean & include Jharkhand State Electricity Board and its different functionaries entrusted with the responsibilities in relation to this Contract in respect of the area of responsibilities of such functionaries.

1.10 **"Erection"** shall mean the putting up of structures and/or installation of equipment supplied under the Contract and will include any service which the Contractor is required to perform at the site with his own and/or other staff or labor for due fulfillment of the Contract.

1.11 **"Letter of Intent"/"Telegraphic Order"/ "Letter of Acceptance"/Letter of Award/ Work Order** shall mean the Purchaser's letter to the Contractor conveying his acceptance of the tender.

1.12 **"Mobilization"** shall mean establishment as per Contract of sufficiently adequate infrastructure by the Contractor at "Site" comprising of construction equipment, aids, tools & tackles including setting up site offices with facilities such as power, water, communication etc. establishing man power organization comprising Resident Engineers, Supervisory personnel and an adequate strength of skilled, semi-skilled and unskilled workers, who, with the so established infrastructure shall be in a position to commence execution of work at site(s), in accordance with the agreed time schedule of completion of work. "Mobilization" shall be considered to have been achieved if the Contractor is able to establish infrastructure as indicated above to begin work at site(s) in accordance with agreed schedule of work to the satisfaction of the Purchaser.

1.13 The terms **"Particulars"** shall mean the following: -

a) Specification
b) Drawing
c) Sealed pattern denoting a pattern, sealed and signed by the Inspector.
d) Proprietary makes denoting the product of an individual firm.
e) Any other details governing the construction, manufacture, supply and/or erection as per the Contract.

1.14 **"Plant", "Facilities", "Equipment", "Stores", "System", "Item", "Unit", "Material"** shall mean and include equipment, material, machinery or any part thereof to be provided for and the work to be done by the Contractor under the Contract.

1.15 **"Project"** shall mean the Project or Scheme Installation of Distribution Meter/ Replace old defective DT meters and CT Box/Refurbishment of Primary and secondary side wiring of DT Meters/ Repairing/replacement of structures of DT meters and aluminum painting under Illegible Town of Jharkhand in respect of which this Contract has been signed.

1.16 **"Site"** shall mean the place or places envisaged by the Purchaser at which the equipment & systems supplied under the Contract are to be erected and/or the construction are to be carried out and/or services are to be performed under the Contract together with such other places as may be specifically provided by the Purchaser for the purposes of the Contract.

1.17 **"Specifications", "Contract Specifications"** shall mean the technical specification, general specifications, schedules, detailed designs, statements of technical data, performance characteristics values and all such "particulars" mentioned as such in the Contract.

1.18 **"Successful Commissioning"** shall mean when Unit is ready for commercial use.

1.19 **"Commercial Use"** shall mean that use of the work or works, which the Contract contemplates or of which it is to be commercially capable

1.20 **The "Sub-Contractor"** shall mean the person or Company named in the Contract for execution of any part of the work or any person to whom any part of the Contract has been

sublet by the Contractor with the consent in writing of the Purchaser and shall include his heirs, executors, administrators, representatives and assigns approved by the Purchaser.

1.21 **"Supervision"** shall mean the successive control and directions given by the Contractor in relation to Contract Work during execution of the Contractor's and/or his Sub-Contractor's work.

1.22 **"Supply and Services"** shall mean and include any and all equipment, supplies, materials, drawings, documents and engineering & technical services to be made/performed by the Contractor under this Contract.

1.23 **"Test"** shall mean and include any & all test or tests to be performed under the Contract in order to ascertain the quality and efficiency of the Contract Work or part thereof and material tests in particular.

1.24 **"Time"** shall be reckoned by months, days and hours, the period of a month being equivalent to the calendar month according to the Gregorian calendar. The day or days unless herein otherwise expressly defined shall mean calendar day or days of 24 hours each

1.25 **"The Inspector"/"Inspecting Engineer"** shall mean any person nominated by or on behalf of the Purchaser to inspect equipment, supplies, materials or work under the Contract or his duly authorized agent.

1.26 **"Weight"** shall mean the calculation of a load. It is to be stated in ton (1 ton = 1000 Kilogram) and/or kilogram (1 kilogram = 1000 gram).

1.27 **"Work"** shall mean and include all works specified or set forth and required in and by the specifications, drawings and schedules hereto annexed/referred to or to be implied there from or incidental thereto or to be hereafter specified or required in such explanatory instructions and drawings as shall from time to time during the progress of the work hereby Contracted for, be supplied by the Purchaser and to be supplied and executed by the Contractor under the Contract.

1.28 Words importing persons shall include firms, Companies, Corporation, associations or body of individuals whether incorporated or not. Words importing masculine gender or singular number shall also include the feminine gender and plural number and vice-versa where the Context so requires or permits.

1.29 Terms and expressions not herein defined shall have the same meaning as are assigned to them in the Indian Sales of Goods Act (1930), failing that in the Indian Contract Act (1872) and failing that in the General Clauses Act (1897) and such others as mentioned from time to time.

SCHEDULE-2 : SCOPE OF SUPPLIES AND SERVICES

2.0 In consideration of the Contract price to be paid by the Purchaser, Contractor's scope of supplies & services includes design, engineering, drawings and documentations, manufacture, procurement, shop testing, supply and delivery at site of Facilities including fabricated steel structures, commissioning spares and Five (5) years operation & maintenance spares (Two years free maintenance & three years paid maintenance, it may extendable further on mutual agreement), civil works and dismantling works, disposal of dismantled items at locations to be designated by the Purchaser taking delivery of equipment/ materials/ structures, their storage and handling at site, training of Purchaser's personnel transit-cum- storage-cum-erection insurance including third party insurance, erection, testing, start-up, trial runs, commissioning, demonstration and establishment of Performance Guarantees Parameters of the Facilities etc. as detailed in the Technical Specification.

2.1 The said work is on turnkey basis and the bidder must include all the required associated materials/ equipment not specially mentioned but required for overall completion of the project in their offer.

SCHEDULE-3 : CONTRACT PRICE

3.1 The total price in respect of the scope of supplies and services for the entire works covered by and in accordance with all terms, conditions, stipulations, specifications, requirements and other conditions of the Contract and incorporated in the Price Schedule shall be treated as the Contract price.

3.2 The Contract price indicated hereinafter is for the scope of the work and services detailed under technical specification and for all the contractual obligations of the Contractor together with his Sub-Contractor(s), if any, under the Contract.

3.3 The Contract price includes and covers the cost of deployment of construction equipment, temporary work, establishment of labour camp, all materials and supplies, labour, fuel, stores, appliances, security arrangements, safety and fire fighting arrangements (including those required during construction, storage and erection) to be supplied/used by the Contractor and all such other materials and services and actions that may be necessary or derived or statutorily required in connection with the execution of the Work under the Contract or any portion thereof complete in every respect and maintained as detailed in the Contract documents or as may be required in terms of the Contract.

3.4 The Contract price includes and covers the cost of all royalty and fees for all articles and processes, protected by letters, patent or otherwise incorporated in or used in connection with the work, also all royalties, rents and other payments in connection with obtaining all the materials for the work and the Contractor shall indemnify and keep indemnified the Purchaser,

which indemnity, the Contractor hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use of work of any such articles, processes or supplies.

3.5 The Contract price includes supply of special tools & tackles, instruments, appliances for erection, operation & maintenance, consumables, oil etc. till successful commissioning, during performance guarantee test and taking over of the plant by the Purchaser. The contract price also includes the cost of all foundation bolts, anchoring parts, floor plates, hand railings, cross-overs, safety guards etc.

3.6 The Contract price as well as the associated unit rates includes cost of packing & forwarding, taxes, levies & duties, painting and all expenses in connection with the execution of Contract. Note: The tender shall remain valid for six months (180 days) from the date of opening of the Tender and contractor shall be bound to execute all works as per requirement of Purchaser without any extra payment. Any new item of work shall be done on the basis of mutually agreed rates. The Purchaser shall have the option of ordering any additional quantity of any item/equipment at the same unite rates within completion period. For deletion of items ordered by the Purchaser, the same unit rates shall apply within this validity period. Rates should be valid for entire period of completion.

3.7 Quantity Variation

Quantities of certain items as given in the Schedule of Equipment/Bill of Quantities in the Technical Specification may vary during execution of work. Payment shall be made to the Contractor as per the actual quantity of work done based on the unit rates furnished by the Contractor and mentioned in the Contract. It is to be noted that the quantities given in the Technical Specification are indicative only and actual quantity shall be supplied/erected and commissioned as per detailed engineering and erection at site. Quantity variation are applicable for all items. The variation in Lot items will be applicable on lump sum basis. The tenderer/ contractor will be bound to execute the additional quantities to the extent of ($\pm$20%) of the agreement value. 80% of materials town wise may be procured before survey.

3.7.1 BOQ given in the work order is subject to $\pm$20% variation. The final BOQ would be based on the final survey duly signed by the contractor and the Engineer in Charge (EEE(MRT)). This survey should be completed within 15 (fifteen) days from the date of work order. It would be joint responsibility of the Contractor and the Engineer in Charge to get it finalized within the 15 (fifteen) days. The variation of BoQ on higher side of the work order is subject to Committee at **(Area Level and HQ Level)** recommendation and approval of the competent authority of JSEB.

3.8 Price Schedule shall be as indicated in Volume-I (Technical Part).

SCHEDULE-4 : TAXES & DUTIES

4.1 The Contract is a divisible contract of supply & services. On the supply portion of the Contract price is inclusive of Excise Duty, Central Sales Tax and Jharkhand Sales Tax (VAT) on purchases in Jharkhand and all other applicable taxes & duties.

On the service portion of the Contract the contract price is inclusive of Works Contract Tax on the materials and components of erection and civil works excluding the supplies referred in above para.

4.2 **Manufacture, supply and delivery at site of Facilities including structural steel fabricated items, commissioning spares.**

4.2.1 Manufactured items/Bought out items directly consigned to site

The Contract price is inclusive of all taxes, duties and levies like Excise Duty, Sales Tax etc. and other statutory levies prevailing on the date of opening of Tender.

4.2.1.1 Excise Duty

i/ The rates of Excise Duty included in the price are as prevalent on the base date i.e. the date of opening of tender. Reimbursement of Excise Duty in excess of prevailing rates arising out of statutory variations within contractual delivery period as per Contract shall be made by the Purchaser. Similarly, if the Excise Duty is reduced below the prevailing rates, the Purchaser shall be entitled to get reimbursement from the Contractor.

ii/ For claiming statutory variation in Excise Duty, the Contractor shall provide the Purchaser relevant documentary evidence showing the rates of Excise Duty prevailing on the base date (i.e. the date 28 days prior to the last date of submission of tender) as well as that on the date of dispatch.

iii/ The Contractor shall furnish his statutory Auditor's Certificate to the effect that no refund of Excise Duty has been obtained/claimed by him and that no reduction has taken place in Excise Duties. In case, any refund is obtained in future by the Contractor due to MODVAT/CENVAT facilities or otherwise the same shall be passed on to the Purchaser.

iv/ The Purchaser shall reimburse statutory variation in Excise Duty within the contractual period only in respect of finished equipment supplied to the Purchaser as per the Billing Schedule submitted by the Contractor and approved by the Purchaser.

4.2.1.2 **Sales Tax (Jharkhand VAT)**

The price shall be inclusive of Central Sales Tax at the concessional rate applicable for supply of finished items. The Purchaser shall issue Sales Tax declaration form "C" for this purpose to Contractor. Any statutory variation in Sales Tax on finished items supplied by the Contractor during the contractual delivery period shall be reimbursed on production of documentary evidences. In case of supply of items from the state of Jharkhand, the price shall be inclusive of Jharkhand Sales Tax at the concessional rates. The Purchaser shall issue Sales Tax declaration form as applicable (Form C and Form 9). The Contractor shall ensure that the incidence of sales tax will be on one point only, whether it is VAT/ JST or CST.

4.2.1.3 **C-Form and Road Permit**

JSEB will issue Road Permit and C-Form. Contractors will have to get registered in Commercial Taxes Department Jharkhand within a month after award of LoI failing which legal action may be taken. JSEB will pay VAT as per terms.

4.2.2 **Other Bought out items**

The price shall be inclusive of all taxes, duties and levies including excise duty and sales tax, etc. No claim on any account whatsoever shall be entertained by the Purchaser on this account.

4.3 **Taking delivery of equipment/materials/structures, at site, their storage, storage-cum-erection insurance including third party insurance, dismantling erection, testing, start-up, trial run and commissioning, demonstration and establishment of Performance Guarantees.**

The price is inclusive of all taxes, duties levies and service charge etc.

4.4 The Contract price is inclusive of Jharkhand Sales Tax on Works Contract and surcharge on Works Contract Tax as applicable. Any statutory variation during the Contract period shall be to Purchaser's account on production of documentary evidence.

4.5 Imposition of new taxes & duties or withdrawal of existing taxes & duties by the Central or State Government shall be to Purchaser's account.

4.6 The price is inclusive of Customs Duty and other applicable charges on imported items, if any. No claim whatsoever on account of Customs Duties or Variation thereon (including those due to exchange rate variation) shall be entertained by the Purchaser on this account.

4.7 Recovery of TDS in respect of Sales Tax / Income Tax and other taxes as applicable to this work shall be made by JSEB. TDS so deducted shall be deposited with concerned tax authorities and corresponding TDS certificate(s) shall be issued by the Purchaser.

Note: Excise Duty & Sales Tax and any other taxes as payable on finished goods shall be indicated separately at the prevailing rate. In case of delay in delivery not attributable to the Purchaser any increase in the rates of taxes and duties beyond schedule rate of completion shall be to the Contractors account. The Purchaser will furnish appropriate tax exemption certificate, if applicable and when requested by the Contractor or in lieu thereof the amount of such taxes shall be reimbursed to the Contractor by the Purchaser upon presentation of documentary evidence. However, all necessary formalities for the same shall be performed by the Contractor.

The term "Sales Tax" includes Central Sales Tax as well as local sales tax i.e., Value Added Tax (VAT) as applicable.

SCHEDULE-5 : PRICE ADJUSTMENT

5.0 The Contract price is based on the unit rates and the quantities of items stipulated in the Contract as well as on the lump sum prices of certain items. The Contract price may undergo corresponding change, if the Purchaser orders for change in quantities of items during execution of work.

The unit rates are inclusive of all applicable charges (taxes, levies & duties etc.) for delivery/completion or work at site. However, the unit rates and the lump sum prices (wherever applicable) indicated in Schedule-3 shall be subject to **firm Price only.**

SCHEDULE-6 : TIME SCHEDULE

6.1 **Completion Time**

- The Contractor shall complete all work covered under the Contract within ten months.
- Ranchi & Dumka Town work shall be completed within six months.
- For rest of the towns work shall be completed within ten months.
- A bar chart showing delivery of materials and installation may kindly be provided with the Bid Document. No of required man power should also be submitted with justification.
- The Contractor shall plan his work meticulously so that the requirements of shut down will be minimal.

6.2 **Effective Date of Contract**

The Effective Date of the Contract shall be the date of issuance of LoI.

SCHEDULE-7 : TERMS OF PAYMENT

7.1 **General**

Project Co-ordinator: ESE/R- APDRP, Board Hqr.

Subject to any deductions from the Contract price as per Contract, the Contractor shall be entitled to receive the Contract Price in the following manner: -

All payments shall be released directly by the Purchaser to the Contractor except as otherwise provided in the Contract. If as per provisions of Contract or otherwise any payments are made directly by the Purchaser to the sub-contractors, such payments shall constitute a proper discharge of Purchaser's obligations for such payments to the Contractor.

All payments to the contractor under his contract shall be made by Dy. Director of Account (Hqr.), Jharkhand State Electricity Board, Ranchi on submission of the following documents.

7.2 **Documentation**

Payment for Materials

Following documents will be required for payment of materials.

a) Materials Receipt Certificate i.e. SRV from concerned stores.
b) Supplier's Challan
c) LR / IRR
d) Material Receipt Certificate i.e. SRV from Electrical Executive Engineer (concerned Central Stores) countersigned by CEO (i.e. Electrical Superintending Engineer of the concerned circle) who will issue the materials to the Contractor against indemnity bond equal to the price of material.
e) Contractor's bill duly certified and verified by Engineer-in-Charge of JSEB (EEE (MRT) of the concern Circle) counter signed by ESE cum –CEO of the concern circle shall forward the bill to the project co-ordinator, JSEB HQ for needful.
f) The bill should be submitted by the Contractor's with commissioning report in the format mentioned below:
i) Name of Town ii) Name of Circle
iii) Commissioning report of DTR Meter /Repairing/Replacement/Renovation of Feeder Meter in the format given below:

For installation of DTR Meters

Sl. No.	Name of 33/11 kV PSS	Name of connecting 11 kV feeder	Name of location of DTR Meter	Print Out of AMR taken	Remark
1	2	3	4	5	6

Sl. No.	Name of P/S/S	Name of 33/11kv feeder	Maintained by the contractor		Fault type
			meter	Metering unit	

Payment for Erection

Contractor's bill duly certified and verified by Engineer-in-Charge of JSEB will be required for payment of erection.

The Engineer-in-Charge will submit the bill counter signed by the ESE cum CEO to the project co-ordinator, JSEB HQ for needful.

7.3 **Payment for Manufacture, Supply, Delivery and maintenance/ replacement at Site of Equipment & Materials**

Payment shall be released if Security money is deposited and agreement is entered into by the Agency with JSEB.

i. 10% of contract value will be paid as mobilization advance after the effective date of contract, on submission of Bank Guarantee of equal amount in purchaser's enclosed performa from any Nationalized Bank of India. This advance will carry 11.25% simple interest per annum from the date of release of advance to the bidder on un-adjusted amount.

ii. 80% of the material value for supply portion on receipt of materials town wise at site in good condition duly certified by the purchaser. The supplier has to submit BG of Value equal to 10% of material issued from any Nationalised Bank. This BG will be released along with clause 7.3(iv).The delivery of the materials should be managed in such a way that before payment against next lot of materials, erection of 50% of materials against the previous lot should be completed.

iii. Works has to be executed in the priority mentioned below and payment will be made on that the priority only: -

Priority – I

(a) Bill against erection & commissioning shall be raised town wise after completion of all feeders metering works town wise.

Priority – II

Payment of erection against DTR Meters will be done when 100% DTR metering will be completed town wise.

All materials required may be procured under this NIT as per following schedule: -

Schedule:-A

A_1) Name of the town

i) Ranchi
ii) Jamshedpur
iii) Hazaribagh

iv) Simdega
v) Gumla
vi) Lohardaga
vii) Daltonganj

A_2) <u>Name of the town</u>

i) Garhwa
ii) Ramgarh
iii) Patratu
iv) Chaibassa
v) Chakardharpur
vi) Musabani
vii) Ghatshila
viii) Saunda

Material for the next scheduled i.e. **<u>schedule A_2</u>** may be procured only after installation and commissioning of DTR and Feeder meter of at least 4 Towns (starting from Ranchi)

<u>Schedule:-B</u>

B_1) <u>Name of the Town</u>

i) Dumka
ii) Dhanbad
iii) Deoghar
iv) Godda
v) Madhupur
vi) Bokaro Steel City
vii) Sahebganj
viii) Pakur

B_2) <u>Name of the Town</u>

i) Jhumri Tilaiya
ii) Phusaro
iii) Chatra
iv) Gumia
v) Giridih
vi) Chirkunda
vii) Mihijam

Material for the next scheduled i.e. **<u>schedule B_2</u>** may be procured only after installation and commissioning of DTR and Feeder meter of at least 5 Towns (starting from Dumka)

Note: - Payment will be made after completion of the full project town wise only not in pieces meal.

Work may be divided at L_1 price among two bidders for timely completion of the project. In this distribution work against group-A may be allotted to L_1 and against group-B to other party (L_2) at the rate of L_1.

(b) However, if the total metering system town wise will not be completed in lack of required support from JSEB/ Jharkhand Govt., the payment may be released on Monthly Prorata basis.

iv. 15% of the material value and 95% of the erection value will be paid at a time after Successful commissioning of the all DTR & Feeder meters both as mention in Sl. No. (iii) under payment schedule towns wise.

v. 5% of the contract value will be paid for supply & erection portion after Demonstration of Performance Guarantee Parameters, if any, and issue of Final Acceptance Certificate by the Purchaser and against submission of Bank Guarantee for equal amount to be kept valid till expiry of Guarantee Period of 5 years (Two Years free maintenance after completion of the project + Three years paid maintenance). Payment against three years paid Annual Maintenance Contract for DTR Meters after expiry of Two years free annual maintenance of the system will be made.

5. During paid maintained period fixed charge against vehicle & maintenance gang will be payable against monthly/ Quarterly bills because materials will be supplied by the JSEB. Idle time of the maintenance gang may be utilized by the JSEB for preventive maintenance of metering systems or other works required by the JSEB.

Notes: - Payment against the admissible bills may be done within 30 days from the date of receipt of the bill.

6. (A) <u>Service Level Agreement (SLA)</u>

i) Unit assemblies/ spares reserve of 2% meters including CT/PT unit (at least 1 no. of 3.3 kV and 1 no. of 6.6 kV) required to be maintained during free maintenance period at Ranchi or at different location under Jharkhand. In case of utilization of any item in maintenance during this period, 45 to 60 days lead time shall be allowed for procurement of material to maintain the required 2% reserve stock.

ii) To rectify the defect 7 days time shall be allowed. If the fault is of abnormal nature & sudden (i.e. more than 5 metering system go defective at a time), then 15 days time shall be allowed.

iii) In case the firm fails to manage CT/ PT unit or meters etc. during free maintenance period, the same shall be provided by the JSEB to the firm & the landed cost of material will be recovered from the contractor over and above penalty due to time delay in maintenance.

(B) <u>Penalty Clause</u>

i) During guarantee/ maintenance period, the defect should be rectified in all aspect & should make operational within 3 days from the time of reporting by the JSEB officials either by phone or SMS. Failing which, Rs. 200.00 per day or part thereof, will be deducted from their account. Maximum deduction shall be Rs. 2000.00 per metering system per month.

ii) SLA clause may be reviewed in monthly progress review meeting.

SCHEDULE-8 : GENERAL TERMS & CONDITIONS

CONTENTS

TITLE

SCHEDULE-8 : GENERAL TERMS & CONDITIONS

1. LANGUAGE

1.1 All documents, instructions, catalogues, brochures, pamphlets, design data, norms and calculations, drawings, operation, maintenance and safety manuals, reports, labels, on deliveries and any other data shall be in English Language.

1.2 The Contract agreement and all correspondence between the Purchaser/Consultant and the Contractor shall be in English language.

1.3 However, all signboards required to indicate "Danger" and/or security at site and otherwise statutorily required shall be in English & Hindi languages.

2. CONSTRUCTION OF CONTRACT

The terms & conditions herein contained including annexures shall construe the entire Contract and understanding between the parties and shall supercede all other communications which were made prior to the signature of the Contract, whether written or oral between the parties hereto with respect to the subject matter hereof.

3. SECURITY DEPOSIT

3.1 The Contractor shall be required to submit Security Deposit of 5% of the contract price in the form of Bank Guarantee in Purchaser's enclosed proforma within 15 days from the date of Work order. Additional Work allotted in continuation to this with respect to (if any) attract additional security deposit @ 5% of additional amount.

The Contractor shall be required to submit Security Deposit Bank Guarantee issued by State Bank of India or a Nationalised Bank. Earnest money paid by the successful tenderer may be adjusted towards security deposit.

3.2 The Security Deposit furnished by the Contractor will be subject to the terms and conditions of the contract and the Purchaser will not be liable for payment for any interest on the security deposit or depreciation thereof.

3.3 Security Deposit Bank Guarantee shall be for the due and faithful performance of the Contract and shall remain binding notwithstanding such variations, alterations or extensions of time, as may be made, given concluded or agreed to between the Contractor and the Purchaser under the General Conditions of Contract or otherwise.

3.4 The Security Deposit furnished by the Contractor (i.e., the successful Tenderer) shall be subject to the terms & conditions of the contract finally concluded between the Contractor and the Purchaser.

3.5 The Security Deposit Bank Guarantee shall be valid till expiry of guarantee period and shall be released on application by the Contractor within thirty (30) days after the expiry of the guarantee period and after the Contractor has discharged all his obligations under the Contract and produced a "No Demand Certificate" from the Purchaser. The Purchaser shall not unreasonably withhold the issue of "No Demand Certificate" after receipt of request for the same.

3.6 The Security Deposit is stated by its terms, to be payable on demand of the Purchaser when anyone of the following conditions arises:

a) The Contractor is in breach of the contract and fails to remedy the breach within forty two (42) days after receiving written notice from the Purchaser requiring him to do so. The notice shall state the intention to claim under the Security Deposit, the amount claimed and the breach relied upon, or

b) The Purchaser has obtained an award in settlement of dispute and the amount settled has not been paid within forty two (42) days after the award, or

c) The Contractor has gone into liquidation or is bankrupt, or

d) Any other reason which may affect the contractual obligations of the Contractor.

In every case the Purchaser shall, when making the claim, send a copy thereof to the Contractor.

4. IMPORT LICENCE AND FOREIGN EXCHANGE

If any portion of the supplies is required to be imported by the Contractor for incorporation in or manufacture of the equipment /materials, the Contractor shall arrange the necessary import license and foreign exchange on its own. The Purchaser shall neither bear any responsibility nor any liability in this regard including any variation in Foreign exchange rate.

5. INSURANCE

5.1 All the insurances required for the supplies/services covered under the Contract shall be arranged by the Contractor at his own cost. The Purchaser shall neither bear any responsibility nor any liability whatsoever on this account.

5.2 The Contractor shall take out insurance policy in the joint name of the Contractor and the Purchaser from one or more Nationalised Insurance Company from any branch office at Ranchi.

5.3 The insurance policy to be taken by the Contractor shall cover replacement cost of all supplies & services with due consideration of escalation, incidental expenses, supervision cost, re-erection cost etc.

5.4 The insurance policy shall cover third party liability. The third party liability shall cover the loss/disablement of human life and also cover the risk of damages to others materials/equipment/ properties during erection, testing and commissioning at site. The value of third party liability shall cover such compensation as may be awarded by a Court of Law in India for loss of human life or partial/full disablement. The value shall also cover for damages to others equipment/property as approved by the Purchaser.

5.5 The policy shall cover all risks and shall be valid till successful commissioning and taking over of the systems by the Purchaser.

5.6 All the insurance claims shall be lodged and settled by the Contractor and the missing/damaged items shall be replaced/repaired by the Contractor without any extra cost to the Purchaser and without affecting the scheduled completion time. The Purchaser's decision regarding replacement of goods damaged, lost or rendered unusable shall be final.

5.7 The Contractor shall arrange accident insurance policy for his own personnel deputed to site and also take out a separate policy for his workmen as per Workmen's Compensation Act.

6. DEATH, BANKRUPTCY ETC.

If the Contractor shall die, dissolve or become bankrupt or insolvent or cause or suffer any receiver to be appointed of his business or any assets thereof compound with his Creditors, or being a corporation commence to be wound up, not being a member's voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a Receiver for the benefits of its Creditors or any of them, the Purchaser shall be at liberty:-

a) to terminate the Contract forthwith upon coming to know of the happening of any such event as aforesaid by notice in writing to the Contractor or to the Receiver or Liquidator or to any person in whom the Contract may become vested to, or

b) to give such Receiver, Liquidator or other person the option of carrying out the Contract subject to his providing a guarantee upto an amount to be agreed for the due and faithful performance of the Contract.

7. RESPONSIBILITY FOR PERFORMANCE OF CONTRACT

7.1 The Contractor is to be entirely responsible for the due performance of the contract in all respects according to the intent and meaning of the drawings specifications and all other documents referred in the Contract. Any approval which the Purchaser/ Consultant/Inspector may have given in respect of the stores, materials or other particulars and the work or the workmanship involved in the contract (whether with or without test carried out by the Contractor or the Purchaser) shall not bind the Purchaser and notwithstanding any approval or acceptance given by the Purchaser, it shall be lawful for the Purchaser to reject the materials at site, if it is found that the materials supplied by the Contractor are not in conformity with the terms and conditions of contract in all respects.

7.2 Co-operation with other Manufacturers and Contractors

The Contractor shall co-operate with the Purchaser's other Contractors, if any, for any associated plant and freely exchange all technical information with them to avoid unnecessary duplication of equipment/scope work. The Contractor shall further co-operate and furnish all possible help and information required by other Contractors for construction and erection of associated plant, structures, civil and electrical work. No remuneration shall be claimed from the Purchaser for such co-operation.

8. SUB-LETTING OF CONTRACT/ASSIGNMENT

8.1 The Contractor may draw upon and seek the co-operation of and/or sublet the design, engineering, supply of equipment, materials and the work of erection, structural work, dismantling, testing, commissioning and transportation of materials, equipment, and civil work (wherever applicable) etc. to Engineers/Manufacturers/ Consulting/ Construction Firm or Company with the prior written permission of the Purchaser subject to the overall responsibilities and liabilities of the Contractor for the successful completion of the entire obligations under the Contract without in any way shifting and/or diluting their overall responsibilities, liabilities and obligations under the Contract.

8.2 In case of failure of prompt and/or satisfactory performance of the work sublet to the Sub-contractor or sub-supplier, the Contractor shall engage any other Manufacturer/Engineers/Consulting/Construction Firm or Company to ensure timely completion of work with the prior written permission of the Purchaser. In the event of the Contractor contravening this condition the Purchaser shall be entitled to place the Contract elsewhere on the Contractor's account and at his risk and cost and the Contractor shall be liable for any loss or damage which the Purchaser may sustain in consequence of or arising out of such replacement of the Contractor.

8.3 Bought-out items, critical components, proprietary items and equipment manufactured and supplied by specialized manufacturers which the Contractor intends to incorporate in the Contract Work shall also come under the purview of this clause. However, the Contractor shall follow the recommended suppliers list of the Purchaser, if any and to the extent applicable, in this regard.

8.4 Approval of the Purchaser under this clause shall not be required in the case:

i/ of materials bearing test certificates such as rolled steel materials, pipes or such other standard materials.

ii/ of equipment manufactured as per the manufacturing drawings prepared by the Contractor and approved by the Purchaser.

8.5 The Purchaser may request the Contractor to submit un priced copies of purchase orders with technical specifications included in all orders placed on Sub-contractors and the Contractor shall promptly comply with the same.

8.6 In case the Contractor intends to assign the contract to some other party, he will seek prior permission of Purchaser and the said request may be considered by the Purchaser on the terms & conditions to be decided by the Purchaser.

9. RESPONSIBILITY FOR COMPLETENESS

9.1 Any supplies and services which might not have been specifically mentioned in this Contract but are necessary for the design, engineering, manufacture, supply, construction, erection, commissioning, performance and/ or completeness of the works, shall be supplied/provided by the Contractor without any other extra cost to the Purchaser within the time schedule for efficient and smooth operation and maintenance of the works under Indian/Local conditions unless expressly excluded from the scope of supplies and services in this Contract.

9.2 The approval by the Purchaser/Consultant at any stage for any supplies and services by the Contractor shall not relieve the Contractor of his obligations indicated hereinabove.

10. TYPE, QUALITY OF MATERIALS AND WORKMANSHIP

10.1 The Contractor shall be deemed to have carefully examined and to have knowledge of the equipment, the general and other conditions, specifications, schedules, drawings, etc. forming part of the Contract and also to have satisfied himself as to the nature and character of the work to be executed and the type of the equipment and duties required including wherever necessary, of the site conditions and relevant matters and details. Any information thus had or otherwise obtained from Purchaser/ Consultant shall not in any way relieve the Contractor

from his responsibilities under the contract including erection of material and equipment supplied and incidental works and supply of accessories or apparatus not specifically mentioned in the contract but necessary for ensuring completeness and efficient working of the equipment and systems and contractual obligations for designing, manufacturing and supplying the Facilities at site and executing the work in terms of the Contract. If the Contractor shall have any doubt as to the meaning of any portion of the Contract, he shall, before signing it set forth the particulars thereof and submit to the Purchaser in writing in order that such doubt may be removed.

10.2 The Equipment/material under scope of supply shall be of the best quality and workmanship according to the latest engineering practice at the time of placement of order and shall be manufactured from materials of best quality or highest class considering strength and durability for their best performance. All material shall be new. Substitution of specified material or variation from the method of fabrication may be permitted with the prior written approval of the Purchaser. Such approval shall be granted only if a compelling reason exists for making a substitution.

10.3 The Contractor shall procure and/or fabricate all materials and equipment in accordance with all requirements of Central and State enactments, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Contractor from complying with any requirement of Purchaser as enumerated in the Contract Specifications which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Contract Specification from the laws, ordinance, rules and regulations governing the work, the Contractor shall immediately notify the same to the Purchaser. It is the sole responsibility of the Contractor, however, to determine that such variance exists. Wherever required by rules and regulations, the Contractor shall also obtain the approval of Statutory Authorities for the plant, machinery and equipment to be supplied & erected by the Contractor.

10.4 Codes and standards referred in Contract documents shall be followed. Codes and standards of other countries can be followed with the prior written approval of Purchaser, provided materials, supplies & equipment according to the standard are equal to or better than the corresponding standards specified in the Contract.

10.5 All meters, gauges, recorders and other types of indicating, integrating or recording devices shall be calibrated in metric system and degree Celsius. Where vernier attachments are related, English system gearing must be changed to produce result on a true decimal (metric basis). Functions and instruction plates shall be mentioned in English language.

10.6 Brand names mentioned in the Contract documents are for the purpose of establishing the type and quality of products to be used. The Contractor shall not change the brand name and qualities of the bought-out items without the prior written approval of the Purchaser. All such

products and equipment shall be used or installed in strict accordance with original manufacturer's recommendations, unless otherwise directed by the Purchaser.

10.7 All materials used in the manufacture of the equipment shall be selected from the best available for the purpose, considering strength durability and best engineering practice. Liberal factors of safety shall be used through the design and especially in the design of all parts subject to alternating stresses. All the work shall be performed and completed in a thorough workman like manner and shall follow the best practice in the light of modern developments in manufacture of high grade equipment notwithstanding any omissions in the specification.

10.8 The Contractor shall be deemed to be aware of the fact that the supplies and services under the Contract are required for the project and he shall therefore, make provisions for his supplies and/or services to be so adjusted that they fit into Purchasers general scheme in respect of the project and will not interfere with interaction of the combined operation. The Contractor shall make necessary references and inquiries at appropriate stages.

11. ERRORS AND OMISSIONS

11.1 The Contractor shall be liable for any discrepancies, errors and omissions in the drawings or other information submitted by him, irrespective of whether these have been approved by the Purchaser.

11.2 The Contractor shall take all corrective measures arising out of discrepancies, errors and omissions in drawings and other information within the time schedule and without extra cost to the Purchaser.

11.3 The Contractor shall also be responsible for any delay and/or extra cost if any, in carrying out engineering and site works arising solely out of discrepancies, errors and omissions stated above as well as of any late revision/s of drawings and information submitted by the Contractor. The Contractor shall pay for any extra cost due to any alteration of the work necessitated by reasons of any discrepancy, error or of omission in the drawing and particulars supplied by the Contractor.

12. APPROVAL BY THE PURCHASER/CONSULTANT

12.1 The Contractor shall submit the documents & drawings according to the categories as mentioned in the Technical Specification for approval/review.

12.2 All changes from the agreed specifications/drawings shall be subject to the approval of the Purchaser/ Consultant.

12.3 All Sub-contractors to be engaged for design and engineering, manufacture, supplies and any other work/services covered under the Contract shall be subject to the written approval of the Purchaser/ Consultant.

12.4 While the Contractor shall make/execute/perform supplies, work and services in terms of the Contract, the Purchaser shall have the right to check and approve design, type, quality, quantity, materials and workmanship of any or all items of supplies, work and services where considered necessary by the Purchaser to ensure that supplies, work and services made/executed/ performed by the Contractor are in accordance with the provisions of this Contract.

12.5 The Project In-charge of Contractor who shall be in overall charge of the Project at site shall be appointed in consultation with the Purchaser.

12.6 All Experts/Specialist of the Contractor assigned to the site including their assignment schedules shall be subject to approval of the Purchaser. The Contractor shall submit bio-data of all such personnel in advance of their assignment.

12.7 To enable the Purchaser to accord approval/review if any, the Contractor shall submit back-up data/ drawings/basic calculations/assumptions as may be required by the Purchaser/Consultant.

12.8 Where approval of the Purchaser is required or implied but is not specifically provided for elsewhere in this Contract, such approval shall also come within the purview of this clause.

12.9 Approval by the Purchaser in terms of this clause shall not relieve the Contractor of his obligations under this Contract.

12.10 All equipments would be inspected & supplies as per GTP and drawing provided in T.S. (Technical Specifications).

13. PROGRAMME OF WORK & PROGRESS REPORT

The Contractor shall submit weekly progress reports detailing status of following activities as on every Monday to the Purchaser (i) Engineering Drawing (ii) Procurement of materials and bought-out items (iii) Manufacturing (iv) Testing & Inspection (v) Ex-works dispatch of equipment/ materials (vi) Payment received.

The weekly progress report shall be submitted in 5 (five) copies and shall be distributed as per following:-

(a) One copy to Member (Dist.), JSEB, Ranchi.

(b) One copy to GM(R-APDRP), JSEB, Ranchi.

(c) One copy to the GM cum CE of the concerned Supply Area Board.

(d) One copy to ESE cum Chief Executive Officer of concerned Electrical Supply Circle.

(e) One copy to Electrical Executive Engineer (Central Store).

(f) one copy to Electrical Executive Engineer (MRT)

The Contractor shall submit at such times as may be requested by the Purchaser, schedules showing the programme and other in which the Contractor proposes to carry out the work with dates and estimated completion time, for various parts of the work which shall be within the framework of schedule of completion of the work covered under the scope of the Contractor. Such schedule shall be approved by the Purchaser prior to starting of the work. Such time shall be binding on the Contractor for the purpose of assessing the liquidated damages as per the provisions of Liquidated Damages clause given hereinafter.

During the progress of works the Contractor shall furnish the Purchaser with weekly progress report and such other reports as required by the Purchaser.

14. INSPECTION & TESTS AT CONTRACTOR'S/MANUFACTURER'S PREMISES

14.1 The Purchaser or his duly authorised representatives, shall have at all reasonable times access to the Contractor's premises or works and shall have the power at all reasonable times to examine, inspect and call for tests of the materials and workmanship during the manufacture and assembly in the Contractor's premises or works, and if a part of the plant is being manufactured not at Contractor's premises but at other premises the Contractor shall obtain for the Purchaser or his duly authorised representatives permission to examine, inspect or test as if the plant or equipment were being manufactured at Contractor's own premises. The cost of all the above said tests and any other tests shall be borne by the Contractor.

14.2 The Contractor on being requested shall present sufficient documentary evidence that the materials used in the manufacture of the equipment will meet the specification requirement. The Contractor shall produce requisite test certificates along with specimen and test pieces on which tests will be carried out by the manufacturer at the time of examination. With respect to large casting or forging the Contractors shall arrange for X-ray and ultrasonic tests to be carried out at his own cost. Such tests shall be carried out free of cost to the Purchaser and should the Contractor himself be not in a position to carry out the tests, he shall arrange to get these tests done by Govt. approved test houses and the cost for such tests shall be to Contractor's account.

14.3 The Purchaser or his duly authorised representative shall have the right to be present at all tests carried out and arranged by the Contractor. Samples and specimens shall become the Purchaser's property.

14.4 The Contractor shall notify the Purchaser in an appropriate manner as to the progress of the contract work particularly before any assembly in order that the inspection or test can be

carried out as may be required to ascertain without prejudice to the Contractor's liability whether the materials and/or services are in conformity with the requirements of the Contract.

14.5 The Purchaser or his duly authorised representative shall, on giving 7 days' notice in writing to the Contractor setting out any grounds of objection which he may have in respect of the work, be at liberty to reject all or any plant or workmanship, which are not in accordance with the contract and do not fulfill the requirement of the Contract.

14.6 The Contractor shall give reasonable notice as may be acceptable to the Purchaser/Inspector but not less than ten (10) days in advance of any material being ready for testing, specifying the period likely to be required for such testing and the Purchaser or his authorised representative shall (unless the inspection or tests is voluntarily waived by the Inspector) on giving twenty four (24) hours previous notice in writing to the Contractor's works as the case may be, attend and witness the testing as soon as possible from the date on which the materials is notified as being ready for testing or inspection, failing which Contractor shall proceed with the tests which shall be deemed to have been made in the presence of the Purchaser/ Inspector and shall forthwith forward to the Purchaser and Inspector duly certified copies of the tests reports for approval and necessary clearance for dispatch. **The inspection should be done in all cases on the due date positively except in State of force majeure.**

14.7 In all cases, where examination, inspection and testing are to be carried out whether at the premises of the Contractor or Sub-contractor the Contractor, except where otherwise specified, shall provide, free of charge to the Purchaser such labor, materials, electricity, fuel, water stores, apparatus and instruments as may be reasonably required to carry out efficiently such tests of the equipment/materials, in accordance with the contract and shall have facilities to the Purchaser/Inspector or his authorised representative to accomplish/witness such testing.

For all equipment supplied the following documents (as applicable) will be put up for inspection along with the equipment and will be checked by the Inspecting Authority of the Purchaser.

a/ Dimensional General Arrangement Drawings.

b/ Electrical Schematic Diagram with terminal numbers.

c/ External Wiring Diagram.

d/ Internal Wiring Diagram.

e/ List and Catalogues for components used.

f/ Manufacturer's Test Certificate.

g/ Type Test Certificate.

h/ Instruction manuals for erection, testing and commissioning and operation and maintenance.

After inspection an endorsement would be made in the inspection certificate about the availability of the documents.

14.8 When the tests have been satisfactorily completed at the Contractor's or Sub-contractor's works, the Purchaser/Inspector shall forthwith issue a certificate to that effect. If a final certificate can not be issued, a preliminary or provisional certificate shall be issued,. If the tests were not witnessed by the Purchaser or his representative, the certificate shall be issued on receipt and scrutiny of the test report from the Contractor but not later than fifteen (15) days after the receipt of the tests reports by the Purchaser. No material/equipment shall be dispatched before such certificates have been issued.
The satisfactory completion of these tests or the issue of the certificate shall not bind the Purchaser to accept the material/equipment should it, on further tests after erection, be found not to comply with contract.

14.9 Notwithstanding anything state hereinabove, all equipment/ materials purchased from sub-vendors/ manufacturers shall be subject to inspection by Purchaser's representative. However, if materials are not offered for inspection at scheduled date, time and place or equipment/ materials are rejected during course of inspection, the cost of **re-inspection @ 0.5% of the landed cost of equipment/ materials shall be recovered from the Contractor.**

14.10 List of preferred make for major items is provided in the contract strictly as per TS. For other items whose preferred makes are not mentioned may be purchased having ISI mark or manufacturer having ISO 9001:2000 certificate, after approval of purchaser.

15. PACKING, IDENTIFICATION AND MARKING

15.1 The Contractor shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling & transport by air, rail and road.

15.2 All packing shall allow for easy removal and checking at site. Special precaution shall be taken to prevent rusting of steel and iron parts during transit.

15.3 The number of each package in a shipment shall be shown in fraction, numerator showing number of the package and the denominator showing the total number of packages in a lot/consignment. The packages number shall be generally prepared wherever, possible, in the sequence in which they will be required for erection.

15.4 Each package delivered under the Contract shall be marked by and at the expense of the Contractor and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall show the following :

- Description and quantity of contents

- Name and address of consignee
- Gross weight and net weight of the package
- Name of the Contractor
- Contract Number
- Case No.

All markings shall be carried out with such materials as to ensure quickness of drying fastness and indelibility. Each equipment or parts of equipment shall when shipped or railed or otherwise dispatched, be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the Contractor, the number and date of contracts or orders and the name of the office placing the Contract, nomenclature of the stores and include a schedule parts for each complete equipment giving the part numbers with reference to the assembly drawing and the quantity of each part, drawing Nos. and tag numbers. Packages which cannot be marked in accordance to above shall have an attached metal tag with the corresponding marking.

15.5 Besides wherever necessary packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURNOVER", "KEEP DRY", "HANDLE WITH CARE", etc.

15.6 All packing cases, containers, packing and other similar materials shall be new and supplied free by the Contractor and same will not be returned unless otherwise stated in the schedule hereto.

15.7 Notwithstanding anything stated in this clause, the Contractor shall be entirely responsible for loss, damage or depreciation or deterioration to the materials & supplies due to faulty protective and insecure packing.

16. DISPATCH AND BILLING SCHEDULE

16.1 The Contractor shall prepare and submit detailed billing-cum-dispatch schedule for the supplies within 15 days of the Date of Work Order. The Contractor shall arrange for supplies in the logical sequence required for erection within the overall delivery schedule of the Contract. The Contractor shall promptly give written notice to the Purchaser of any anticipated delay in maintaining such schedule stating reasons and remedial measures, therefore. This shall not, however, in any way absolve the Contractor from his responsibility of timely delivery of supplies as per contractual time period.

17. DISPATCH PROCEDURE

17.1 The consignee for both rail and road dispatches shall be clearly marked as : _____ , *(to be indicated by the Purchaser before placement of order.*

The Contractor shall arrange to dispatch the following documents to:

_____ *(to be indicated by the Purchaser before placement of order.*

a) One (1) original and six (6) photo copies of the clean rail/lorry receipt.

b) One (1) original and six (6) photo copies of Contractor's signed invoice.

c) One (1) original and six (6) photo copies of Challan and Packing List.

d) One (1) original and six (6) photo copies of inspection certificate.

e) One (1) original and six (6) photo copies of Purchaser's dispatch instruction without which no material/ equipment would be acceptable. It would be issued from GM/ R-APDRP..

f) Copy of transit insurance policy.

The RR/Challans duly endorsed will be handed over to the Contractor for taking delivery of materials from Railway/Trucks unloading the same from wagons/ trucks and subsequent handling, transportation and storage at site after submission of custody-cum-indemnity bond in Purchaser's approved proforma. The demurrage charges, if any, shall be paid by the Contractor.

17.2 Transportation by Road

In case of the consignments dispatched by road, the Contractor shall ensure that the following is observed by himself and the Sub-contractors, if any:

i) To identify and obtain the correct type of trucks/tailors, keeping in view the nature of consignments to be dispatched.

ii) Care being taken to avoid all possible chances of damages during transit to ensure that all packages are firmly secured.

iii) All consignment dispatched by road shall be on "door delivery" and freight paid basis.

17.3 For bought out items, the Contractor shall arrange to dispatch the supplies directly to the Purchaser's work site at _____ *(exact destination to be indicated by the Purchaser before placement of order)* and the Consignee for both rail and road dispatches shall be the _____ *(to be indicated by the Purchaser before placement of order.*

17.4 Notification of delivery or dispatch in regard to each and every consignment shall be made to the Purchaser immediately after dispatch or delivery insuring arrangements for its receipt at the site sufficiently in advance of actual delivery.

18. TRANSFER OF TITLES

The title of ownership and property in equipment/ spares/materials etc. shall pass on to the Purchaser as per the terms and conditions of this Contract after the Contractor has effected the dispatch ex contractor's works/place of dispatch of the same to "_____" *(to be indicated by the Purchaser before placement of order)* and the Contractor has prepared necessary documentation for handing over the same to Purchaser's authorised representative, provided, however, such passing of titles of ownership and property to the Purchaser shall not in any way absolved, dilute or diminish the responsibility and obligations of the Contractor under this Contract including loss or damage and all risks which shall vest with the Contractor till the successful commissioning and final acceptance of the Plant as per this Contract.

19. TESTS ON COMPLETION

Where possible, all tests shall be carried out before shipment, rail or dispatch by any other means. Should, however, it become necessary for the final tests as to performance and guarantees to be held over until the system is erected at site, they shall be carried out by the Contractor's representative within one month or such time as may be considered reasonable by the Purchaser from the date of completion of erection or from the date on which the plant is put into commissioning. Should the result of these tests not come within the mark specified, the tests shall, if required, be repeated within one month from the date the system is ready for retest and the Contractor shall repay to the Purchaser all reasonable expenses which he may be put to by such retests. All tests will be conducted by the Contractor in the presence of Purchaser's representative.

20. ACCEPTANCE

20.1 Preliminary Acceptance

20.1.1 On completion of erection, Preliminary Acceptance Test (cold test) shall be taken up and carried out by the Contractor along with the Purchaser to prove that the system has been completely supplied, properly erected and is fit for commissioning.

20.1.2 Cold tests shall be performed on the individual equipment of the system and shall be designed to conduct the systematic check of the components and of the functional operation thereof.

20.1.3 Cold tests shall comprise site tests as defined in the Contract Specifications. Site tests shall be conducted by the Contractor under his sole responsibility and employing his personnel. The Purchaser's supervisory personnel and skilled operating personnel shall, however, be present during the site tests.

20.1.4 A detailed programme of cold tests shall be drawn up by the Contractor 15 (fifteen) days in advance and shall be submitted to Purchaser for approval.

Such programme may be revised and adjusted during the test run as may be mutually agreed.

20.1.5 Results of cold tests shall be recorded jointly by the Contractor and the Purchaser.

20.1.6 On successful completion of Preliminary Acceptance Tests, and liquidation of the defects lists (except minor defects which in the opinion of the Purchaser will not affect the commissioning of the package/system), when the results of the Preliminary Acceptance Test are found to be to the satisfaction of the Purchaser, Preliminary Acceptance Test shall be considered to be completed.

20.2 **Commissioning**

20.2.1 Upon completion of Preliminary Acceptance Test, the Contractor shall start-up and commissions the system in an integrated manner under his sole responsibility. A detailed programme of commissioning shall be drawn by the Contractor 15 (fifteen) days in advance & submitted to the Purchaser for his approval.

20.2.2 The Contractor shall rectify the defects observed during commissioning period promptly.

20.2.3 Commissioning of the unit/system shall be deemed to be successfully completed when:

The System as defined in the Technical Specification of the Package shall give performance level upto the contractual rated capacity.

20.2.4 Results of start-up tests and commissioning shall be recorded jointly by the Contractor and the Purchaser.

20.2.6 On successful completion of commissioning of the System/Unit and its commencement of commercial use, commissioning certificate shall be issued by the Purchaser. Such certificate, however, shall be deemed to be on account and shall in no way relieve the Contractor from his liabilities and responsibilities in respect of the performance of the System as a whole.

20.3 **Taking Over**

The unit of the plant shall be taken over by the Purchaser when:

a) The Contractor has submitted all final drawings & documents in compliance with the provisions of the Contract. The Contractor shall submit 6 (six) sets of drawing of each equipment, CKT drawings, line diagrams etc. for the use of maintenance by the Purchaser after completion of each work.

b) The Contractor has supplied the spares, initial fill of oil & lubricant, special tools & tackles etc. as per the Contract.

c) The Contractor has complied with rectification of all the defects/deficiencies observed by the Purchaser contained in the Commissioning Certificate.

Taking over of the package shall in no way relieve the Contractor of his obligations under this Contract. Taking over means taking over physical possession.

20.4 **Demonstration of Performance Guarantee Parameters**

After Commissioning, the Contractor shall arrange for demonstration of Performance Guarantee Parameters as per Contract Specification.

In case the Contractor fails to demonstrate and prove the performance guarantee parameters and achieve the results, as agreed, the Contractor will rectify/ replace the Facilities in order to achieve the performance guarantee parameters failing which the equipment/system will be liable for rejection.

20.5 **Balance Material**

After consumption of work final statement of materials will be prepared by Engineer-in-Charge. Balance/ unconsumed petty materials only will have to be taken back by the contractor and its value will be deducted from his final bill/ B.G.

21. **FINAL ACCEPTANCE**

Final acceptance certificate shall be issued to the Contractor on successful demonstration of Performance Guarantee Parameters of the System. On the issue of the Final Acceptance Certificate the Purchaser shall be deemed to be the owner of the plant, machinery and equipment installed.

22. REJECTION OF DEFECTIVE SYSTEM

22.1 If the system or any portion thereof, before it is finally accepted or taken over, be defective or fails to fulfil the requirements of the Contract, the Purchaser shall give the Contractor notice setting forth particulars of such defects or failure and the Contractor shall forthwith make the defective system good, or alter the same to make it comply with the requirements of the Contract. Should he fail to do so within a reasonable time, the Purchaser may reject and replace at the risk and cost of the Contractor, the defective unit, which fails to fulfil the requirements of the Contract. However, such rejection/replacement by the Purchaser shall not absolve the Contractor of his responsibilities under this Contract.

22.2 In the event of such rejection, the Purchaser shall be entitled to the use of the system in a reasonable and proper manner for a time reasonably sufficient to enable him to obtain other replacement system.

23. FORCE MAJEURE

The time stipulated for dispatch, delivery, erection or completion as the case may be, shall be reckoned from the effective date of the Contract.

If at any time during the continuance of the Contract, the performance in whole or in part by either party of any obligations under the contract shall be prevented or delayed by reason of any war, hostilities, acts of public enemy, civil commotion, sabotages, fire, floods, explosions, epidemics, quarantine restrictions, or other Acts of God, strikes & legal lockouts (hereinafter referred to as 'Eventualities') then provided notice to the happening of any such eventualities is given by either party to the other within 15 days from the date of occurrence thereof, neither party shall by reason of such eventualities be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such performance or delay in performance and deliveries under this contract shall be resumed as soon as practicable after such eventualities have come to an end or ceased to exist and the decision of the Purchaser as to whether the deliveries/services have been so resumed shall be final and conclusive. Illegal strikes and lockouts shall not come under the purview of this clause.

Should one or both the parties be prevented from fulfilling their contractual obligations by a state of force majeure lasting continuously for a period of at least three months, the two parties should consult each other regarding the further implementation of the contract provided always that if no mutually satisfactory arrangement is arrived at within a period of one month from the expiry of three months referred to above, the contract shall be deemed to have expired at the end of the said three months referred to above. The above mentioned expiry of the contract will imply that both the parties have obligation to reach an agreement regarding the winding up and financial settlement of the Contract.

24. **LIQUIDATED DAMAGES FOR DELAY**

If the Contractor fails to execute and complete the work within the time specified in the contract or within the period of extension granted except in so far that the delay is on the Purchaser's account, agreed liquidated damages @ 1% for 1st month or part thereof, 1+2= 3% for 2nd month or part thereof, 3+2=5% for 3rd month or part thereof, of the project cost (supply & erection) shall be levied on the contractor. If the work is not completed during the 4th month, the B.G. submitted by the bidder will be en-cashed apart from other legal actions. The ESE cum CEO shall at his sole discretion, specify a time limit within which the unfinished portion of the work shall be completed. In the event of failure of the Contractor, the Purchaser shall be at liberty to take action in accordance with provision of the contract.

Recovery of liquidated damages from the Contractor shall in no way relieve the Contractor from his contractual obligations to complete the work as per contract.

25. **GUARANTEE**

25.1 The Contractor shall give the following guarantees in respect of the complete system supplied/work executed by them.

For a period of Sixty (60) calendar months of reliable regular working of the system commencing from the date of successful commissioning, the Contractor shall be liable to replace any parts that may fail or show signs of defects in case of his own supplies/services or those of his Sub-Contractors' under the conditions provided for by the contract and under proper use arising from faulty designs, materials or workmanship or from any act of omission of the Contractor/Sub-contractor. Guarantee period for spare shall be coincident with the guarantee period for erected equipment.

25.2 All such replacements of defective parts mentioned above shall be made free of cost at site by the Contractor and taking the return of the defective parts to the Contractor's works shall be Contractors' responsibility and shall be made good at his own expense. The Purchaser will, however, render such assistance in this matter as will expedite the same. In the case of defective parts not repairable at site but essential in the meantime for the commercial use of the plant, the Contractor shall replace at site free of cost to the Purchaser the said defective parts, before the defective parts are removed to his works.

25.3 If it becomes necessary for the Contractor to replace or rectify any defective portions of the equipment/system under this clause, the provisions of this clause shall apply to the portions of the equipment/system so replaced or rectified until the expiration of six months from the date of such replacement or rectification or until the end of the above mentioned period of

twelve months, whichever may be the later. If any defect be not satisfactorily remedied within a reasonable time, the Purchaser may proceed to do the work at the Contractor's risk and expense but without prejudice to any other contractual rights which the Purchaser may have against the Contractor in respect of any such defects.

25.4 If the replacement or rectification are of such character as may affect the efficiency of the system, the Purchaser shall have the right to give to the Contractor within one month of such replacement or rectification, notice in writing the "tests on completion" be made to ascertain that the system fulfils the guarantees. The costs of such tests shall be borne & paid by the Contractor.

25.5 Until the end of the guarantee period, the Contractor shall have the right of entry to the working site at his own risk and expense, by himself or his duly authorised representative whose name shall previously have been communicated in writing to the Purchaser, at all reasonable working hours, upon all necessary part of the works for the purpose of inspecting the working and the records of the system and taking notes there from and if he desires, at his own expense, making any tests subject to the approval of the Purchaser, which shall not be unreasonably withhold.

25.6 Consumables and normal wear parts shall be excluded from the purview of Guarantee clause. However, manufacturer's standard warranty / guarantee for consumables shall be extended to the purchaser. In respect of equipment manufacturer's warranty / guarantee available beyond the period stated under clause 25.2 above, Maintenance of the system will be done by the contractor for three year (One year free maintenance & two years paid maintenance). It may extendable further on mutual agreement.

26. NEGLIGENCE

26.1 If the Contractor shall neglect to execute the work with due diligence or expedition or shall refuse or neglect to comply with any reasonable order given to him in writing by the Purchaser in connection with the work or shall contravene the provisions of Contract, the Purchaser may give notice in writing to the Contractor calling upon him to make good the failure, neglect or contravention complained of within such time as may be deemed reasonable and in default of the compliance with the said notice, the Purchaser without prejudice to his rights under para below hereto, may rescind or cancel the Contract holding the Contractor liable for the damages that the Purchaser may sustain in this behalf. The making good the failure, neglect or contravention hereunder will be governed by the clause "Rejection of Defective System"

26.2 Should the Contractor fail to comply with such notice within a reasonable period from the date of serving thereof, in case of failure, neglect or contravention capable of being made good within that time or otherwise such time as may be reasonably necessary for making good for same, then in such case without prejudice to the Purchaser's right under para above

hereto, the Purchaser shall have the option and be at liberty to take the work wholly or in part out of the Contractor's hands and may complete the work as envisaged in the contract either departmentally or may re-contract with any other person or persons to execute the same or any part thereof and provide other materials, tools, tackles or labour for the purpose of completing the work or any part thereof.

26.3 In such event the Purchaser shall, without being responsible to the Contractor for wear and tear of the same, be entitled to seize and take possession and have free use of all materials, tools, tackles or other things which may be on the site for use at any time in connection with the work to the exclusion of any right of the Contractor over the same and the Purchaser shall be entitled to retain and apply any balance sum which may otherwise be then due on the Contract by him to the Contractor or such part thereof as may be necessary to the payment of the cost of execution of such work as aforesaid.

26.4 If the cost of executing the work as aforesaid shall exceed the balance due to the Contractor and the Contractor fails to make good the deficit, the said materials, tools, tackles, construction plant or other things and properties of the Contractor as may not have been used up in the completion of the works, may be sold by the Purchaser and the proceeds applied towards the payment of such difference and the cost of and incidental to such sale. Any outstanding balance existing after crediting the proceeds of such sale shall be paid by the Contractor on the certificate of the Purchaser. But when all expenses, cost and charges incurred in the completion of the work are paid by the Contractor, all such materials, tools, tackle, construction plant or other things not used in the completion of the works and remaining unsold shall be removed by the Contractor.

27. SUSPENSION

27.1 The Purchaser may suspend the work in whole or in part at any time by giving Contractor notice in writing of such effect stating the nature, the date and the anticipated duration of such suspension.

27.2 On receiving the notice of suspension, the Contractor shall stop all such work which the Purchaser has directed to be suspended with immediate effect. The Contractor shall continue to perform other work in terms of the Contract which the Purchaser has not suspended.

27.3 The Purchaser may at anytime cancel the suspension notice for all or any part of suspended work by giving written notice to the Contractor specifying the part of work to be resumed and the effective date of suspension withdrawal. The Contractor shall resume the suspended work as expeditiously as possible after receipt of such withdrawal of suspension notice.

27.4 In the event of suspension of work, the Purchaser shall neither be responsible nor be liable to pay to the Contractor for any damage, loss and idle labour caused by such period of suspension of work.

28. CANCELLATION OF THE CONTRACT

If the Contractor shall neglect to comply with any orders given to him in writing by the Purchaser or on behalf of the Purchaser within the scope of the contract or shall contravene the provisions of the contract, the Purchaser may give notice in writing to the Contractor calling upon him to make good the failure, neglect or contravention complained of within such time as may be deemed reasonable not exceeding 15 days and in default of the compliance with the said notice within the time specified in the notice the Purchaser without prejudice to his rights under para below hereto, may rescind or cancel the contract holding the Contractor liable for the damages that the Purchaser may sustain on his behalf. The making good, the failure, neglect or contravention hereunder will be governed by provisions of respective conditions of contract. Should the Contractor fail to comply with such notice within the stipulated time from the date of service thereof, in the case of failure, neglect or contravention capable of being made good within that time otherwise within such time as may be specified by the Purchaser for the same making good, then and in such case without prejudice to the Purchaser's right under above hereto, the Purchaser shall have the option and be at liberty to take the work wholly or in part out of the Contractor's hand and may complete the work envisaged in the contract either departmentally or may recontract at a minimum possible price with any other persons to execute the same or any part thereof and provide other materials, tools, tackle or labour for the purpose of completing the work or any part thereof.

In such event the Purchaser shall, without being responsible to the Contractor for wear and tear of the same, be entitled to seize and take possession and have free use of all materials, tools, tackle or other things which may be on the site for use at any time in connection with the work to the exclusion of any right of the Contractor over the same, and the Purchaser shall be entitled to retain and apply any balance sum which may otherwise be then due on the contract by him to the Contractor or such part thereof as may be necessary to the payment of the cost of execution of such work as aforesaid.

If the cost of executing the work as aforesaid shall exceed the balance due to the Contractor and the Contractor fails to make good the deficit, the said materials, tools, tackle, construction plant and other things, the property of the Contractor as may not have been used up in the completion of the work, may be sold by the Purchaser and the proceeds applied towards the payment of such difference and cost of and incidental to such sale any outstanding balance existing after crediting the proceeds of such sale shall be paid by the Contractor on the certificate of the Purchaser but when all expenses, costs and charges incurred in the completion of the work are paid by the Contractor, all such materials, tools, tackle, construction plant or other things are not used in the completion of the works and remaining unsold shall be removed to the Contractor.

29. **SECRECY, TITLES**

29.1 All maps, plans, drawings, specifications, schemes and the subject matter contained therein and all other information given to the Contractor by the Purchaser in connection with the performance of the Contract Work shall be held confidential by the Contractor and shall remain the property of the Purchaser and shall not be used or disclosed to third parties by the Contractor for any purpose other than for which they have been supplied or prepared. The Contractor may disclose to third parties, upon execution of secrecy agreements satisfactory to the Purchaser, such part of the drawings, Specifications or information if such disclosure is necessary for the performance of the Work.

29.2 Maps, layouts and photographs of the unit/system including its surrounding regions showing vital installation for national security shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the Purchaser and upon execution of secrecy agreements satisfactory to the Purchaser with such third parties prior to disclosure.

29.3 Title to secret processes if any developed by the Contractor on an exclusive basis and employed in the design of the unit shall remain with the Contractor. The Purchaser shall hold in confidence such processes and shall not disclose such processes to the third parties without prior approval of the Contractor and execution by such third parties of secrecy agreements satisfactory to the Contractor prior to disclosure.

29.4 Subject to para 29.3, title to technical specifications, drawings, flow sheets, norms, calculations, diagrams, interpretations of test results, schematics, lay-outs and such other information which the Contractor has supplied to the Purchaser under the Contract shall be passed on to the Purchaser. The Purchaser shall have the right to use these for construction, erection, start-up, commissioning, operation, maintenance, modifications and/or augmentation of the unit/system.

29.5 The provisions of para 29.1 to 29.3 shall not apply to the information:

i) Which at the time of disclosure are in the public domain or which later on become part of public domain through no fault of the party concerned.

ii) Which were in the possession of the party concerned prior to disclosure to him by the other party, or

iii) Which were received by the party concerned after the time of disclosure without restriction on disclosure or use, from a third party who did not acquire such information directly or indirectly from the other party.

30. **PATENTS**

30.1 If the performance of the Contract involves the use of a patent, trade mark, registered design, copy rights and/or industrial property rights of which the Contractor holds the title, the Contractor shall not be entitled to any licence fee, royalty and/or compensation from the Purchaser outside of the Contract price which shall be deemed to include such licence fee, royalty and/or compensation.

30.2 Where the title holder of a patent, trade mark, registered design, copy rights and/or industrial property rights used is a third party, the Contractor shall be liable for settling with such party and paying any licence fee, royalty and/or compensation thereon.

30.3 In the event of any third party raising claim or bringing action against the Purchaser including but not limited to action for injunction in connection with third party's alleged rights affecting the equipment covered under the Contract or the use thereof, the Contractor agrees and undertakes:

i) To defend and to assist the Purchaser/Consultant in defending at the Contractor's cost against such third party's claim and/or actions and against any law suits of any kind initiated against the Purchaser/Consultant.

ii) To indemnify, keep indemnified and hold harmless the Purchaser/Consultant against all actions, claims, demands, costs, charges and expenses arising from or incurred by reason of any infringement of patent, trade mark, registered design, copy rights and/or industrial property rights by manufacture, sale or use of the equipment supplied by the Contractor whether or not the Purchaser/ Consultant is held liable for by any court judgement.

Provided, however, that :

a) The Purchaser shall, as soon as reasonably possible notify the Contractor in writing of such third party's claims and/or actions and:

i/ The Contractor shall at its own cost defend or assist the Purchaser in defending its rights against any such claims and/or actions;

ii/ If the Contractor defends the case, the Purchaser shall, assist the Contractor free of charge by providing all such information and documents as are available with the Purchaser, save and except that in case of production of any witness at the request or instance of the Contractor, the Contractor shall bear the costs and expenses required in this regard.

b) The Purchaser shall not without the Contractor's consent (which shall not be unreasonably withheld) enter into any commitment or admit any fact capable of

supporting third party's claims, unless the Purchaser shall release the Contractor of its liabilities and obligations under the Contract

30.4 Nothing in this clause shall abrogate or abridge the Contractor's own liability for infringement or violation of patent, trade mark, registered design, copy rights and/or industrial property right of a third party.

30.5 If required and mutually agreed, the Purchaser shall enter into Process Licence Contract/s.

30.6 The rights and liabilities of the parties under this clause shall survive this Contract.

31. **INDEMNITY**

31.1 The Contractor shall at all times indemnify and keep indemnified the Purchaser against all claims which may be made against the Purchaser in respect of any infringement of any rights protected by patent registration of design of trade mark. In this connection, the Purchaser shall pass on all claims made against him to the Contractor for settlement.

31.2 The Contractor assumes responsibility for and shall indemnify and save harmless the Purchaser/ Consultant from all liability, claims, costs, expenses, taxes and assessments including penalties, punitive damages, attorney's fees and court costs which are or may be required with respect to any breach of the Contractor's obligations under the Contract or for which the Contractor has assumed responsibilities under the Contract including those imposed under any Contract local or national law or laws, or in respect to all salaries, wages or other compensation or all persons employed by the Contractor or his Sub-contractors or suppliers in connection with the performance of any work covered by the Contract. The Contractor shall execute, deliver and shall cause his Sub-contractor and suppliers to execute and deliver, such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary thereunder to conform and effectuate the Contract and to protect the Purchaser/ Consultant.

31.3 The Purchaser shall neither be held responsible nor be liable for any accident or damages incurred or claims arising therefrom during the period of erection under the responsibility of the Contractor and putting into operation of the system under the supervision of the Contractor in so far as the latter is responsible. However, the Contractor shall be liable for such accidents as may be due to negligence on his part in accordance with Indian laws and regulations.

31.4 The Contractor shall be responsible for proper fencing, lighting, guarding and watching of all works at site until they are taken over and further proper provisions for like period of temporary drainage, roadways, footways, guards and fences as far as may be rendered necessary by reason of works for accommodation and protection of the Purchaser 's and occupiers of adjacent property, the public and others. No naked light shall be used by the

Contractor on the site otherwise than in the open air without the special permission in writing from the Purchaser.

32. The Contract shall be subject to the exclusive jurisdiction of Courts at Ranchi having jurisdiction at Ranchi (with the exclusion of all other Courts).

33. **DEDUCTIONS FROM CONTRACT PRICE**

All costs/charges/damages or expenses which the Purchaser may have paid, for which under the contract, the Contractor is liable, may be deducted by the Purchaser from any money due or becoming due to him under the contract or may be recovered by action of law or otherwise from the Contractor.

34. **TERMINATION OF SERVICES OF CONTRACTOR'S PERSONNEL**

In the event the Contractor or their Sub-contractors, agent, sub-agent, assistants, firms or other employee shall, in the opinion of the Purchaser be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or in the opinion of the Purchaser it is undesirable for administrative or any other reasons for such person to be employed, the Contractor, if so directed, shall immediately remove such person or persons from deployment thereon. Any person or persons so removed shall not again be employed in connection with this Contract without the written permission of the Purchaser. Any person so removed shall immediately be replaced by a qualified and competent substitute at the Contractor's cost and expenses. Should the Contractor be requested to remove any person he shall do so and shall bear all costs and charges in connection therewith.

35. **WAIVER**

35.1 Non-enforcement by either party of any of the provisions of the Contract shall not operate or constitute as a waiver of the provision itself or any subsequent breach thereof.

35.2 The validity of the Contract shall not be affected, should one or more of its stipulations be or become legally invalid and such stipulation is severable from and not fundamental to the obligations of either party to the Contract. In such a case, the parties shall negotiate in good faith to replace the invalid clause by an agreed stipulation which is in accordance with the applicable law and which shall be as close as possible to the parties' original intent.

36. **AMENDMENT**

Any amendment to the Contract can be made with the consent of both the parties in writing.

37. EXTENSION OF TIME

If the Contract is delayed at any time in the progress of work by any act, delay or neglect, of the Purchaser, or by any other Contractor employed by the Purchaser, or by changes ordered in the work by the Purchaser or by strike, lock out, fire, war, act of public enemy, or by any cause which the Purchaser shall decide as justifiable, then the time of completion shall be extended by a reasonable time as the Purchaser may decide on reasonable ground. In case of such occurrence, the Contractor shall request in writing to the Purchaser for extension of time within 15 (fifteen) calendar days from the date of occurrence of the causes of delay.

38. NOTICES ON BEHALF OF PURCHASER

Notices and certificates on behalf of the Purchaser in connection with the contract may be given by duly authorised representative of the Purchaser.

39. PROCUREMENT OF STEEL AND CEMENT

39.1 Steel

Steel required for the scope of work covered under the Contract shall be arranged by the Contractor at his own cost.

39.2 Cement

Cement required for the scope covered under this Contract shall be arranged by the Contractor at his own cost.

40. EXPLOSIVES

In case explosives are required for blasting of hard rock, the same shall be arranged by the Contractor at his own cost. Fulfillment of statutory obligation shall be the responsibility of the Contractor. The Contractor shall transport the same to the site in an explosive van as per the statutory regulations, at his own cost.

The Contractor shall engage only the licensed blasters and comply with all statutory regulations.

41. CONSTRUCTION FACILITIES

41.1 **Water Supply -** Water required for construction purposes as well as for drinking purposes shall be arrange by the Contractor at his own cost.

41.2 Power

41.2.1 The Contractor shall responsible for making his own arrangement for construction power.

41.2.2 The distribution diagram with Loadings and specifications shall be submitted to the Engineer for his approval before the system is installed. The system shall conform to Indian Electricity Rules, 1956 and Indian Electricity Act, 1910 with latest amendments and to the approved specifications of the Purchaser.

41.2.3 The Contractor shall ensure at his cost that all electric lines and equipments conform to the Indian Electricity Rules, 1956 and Indian Electricity Act, 1910 with latest amendments and that all installations are approved by the Electrical Inspector, Jharkhand/Bihar before they are charged.

41.2.4 The Contractor shall obtain the permission of the Engineer for installation of equipment, construction of buildings, and electric power supply connections to them. The Contractor shall maintain the distribution system and shall be responsible for any defects therein. Any defect pointed out by the Engineer in the distribution system shall be rectified forthwith by the Contractor failing which the power supply may be cut off by the Purchaser.

41.3 **Temporary Roads**

The Contractor shall provide all temporary roads and walls beyond those established by the Purchaser, deemed necessary to carry out the work at his own cost.

42. FACILITIES FOR MOVEMENT OF MATERIALS AND EQUIPMENT

The service roads and all other enabling works required for transport of materials to and within the site for efficient execution of work under this contract shall be provided by the Contractor. All transport, wharfage, handling charges on account of equipment and materials shall be to the Contractor's account. Service roads constructed by the Contractor may be used by the Purchaser for its purposes.

43. CONSTRUCTION PLANT AND EQUIPMENT

43.1 The Contractor shall make his own arrangements to procure all construction plant and equipment for his works. The Contractor will arrange to operate and maintain construction equipment hired out by him. The Contractor shall, however, ensure the maintenance of condition under which these equipment can operate safely.

43.2 All materials, construction Facilities, etc. once brought by the Contractor within the project area shall not be removed from there without written permission of the Purchaser. Similarly, all temporary works built by the Contractor for the main construction undertaken by him shall not be dismantled and removed without the permission from the Purchaser. After completion of the work and removal of temporary works, the site shall be left cleaned to the extent practicable in a condition as was handed over to the Contractor.

44. RECONCILIATION OF MATERIALS

The Contractor shall maintain proper records for reconciliation of materials with Purchaser as required.

For the purpose of payments towards supplies and services, reconciliation of payments shall be made after completion of erection of items measured in other than numbers (viz. length or weight) such that actual payment towards supplies are for the same quantities as admissible for erection.

45. RETURN OF PACKAGES

The Contractor shall not be allowed to take out empty packing cases, which had contained equipment/ materials. All empty packing cases shall be returned by the Contractor to the Purchaser as directed.

46. LIEN

Final payment to the Contractor shall not be made until the Contractor shall deliver to the Purchaser a complete release of all lien arising out the Contractor receipts in full in lieu thereof and in either case, an affidavit that so far as he has knowledge or information, the release and receipts include all the labour and material for which a lien could be filed, if any lien remains uncertified after all payments are made the Contractor shall refund to Purchaser all moneys that the latter may be complied to pay in discharging such lien, including all costs and a reasonable attorney's fee.

47. GOVERNING LAWS

The terms and provisions of the Contract shall be governed and interpreted in accordance with the Indian Laws.

48. STATUTORY AND OTHER REGULATIONS

The Contractor shall in all matters, arising in the performance of the contract, conform at his own expense with all acts of parliament and with all orders, regulations and by-laws, made by statutory authority or Government departments or by local and other authorities which may be applicable to the works. The Contractor shall not during the performance of the contract in any manner endanger the safety or unlawfully interfere with the public.

All statutory clearances including those pertaining to contract labour as necessary in the performance of the Contract shall also be taken by the Contractor.

49. SAFETY

The Contractor shall abide by the Safety Code for Contractors which is annexed in **Annexure- XIII.**

50. **LABOUR**

In respect of all labour directly or indirectly employed on the work the Contractor shall comply with all legislations and rules of State and or Central Government or other local authority formed from time to time governing the protection of health, sanitary arrangements, wages, welfare and safety for labour employed on building and construction works. The rules and other statutory obligations statutory obligations with regard to fair wages, welfare and safety measures, maintenance of register etc. will be deemed to be part of the Contract.

The age limit for employment of labour shall be strictly accordance with the existing labour Rules and Regulations.

The Contractor shall comply with the provisions of the Minimum Wages Act 1948 and the rules made thereunder by the Government of Jharkhand in respect of all employees employed by him or in carrying out this contract. He shall pay the employees wages not less than the minimum rates of wages, if any, fixed by the Government of Jharkhand, Department of Labour and Employment for that Category (including wages payable for weekly holidays contemplated under the Minimum Wages Act of Jharkhand read with the applicable Rules for minimum wages).

The Contractor shall at all times indemnify the Purchaser against all claims arising out of provisions of the Minimum Wages Act 1948 and the Rules framed thereunder as admissible in respect of any workman employed by the Contractor in carrying out the contract and against all costs and expenses and penalties incurred by the Purchaser in this connection. Without prejudice to other means of recovery, the Purchaser shall be entitled to deduct from any money due or become due to the Contractor all moneys paid or payable by the Purchaser by way of wages and other dues (including compensation, penalty if any, imposed for committing breach of any provision of the Act by the Contractor) in connection with any claim thereto and the Contractor shall abide by the decision of the Purchaser as to the sum payable by the Contractor under the provisions of this clause.

In respect of labour directly or indirectly employed on the works, the Contractor shall provide at his cost reasonable amenities for securing proper working and living conditions such as water supply, lavatories, bathing places cleanliness, etc. Where labour is employed urinals/lavatories will be provided separately by the Contractor for male and female workers as well as crèches for the infant children of women labourers. Labourers engaged on hazardous jobs and occupations will be provided with necessary safety appliances by Contractor, free of charges.

The Contractor's establishment will be subject to inspection, investigation etc. by the Engineer or by Engineer's Representative or such other Representatives of Purchaser as duly authorised on his behalf by him for assuring proper and faithfully compliance of the

provisions of this contract by the Contractor with regard to the implementation of Labour Laws and other matters anticipated herein.

The Contractor shall abide by the decisions and orders of the Engineer with regard to any such matter and furnish, if required, necessary compliance report within the stipulated time. The Contractor shall be responsible for the observance of the provisions of above para by Sub-contractors employed by him in the execution of the contract.

51. CONTRACTOR'S ACCOMMODATION

51.1 The Purchaser will, at his discretion, and for the duration, of the contract, make available free of charge land at site for the Construction of the Contractor's Field Offices, stores Workshops Assembly Yard, etc, required for the execution of the contract; clearing and levelling of the ground, construction of temporary roads, stores, offices, etc. as required shall be done by the Contractor at his own cost to the satisfaction of the engineer. The Contractor shall at his own cost clear and level the ground and construct suitable accommodation for his staff and labour together with all roads, latrines as well as arrangements for disposal of drainage and sanitary arrangements to the satisfaction of the Purchaser and to the standards laid down by the Purchaser. The Contractor shall be responsible for the maintenance of law and order, sanitary and medical arrangements as required within his staff and labour camps and keep the Purchaser fully indemnified in this respect.

51.2 In regard to the lands made available to the Contractor for his office, stores, workshops, etc. the sites shall on completion of work, be restored to reasonably the same condition as when they were originally handed over to the Contractor. All structures erected thereon shall be removed unless their retention is permitted by the Purchaser before the final settlement of dues and the Contractor is released. The Purchaser reserves the right on completion of the work, to take over any or all of such structures put up by the Contractor, at terms to be mutually agreed upon.

51.3 During erection the Contractor shall, without any additional payment, at all times keep the working and storage areas used by him, reasonably free from accumulation of waste materials or rubbish. Immediately after completion of erection. He shall remove or dispose off in a satisfactory manner all temporary structures, waste debris and leave the premises in a condition satisfactory to the Purchaser.

51.4 No accommodation (houses or otherwise) will be provided by the Purchaser for the Contractor or for his staff.

52. **WORK AT SITE**

In the execution of the work, no person other than the Contractor or his duly appointed representatives, Sub-contractors and their workmen shall be allowed to do work at site except with the special permission, in writing, of the Purchaser or his representatives.

Nevertheless, the Contractor shall not object to the execution of work by other Contractors or tradesmen whose names shall have been previously communicated, in writing to the Contractor by the Purchaser and afford them every facility for the execution of their several works simultaneously with his own.

The Contractor shall be liable for such accidents as may be due to negligence on his part in accordance with Indian Laws and regulations. The Purchaser shall not be held responsible for any accident or damages incurred or claims arising therefrom during the period of erection and/or construction under the responsibility of the Contractor and putting into operation of the plant under the supervision of the Contractor, as far as the latter is responsible. The Contractor shall provide all insurance including third party insurance to cover his risks.

The Contractor shall at all times provide sufficient fencing, notice boards, watchmen and lights, to protect and warn the public and guard the works and the plant so as to prevent any loss of the property of the Purchaser which is in his (Contractor's) charge during the period.

The work to be carried out in the Purchaser's premises shall be carried out at such time as the Purchaser may approve and so not to interfere unnecessarily with the conduct of the Purchaser's business but the Purchaser shall give the Contractor all reasonable facilities for carrying out the work.

The Contractor shall not carry out any welding or gas cutting operation until necessary precautions as specified in IS 3016-1965 (Code of Practice for Fire Precautions in Welding and Cutting Operations) are taken prior to undertake the work. In case any damage to Purchaser's property is caused due to fire, due to by Negligence/Non-compliance of the provisions, the Contractor shall be liable to pay the compensation to Purchaser, against the

property so lost/damaged by him directly or indirectly. The amount of compensation and/or extent of damage/debit note raised by the Purchaser, shall be admitted by the Contractor, as may be calculated and fixed by the enquiry authority appointed by the Purchaser to determine the extent of damage and fix up responsibility.

53. **RESTRICTION OF VISITORS**

The Contractor shall not allow any visitors on the works except with the prior written approval of the Purchaser.

54. **POSSESSION PRIOR TO COMPLETION**

The Purchaser shall have the right to take possession or use any completed or partially completed work. Such possession or use shall not be deemed to be an acceptance of any work done not in accordance with the Contract. However, any damage to such work solely due to such provision or use shall be to the Purchaser 's account.

55. **GENERAL LIABILITY PROVISION**

The rights and obligations of the parties are finally and conclusively defined in this Contract. Claims for indirect, remote or consequential damages such as loss of production, loss of profit, loss of use are excluded.

56. **RIGHTS OF PURCHASER TO VARY THE SCOPE**

56.1 The Purchaser shall have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract.

56.2 If any changes are required for completeness of the work as per Clause-9 herein above the Contractor shall not be entitled to extra price or time.

56.3 In the event, the Purchaser requests a change as per Schedule-57.1 the Contract price and time shall be adjusted upwards or downwards, as the case may be and as shall be mutually agreed to. The Contractor shall not be entitled to any extension of time unless such changes adversely affect the time schedule.

56.4 The Contractor shall not change any work to be made pursuant to this Contract except as may become necessary to enable him to meet his technical obligations under this Contract, provided however that such changes shall be subject to prior written approval of the Purchaser.

56.5 If any changes are required for completeness of the works as per Schedule 57.2, or the Contractor himself changes as per Schedule 57.4, the Contractor shall not be entitled to extra price or time.

56.6 The Contractor shall proceed with the changes as requested as per Schedule 57.1 pending adjustment of Contract price and time schedule where so applicable in terms of Schedule-57.3.

56.7 In the event that a request for changes by the purchaser should affect the guarantees of the plant/process, a readjustment of such guarantees shall be agreed upon jointly, before the Contractor proceeds with the change.

56.8 Changes occasioned due to non-observance by the Contractor of the provisions of this Contract or arising out of detection by the Purchaser of errors in the documents or in works not in compliance with the design, specifications & drawings or with the best engineering practice, shall neither give rise to price adjustment nor extension of time. The Contractor shall take immediate steps to restore the contractual position.

57. **GENERAL**

57.1 No member or official or employee of the Purchaser shall in any way be personally bound or liable for the acts or obligations of the Purchaser under the contract or answerable for any default or omission in the observance or performance of any of the acts, matters or things or conditions which are herein contained.

ANNEXURE-VII

OBLIGATIONS OF THE PURCHASER

Obligations of the Purchaser have been stipulated in general in the Contract agreement, schedules and annexures. In particular, the Purchaser's obligations are as follows:

1/ providing permission to the Contractor to enter his premises for the purpose of carrying out the work.

2/ Designation of locations where the materials are to be delivered and stored.

3/ Designation of locations where dismantled equipment/ materials are to be handed over to the Purchaser by the Contractor.

ANNEXURE-X

PROFORMA FOR BANK GUARANTEE TOWARDS SECURITY DEPOSIT

(To be executed on non-judicial stamp paper of appropriate value)

Name of the Bank.....Bank Limited
Address.....Guarantee
No.....A/c Messrs.....Date
of Expiry.....limit to liability Rs.....
Contract No.....
For (Name of Work).....

Subject : Security Deposit

Date.....200..

GUARANTEE BOND

1. In consideration of the Jharkhand State Electricity Board (hereinafter called the Board) having agreed to exempt _____ (hereinafter called the said contractor(s) from the demand under the terms and conditions of an Agreement dated _____ made between _____ and _____ for _____ (hereinafter called the said Agreement) of security deposit for the due fulfillment by the said contractor(s) of the terms and conditions contained in the said Agreement, on production of a bank guarantee for Rs._____ (Rupees _____only) we _____ (indicate Name of the Bank) (hereinafter referred to as the Bank) at the request of _____(Contractor(s)) do hereby undertake to pay to the Board an amount not exceeding Rs. _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Board by reason of any breach by the said contractor(s) of any of the terms or conditions contained in the said Agreements.

2. We _____(indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Board stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Board by reason of breach by the said contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the contractor(s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under

this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs_____.

3. We undertake to pay to the Board any money so demanded notwithstanding any dispute or disputes raised by the contractor(s)/supplier(s) in any suit or proceeding pending before any court or Tribunal or arbitration relating thereto our liability under these presents being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the contractor(s)/supplier(s) shall have no claim against us for making such payment.

4. We,_____(indicate the name of the bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Board under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the Board_____certified that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the_____(date) we shall be discharged from all liability under this guarantee thereafter.

5. We,_____(indicate the name of the Bank) further agree that the Board shall have the fullest liberty without or consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Board against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the Board or any indulgences by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the bank or the Contractor(s)/supplier(s).

7. We,_____(the name of the Bank) further undertake to extend the validity of this guarantee beyond the period stated in clause 4 hereinabove or as extended from time to time, for such further period as may be required by the Board in writing before the expiry of this guarantee and upon such extension(s), all terms and conditions of this guarantee shall remain in full force till the expiry of the extended period(s).

8. We,_____(indicate the name of bank)lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Board in writing.

9. We have power to issue this guarantee under our MemoranRMG and Articles of Association and the undersigned has full powers to sign this guarantee on our behalf under power of Attorney dated ..... granted to his and/or the resolution dated .....passed by our Board of Directors in accordance with our constitution.

Dated the.....day of..... 200..

for

(indicate the name of Bank).

ANNEXURE – XI

PROFORMA FOR BANK GUARANTEE TOWARDS ADVANCE PAYMENT
(IF APPLICABLE)

(To be executed on non-judicial stamp paper of appropriate value)

Name of the Bank.....Bank Limited

Address.....Guarantee
No.....A/c Messrs.....Date
of Expiry.....limit to liability Rs.....
Contract No.....
For (Name of Work).....

Subject:.....Advance payment

Date.....200..

To

Jharkhand State Electricity Board,
Engineering Building, HEC Dhurwa,
Ranchi - 834004
Jharkhand

Dear Sirs,

Whereas you have entered into a contract Ref.No..... Dated..... with M/s.....…….. (hereinafter called the Contractor) for the design, manufacture, supply, storage, erection, testing, commissioning and performance guarantee test of..... hsereinafter referred to as "the said contract" and have agreed to make an advance payment to M/s.....…… a sum of Rs..... (Rupees ……) payment representing.....percentage of the contract value of ..... in terms of the said contract for..... on our agreeing to furnish you with our guarantee in the manner hereinafter contained, we (name of the Bank) ..... do hereby covenant and agree with you as follows:

1. We hereby undertake to indemnify you and keep you indemnified to the extent of the sum of Rs.....(Rupees.....only) from and against all losses and damages that may be caused to or suffered by you in relation to the advance payment to be made by you to the contractor as aforesaid by reason of any default or defaults on the part of the Contractor in due supply of any plant, machinery or equipment or carrying out any works under the said

Contract in respect of which such advance payment as aforesaid is to be made by you to the Contractor or otherwise in the observance and performance of any of the terms and conditions relating thereto in accordance with the true intent and meaning thereof and in the event of any default or defaults on the part of the Contractor as aforesaid we shall forthwith on demand pay to you any sum or sums not exceeding in the total of the said sum of Rs.....(Rupees.....only) as may be claimed by you to be due from the Contractor by way of refund of such advance payment or any portion or otherwise as your losses and/or damages, costs, charges or expenses by reason of such default or defaults on the part of the Contractor as aforesaid without demur or without reference to M/s.....

2. Notwithstanding anything to the contrary we agree that your decision as to whether the Contractor has made any such default or defaults and the amount or amounts to which you are entitled by reason thereof will be binding on us and we shall not be entitled to ask you to establish your claim or claims under this Guarantee but shall pay the same forthwith without any objection, or excuse.

3. We undertake to pay to you any money so demanded notwithstanding any dispute or disputes raised by the contractor or supplier(s) in any suit or proceeding pending before any court or Tribunal or arbitration relating thereto, our liability under these presents being absolute and unequivocal.

4. The payment so made by us under this Guarantee, shall be a valid discharge of our liability for payment hereunder.

   This Guarantee shall come into force simultaneously with your making the said advance payment to the contractor and shall not be revoked by us at any time during its currency without your previous consent in writing.

5. Unless extended, this guarantee shall remain in force till.....day of..... 200.., Provided however, that should it be necessary to extend we shall extend forthwith the period of this guarantee on your request till such time as may be required by you.

6. You will have fullest liberty without affecting this guarantee to postpone for anytime or from time to time any of your rights or power against the Contractor and either to enforce or forebear to enforce any of the terms or conditions of the said contract and we shall not be released from our liability under this guarantee by the exercise of your liberty with reference to the Contractor or any other forbearance, act or omission on your part or any indulgence shown by you to the Contractor or by any variation or modification of the said Contract or any other act, matter, or thing whatsoever which under the law relating to sureties would but

for the provisions hereof have the effect of so releasing us from our liability hereunder. PROVIDED ALWAYS that nothing herein contained will enlarge our liability hereunder beyond the limit of Rs.....…… (Rupees…….....only) as aforesaid or extend the period this guarantee beyond the said.....day of writing in terms of clause 5 hereof.

7. All compensations and payments that may be received by you from the Contractor or any person, firm or company whosoever for or on account of the Contractor in any way in respect of the said contract shall be regarded as payments in gross and you will be entitled to proceed against the assets of the Contractor, should the Contractor be wound up or dissolved or declared insolvent in respect of the whole of the Contractor's indebtedness to you without any right on our part to stand in your place in respect of or to claim the benefit of such compensation or payment or any security that may be held by you until you shall have received the full guarantee shall not in any way be affected by your taking or varying or giving up any securities from the contractor or any other person, firm or company on its behalf or by the winding up, dissolution, insolvency or death as the case may be of the Contractor.

8. In order to give full effect to the guarantee herein contained you shall be entitled to act as if we were your principal debtors in respect of all your claims against the Contractor, hereby guaranteed by us as aforesaid and we hereby expressly waive all our surety ship and other rights if any, which are in any way, inconsistent with the above or any other provisions of this guarantee.

9. Subject to the maximum limit of our liability as aforesaid this guarantee will cover all your claim or claims against the contractor from time to time arising out of or in relation to your such advance payment to the Contractor as aforesaid and in respect of which your demand or notice in writing be issued to us before the date of expiry of this guarantee mentioned above.

10. This guarantee and the power and provisions herein contained are in addition to and not by way of limitation of or substitution for any other guarantee or guarantees hereto given to you by us (whether jointly with other or alone) and now existing uncancelled and that this guarantee is not intended to and shall not revoke or limit such guarantee or guarantees.

11. This guarantee shall be a continuing guarantee and shall not be discharged by any change in the constitution of the contractor or ourselves nor shall it be affected by any change in your constitution or by any amalgamation or absorption thereof or therewith but will ensure for and be available to and enforceable by the absorbing or amalgamated company or concern. We shall not revoke this guarantee during its currency, except with your prior consent in writing.

12. Unless a claim or demand is made on us in writing within three months of the expiry date all your rights shall be forfeited and we shall stand released and discharged from our liability hereunder.

13. We have power to issue this guarantee under our Memorandum and Articles of Association and the undersigned has full powers to sign this guarantee on our behalf under power of Attorney dated ..... granted to his and/or the resolution dated .....passed by our Board of Directors in accordance with our constitution.

Yours faithfully,

Dated.....Day of 200..
For .....
(indicate the name of Bank)

ANNEXURE – XII

Proforma for custody-cum-Indemnity Bond

(To be used for materials to be issued free or goods/materials ownership of which passed on the Purchaser before construction/erection/testing/commissioning)

(on Non-judicial Stamp paper of value not less than Rs 50.00)

Proforma for custody-cum-Indemnity Bond for the work of .....

Jharkhand State Electricity Board,
Engineering Building, HEC Dhurwa,
Ranchi - 834004
Jharkhand

In consideration of the Jharkhand State Electricity Board hereinafter called the Board (which expression shall unless repugnant to the subject or content include its successors and assigns) having agreed under the terms and conditions of the contract no..... dated.....made between ..... and the Board in connection with.....to permit the contractor to receive goods/materials (specify the quantity and name of the materials) of the contract for the supply value of Rs.....interalia on production of Indemnity-cum-custody bond. We do hereby undertake and agree to indemnify and keep indemnified the Board from time to time to the extent of Rs.....(Rupees.....only) against any loss or damage, costs, charges and expenses caused to or suffered by the Board by reason of the..... failing to take proper care and custody of the goods/materials and/or failing to properly use in the job as per contract and hand over the completed job in terms of the agreement aforesaid or not complying the instructions which may be given from time to time during the continuance of the agreement and we further undertake to unconditionally pay the amount claimed by the Board on demand and without demur to the extent aforesaid.

We.....hereby further undertake to use the said goods/materials in terms of the contract aforesaid and further keep safely, preserve and maintain or caused to be kept safely preserved or maintained all plant machinery equipment and all materials for erection till the date of the preliminary acceptance thereof in terms of the agreement and any damage, breakage, loss during this period will be solely to our Account and we would make necessary arrangement proper replacement/repair as desired by the Board.

We.....further agree that the Board shall be sole judge of and as to whether there has been any breach of the terms and conditions of this bond and as to the extent of the loss, damage costs charges and expenses caused to or suffered by the Board.

We .....further agree that our liability under this bond shall not be discharged because of the change in the constitution of the Board/or the extension of the time or for any indulgence by the Board granted to us.

(Signature with seal of the Contractor)

ANNEXURE -XIII

SAFETY CODE FOR CONTRACTORS

GENERAL

1.00 Safety is the responsibility of every person individually and collectively.

1.01 The Purchaser/Engineer should ensure that a copy of this Contractor's Safety Code is handed over to every Contractor working under his control and he should in turn display all rules on the office notice board for the benefit of all the men working under him.

1.02 The Contractor shall in connection with provide adequate guards, illumination, fencing and watching wherever necessary at the construction site & working area, for the safety & convenience of public or others.

1.03 Fire extinguishers, adequate in number shall be kept by the Contractor at the site of works where there is risk of fire hazard, especially near the site stores.

1.04 Adequate washing facilities with proper drainage shall be provided properly maintained near the place of work but at a safe distance from railway tracks and busy roads.

1.05 When work is to be done near any place, where there is risks of drowning, arrangements to be made for safe barricading of such areas. All necessary equipment shall be provided and kept ready for use and necessary steps taken for prompt rescue of any person in danger and adequate provision shall be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work in case of mishap.

1.06 To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Safety Engineer, the Labour Officer, Engineer-in-charge of the department or their representatives.

1.07 Notwithstanding the above clauses, there is nothing in those to exempt the Contractor from the operation of any other Act or Rule in Republic of India for the safety of men and materials.

1.08 An injury sustained in the plant, must be reported to the First-Aid Station no matter how slight it is, the injured person will inform Supervisor/Officer in-charge.

1.09 In case of a fatal accident, the Contractor must inform the Engineer in-charge of the department for which he is working. and report in writing should be made in the proforma of the Purchaser.

1.10 Smoking or keeping of naked light is strictly prohibited near gas lines, valves and any other equipment connected with the gas distribution.

1.11 Smoking and carrying of matches, lighters and other spark producing devices is strictly prohibited within the area where inflammable liquids are stored, handled or used or where loading or unloading operations are performed. Any tank or container containing flammable liquid should be properly grounded for preventing ignition due to static electricity spark. Contractor should earmark such areas and provide necessary warning signals.

1.12 Contractors should ensure that their employees do not come to work while under the influence of intoxicants. Any employee found on duty under the influence of liquor or of intoxicating drugs, will be liable to severe disciplinary action.

1.13 Work surrounds should be kept clean, free from oil, grease and other obstructions or fallen objects like nuts bolts etc.

1.14 After a job or work is completed, all leftover junk and other scrap materials should be cleared from the area immediately.

1.15 Drums or other makeshift arrangement must not be used in place of ladders or as work benches or supports for any job.

1.16 Employees must not walk through or across any operating units unless their duties require them to do so or they are authorised to do so.

1.17 Compressed air should not be used for removing dust from one's clothes. Compressed air should not be blown against anyone as it may injure or even kill him.

1.18 If an employee, in the course of his work, encounters condition of unusual hazard with which he is not familiar, he should contact the supervisor for advice before proceeding further. He should also inform the Contractor as well as the Engineer in-charge.

1.19 Contractors should particularly ensure that they or their employees do not meddle with any equipment and see that they keep away from such equipment.

1.20 It should be ensured that no one takes rest/shelter below any under cut pit/excavation or near any stock of materials.

1.21 i/ For any work involving repair & maintenance underground work the Contractor shall follow the safety procedural orders/instruction issued by the Purchaser.

ii/ The Contractor shall exercise supervision of such jobs by competent persons within the meaning of factories act & rules.

iii/ All persons engage on such jobs shall have to have before hand proper training instructions as required under Factories Act & Rules.

2.00 SAFETY MEASURES IN CONTRACTUAL WORK

2.01 The Contractor shall take all safety precautions and provide adequate supervision in order to carryout the job safely and without damage to equipment.

2.02 Any special safety precautions, if required to be followed by the Contractor, shall also be taken by the Contractor.

2.03 The executing department would take necessary shut-downs wherever there are hazards of gases, electricity, moving machinery etc. The Contractor shall ensure that the shut-down/clearance are taken before sending workers to such locations.

2.04 The Contractor shall supply safety appliance like shoes, safety belts, helmets, gloves etc. to his workers depending on working conditions and Life saving jackets shall be kept in readiness always at the site. The Contractor shall not deploy any workmen without safety boot and safety helmet and the safety applicable to the specific work conditions.

2.05 Before starting the day's job, the Purchaser's Supervisor/representatives will ensure that safety briefing has been done to the Contractor's supervisor who has been imparted safety induction earlier.

2.06 Purchaser will nominate Engineer in-charge of the contractual work under reference who will be fully responsible for the safe execution of the work at site.

2.07 In case of injury to persons, the Contractors shall first take the injured person to nearest Hospital /State Dispensary and the Engineer-in-Charge should be informed in writing.

2.08 The Contractor shall abide by the provisions of Factories Act, State Factory Rules, Workmen's Compensation Act, Payment of Wages Act, Contract Labour (Regulation) Act etc. and keep the Purchaser indemnified of provision the above Acts and Rules.

2.09 The Purchaser upon the satisfaction that the Contractor is not conforming to the Safety requirements may direct stoppage of work and require the Contractor to remedy the defects. The Contractor shall not proceed with the work until he has complied with each directions to the satisfaction of such the Purchaser.

2.10 The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries.

2.11 Without prejudice to the right conferred by the clause 2.09 above for stoppage of work for violations of safety requirements the Contractor shall be liable for penalty as deemed fit for violation of safety rules & regulations upto first two instances. For the third violation he shall be liable to be debarred from further contracts upto a period of one year from the date of issue of debarring notice.

2.12 The Engineer-in-Charge executing the contract will assess the penalty amount having regard to the circumstances, in particular, the nature and gravity of the violation. After issuing a notice to the Contractor to show cause why the amount specified therein shall not be imposed as a penalty and considering the cause shown by the Contractors, if any, he shall pass final orders which shall then be final and binding on the Contractor. The penalty amount will be recoverable from any bill and/or EMD/SD of the Contractor without any further reference to him.

2.13 Whenever work, at height is involved, Contractor must obtain height passes from Safety Engg. Deptt. Of the Purchaser for those persons required to do work at height.

2.14 Contractor must insure all the workmen against "Workmen's Compensation Act."

2.15 As the work pertains to electrical power transmission, utmost care shall be taken by the Contractor especially when making connections/disconnections/ charging.