NIT No:

Note - Contractor shall submit the unit rate of individual item in **Annexure 1** and total value is to be submitted in price bid for unit 10 & 11 Separately. The evaluation of lowest bidder shall be made on the basis of lowest total quoted price.

SCOPE OF WORK & BOQ — **Annexure 1 (Page 1 to 2)**

Job: Dismantling, Erection, Commissioning of maxDNA DCS system for TG autoloop/regenerative/Boiler area for R&M Obra unit-10 & 11, 200 MW, Obra R&M 'B' thermal power station, Obra, Sonebhadra U.P.

Bill of Quantity for Unit no. -10 and Unit no. – 11 (Two Unit)

Sl. No	ITEM DESCRIPTION	UNIT	QTY./ Unit	RATE (IN Rs.)	TOTAL AMOUNT FOR 1 unit
A-	ERECTION & COMMISSIONING (PANELS / CONSOLES / RACKS / CABLE TRAYS/JUNCTION BOX)				
1	DCS BASED PANELS (APPROX SIZE 750L X 2355H X 750W)	No.	16		-
2	EMERGENCY BACKUP CONTROL DESK / PANEL (NON MOSAIC TYPE) ALONG WITH 180 WINDOW ALARM ANNUNCIATOR	No.	1		-
3	GPS BASED TIME SYNCHRONIZATION SYSTEM FOR TIME SYNCHRONIZATION OF MAXDNA DCS ALONG WITH 1 MASTER CLOCK AND 5 SLAVE CLOCKS	No	1		-
4	VDDC PANEL (750L X 2355H X 750W)	NO	2		-
5	LOCAL INSTRUMENT RACK (OPEN RACKS SUITABLE FOR 4 TO 6 TRANSMITTERS)	No.	20		-
6	LADDER / PERFORATED CABLE TRAYS 500/300 MM WIDE INCLUDINGCABLE DUCT WITH COVER	Mtr.	600		-
7	JUNCTION BOXES UPTO 48WAYS	No.	40		-
8	JUNCTION BOXES UPTO 64 WAYS	No	20		-
9	ERECTION AND COMMISSIONING OF LOCAL CONTROL PANEL FOR TG SIDE OIL PUNPS	No	4		-
POWER / CONTROL / SIGNAL CABLES LAYING, DRESSING, CLAMPING & TERMINATION AND IMPULSE PIPING					
10	2 CORE / 1 PAIR CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	14000		-
11	3 CORE / 1 TRIAD CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	5800		-
12	4 CORE / 2 PAIR CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	76000		-
13	7 CORE/ 8 CORE / 4 PAIR / 2 TRIAD CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	25000		-
14	10 - 16 CORE / 8 PAIR CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	7500		-
15	17 - 24 CORE / 12 PAIR CABLE (ARMOURED / UN-ARMOURED) CORE SIZE UPTO 2.5 SQ. MM	Mtr	4600		-
16	3C X 6 / 16 SQ.MM CABLE (ARMOURED / UN-ARMOURED)	Mtr	5700		-
17	3C CABLE FROM 35 SQMM / 70 SQMM (ARMOURED / UN-ARMOURED)	Mtr.	500		
18	4P UTP E-CAT LAN CABLE	Mtr.	1200		
19	½" , ¾"CS/ AS IMPULSE PIPE UPTO 180 SCHEDULE	Mtr.	2400		-
20	INSTRUMENT VALVES AND MANIFOLDS	No.	60		-
LOCAL / FIELD MOUNTED INSTRUMENTS / EQUIPMENT TO BE INSTALLED & COMMISSIONED					
21	DISMANTLING & ERECTION OF NEW CONTROL VALVE WITH ACTUATOR OF TG AUTOLOOP (line size up to 6")	No.	24		-
22	CALLIBRATION, COMMISSIONING OF REGULATING ELECTRICAL CONTROL VALVES WITH POSITIONERS	No.	24		-
23	CALLIBRATION, ERECTION & COMMISSIONING OF PRESSURE / DIFF. PRESSURE / TEMPERATURE/ LEVEL	No.	184		-

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(LOKESH KUMAR)
Engineer

	GAUGE INCLUDING FLUSHING.				
24	CALLIBRATION, ERECTION & COMMISSIONING OF PRESSURE / DIFF. PRESSURE / TEMPERATURE / LEVEL SWITCH (LEVEL SWITCH CAN BE FLANGE TYPE OR WELDED TYPE / WITH OR WITHOUT ELECTRONIC UNIT)	No.	59		-
25	CALLIBRATION, ERECTION & COMMISSIONING OF RTD/ THERMOCOUPLE ALONG WITH FITTINGS	No.	78		-
26	CALLIBRATION ERECTION & COMMISSIONING OF PRESSURE / DIFF. PRESSURE / LEVEL / POSITION TRANSMITTER/MASS FLOW TRANSMITTERS WITH FITTINGS INCLUDING FLUSHING/BACKFLUSHING OF OLD IMPULSE LINE	No.	88		-
27	PC SET WITH MONITOR / KEYBOARD / POWER SUPPLY UNIT & PRINTERS WITH FURNITURE	No.	1		-
28	FABRICATION / ERECTION OF STRUCTURAL STEEL.	MT	4		-
29	COMMISSIONING OF LT MOTORS.	No.	40		-
30	REPLACEMENT / NEW INSTALLATION OF ½" / ¾" INSTRUMENT ROOT VALVES IN IMPULSE LINE	No.	1000		-
	B- DISMANTLING OF C&I ITEMS				
31	PANELS FROM CONTROL ROOM & MCC	No.	24		-
32	CABLES FROM FIELD TO MCC PANEL/VDDC PANEL/CONTROL ROOM PANELS.	Km.	110		-
33	CABLE TRAYS FROM FIELD	Mtr.	600		-
34	IMPULSE PIPE WITH FITTINGS	Mtr.	3000		-
35	INSTRUMENTS (TRANSMITTERS, GAUGES, SWITCHES, RTD & THERMOCOUPLES)	No.	300		-
36	DISMANTLING & REMOVAL OF BOILER SIDE OLD LIE	No.	8		-
37	DISMANTLING OF LOCAL CONTROL PANEL OF TG SIDE OIL PUMPS	No.	4		-
38	DISMANTLING OF LIR	No.	15		-
39	DISMANTLING OF OLD JBS	No.	40		-
	C- SERVICING OF C&I ITEMS (Boiler side control valve/IGV of fans/ on-off valve/ SADC power cylinder etc).				
40	SERVICING/RECTIFICATION OF PNUMETIC CONTROL/ON-OFF VALVES INCLUDING REPAIRING OF F/B LINK ROD ASSEMBLY, REPLACEMENT OF DIAPHRAM INCLUDING ARRANGEMENT OF DIAPHRAM ETC. WITHIN QUOTED PRICE.	No.	25		
41	SERVICING OF SADC POWER CYLINDER & REPLACEMENT OF DIAPHRAGMS. INCLUDING ARRANGEMENT OF DIAPHRAGM WITHIN QUOTED PRICE .	No.	48		
42	SERVICING OF BURNER TILT / HAG & CAD POWER CYLINDER AND IGV OF FANS etc.	No.	20		
43	SERVICING OF SOOT BLOWER MCC MODULES/ DC SCANNER FAN STARTER BOX INCLUDING ARRANGEMENT OF CONSUMABLE.	No.	56		
44	SERVICING OF HEA IGNITOR ASSEMBLY	No.	12		
	TOTAL AMOUNT FOR ONE UNIT (A+B+C)				
	TOTAL AMOUNT FOR BOTH UNIT (Two unit)				

REMARKS -

1. *All dimensions are in mm unless otherwise specified and size is approximate and may vary by ± 20%.*
2. *Quantities indicated against each item above are tentative and same are liable to vary at any extent on either side depending upon 'the site requirement. The contractor has to erect / commission all items indicated by BHEL Engineer for achieving unit wise milestone.*

NIT No:

	SCOPE OF WORK & TERMS AND CONDITIONS	
	NIT No. -	
JOB	Dismantling, Erection, Commissioning of maxDNA DCS system for TG autoloop/regenerative/Boiler area for R&M Obra unit-10 & 11, 200 MW, Obra R&M 'B' thermal power station, Obra, Sonebhadra U.P.	
1.0	SCOPE OF WORK FOR DISMANTLING, ERECTION AND COMMISSIONING	
1.1	Scope of work and Bill of quantity for U-10 & U-11 is as per *Annexure 1*. Quantities are same for unit 10 & 11. Bill of quantity mentioned in the annexure is tentative and may vary at any extent on either side as per site requirement. Contractor has to complete the work as per site requirement and payment shall be made at prorate basis. ***Parties are advised to visit Obra TPS and understand/ asses the exact work, condition of equipment & work required to be carried out before submission of offer.*** ***If party has already deployed their resources at Obra TPS through separate order, then party has to deploy separate resources i.e. manpower (site incharge, engineers, supervisors and workers), T&P, IMTEs, stores and office against subject work order. In case party has not deploy separate resources BHEL has to right deduct amount accordingly.***	
1.2	Contractor shall dismantle, erect, test, commission all equipment, cabinets, panels, instruments etc. as per sequence prescribed by BHEL Engineer at site. The sequence of dismantling, erection & commissioning methodology will be decided by the BHEL Engineer depending upon the availability of materials / work fronts etc. No claim for extra payment from the contractor will be entertained on the grounds of deviation from the methods of dismantling, erection & commissioning adopted in dismantling, erection & commissioning of similar jobs elsewhere or for any reasons whatsoever. The Party shall be responsible for inspection, testing & submit the signed protocol. Customer UPRVUNL may depute their representative for checking and supervision in important stages of work. The contractor shall be responsible to facilitate for inspection of works, without any extra charge. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be carried out without any extra cost	
1.3	Erection Material are to be transported from the BHEL/ UPRVUNL stores after issue of material as per instruction of BHEL engineer.	
1.4	Contractor shall submit a report of erection and commissioning of equipment's & jointly (Sub contractor, BHEL & UPRVUNL) signed protocol before handing over of equipments.	
ERECTION GUIDELINES -		
1.5	**ERECTION OF max DNA Control Panels /UCP/VDDC/LIE/LIR/LCP/ETC.** Erection of Panels after foundations checking / fabrication of base frames or stools (wherever applicable) and carrying out minor modification wherever required, Jointing of panels, inter-panel wiring, busbar & earthbar connections, mounting of loose supplied items, testing of complete board & including testing / calibration of all instruments and schemes, commissioning including loop checking, system checking, and putting necessary controls on automatics, Dummy load test of UPS Chargers including arranging of dummy load and temporary power supply etc. The cleaning of panels have to be done with electrical vacuum cleaner, besides conventional cleaning with brush etc. The drilling of holes in the gland plates for cable entry shall be part of panel erection. All blank holes / gaps in the gland plates / boxes etc. shall be properly sealed with **fire proof** ceiling material & material to be arranged by contractor. The base frames shall be painted suitably. The contractor shall carry out the plugging and sealing of left out holes in the gland plates and other openings at the bottom of panels at his own cost by using fire retardant mortar or good quality sealing material as advised by BHEL. For DVR system shifting of old FB panel with cables will required for fitting the new Thyristor panel which may be carried out by the contractor at no extra cost. **Any minor alterations required in the bus bar arrangement, wiring in the panels/ cubicles shall also form part of the work. During testing, commissioning, some equipment / modules may need replacement / repairs. All such replacements / repairs and assistance during commissioning and running of the unit till handing over to the Customer are part of the scope as some of the test / commissioning will have to be done after the machine is running on various loads.**	
1.6	**ERECTION OF CABLE RACK AND TRAY** Cable trays shall be supplied either ladder, prefabricated, slotted or duct type. **Cost of cable tray erection as per BOQ Cum Rate Schedule shall include fabrication of supports to suit site requirement , fixing of support in position by welding / bolting as per BHEL Engineer's instruction , erection and fixing of cable trays and racks by welding or by bolts and nuts.** Jointing of trays can be carried out by bolting / welding as per direction of Engineer. Contractor shall carryout cutting of tray only by Hacksaw	

	for obtaining proper routing from standard lengths supplied. Materials for support fabrication like flats, channels, angles etc. shall be supplied by BHEL free of cost. The cutting & welding points on trays will be painted by primer & Al paint by the contractor including supply of paint within the quoted price and no extra cost to BHEL. These cable trays may also be required for laying copper tubing, plica type / GI flexible conduits, local cabling and metal temp. thermocouples. Beside above angles / channels of various sizes may have to be fabricated / erected, for use as cable trays, from structural steel to be supplied by BHEL free of cost. Payment for fabrication / erection of these type trays shall be released as per applicable rates for structural fabrication. In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and laying of cables tubes etc. The covers are to be properly secured on the bottom trays and no separate payment will be made for putting these covers. If required, GI / Al strip clamps to be used.
1.7	**ERECTION OF INSTRUMENTS (TRANSMITTERS / GAUGES / SWITCHS / TEMPERATURE SENSING ELEMENTS LIKE RTDs & THERMOCOUPLES)** For instruments supplied loose, the scope includes issue from stores, calibration, erection (including fabrication and fixing of frames / stands by welding to steel structure or by chipping & grouting with RCC columns / floor) and charging / loop checking. The work includes installation of housing connecting manifold / PG valve on supports / racks to be suitably fabricated for the instruments being supplied loose. For instruments supplied duly mounted on skids / racks, the scope includes dismantling from skids / racks, reinstallation after testing / calibration, restoring electrical connections, if any, pressure testing of connected piping and charging / loop checking. Servicing of manifolds PG valves shall also form part of erection job within the quoted prices. The instruments may need repeated calibration / replacement; the same will be carried out by the contractor without any extra cost including calibration of instruments needed for replacement, which will be supplied by BHEL. Erection of thermo elements like RTDs & Thermocouples includes erection of thermowells, wherever required, at no extra cost to BHEL. Tags on all the instruments will be provided by the contractor as directed by BHEL Engineer at no extra cost to BHEL. **Tenderer may note that fabrication / fixing / painting of stands for instruments will be included in quoted / accepted price of respective instrument. However in case the supporting structure required to be fabricated for installation of above equipment is more than 25 Kg. Per instrument the contractor will be paid extra for fabrication etc. for excess of structure as per item rate for structure work.** The contractor shall paint the name / put tag numbers on all the equipment / instruments / cables etc. Erected by him. Materials for tagging shall be supplied by BHEL. The adhesive etc. shall be arranged by contractor at his cost. Certain instrumentation like gauges, transmitters, switches and indicators are received in assembled condition and will be erected along with main equipment by other agency. Contractor for subject work will get these equipment dismantled for calibration and will reinstall them in original location as and when directed by BHEL. Payment for above work shall be released as per respective items indicated in the price bid
1.8	**ERECTION OF GI PIPES FOR INSTRUMENT AIR LINE & RIGID PIPE/CONDUITS/ IMPULSE LINE** Fabrication and erection of channel / angle / slotted angle supports, cleaning GI pipes/ conduits/IMPULSE PIPE, cutting, fitting, laying at required elevation, clamping, connecting, valves fitting, making stations, **Hydro test** fitting of moisture eliminator and auto drain taps etc as per drawings within the quoted rate of pipe laying. Flexible conduits are to be laid in tray or pipes. No extra charges will be claimed by contractor for any modification carried out after laying of GI pipe lines due to site requirement in general.
1.9	**ERECTION OF PNEUMATIC TUBES (COPPER / SS TUBING):** Fabrication and erection of single angle supports / tray supports for single multi run tube. Laying tubes in the angles / trays from the panel to the equipment, instrument to instrument, air supply line to drive / instrument, air line connections, clamping properly as per standard ferruling and termination at both ends. This includes all fittings and needle valves, stop valves etc. also. Proper tagging of valves and pneumatic tubes on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of pneumatic tubes / draft pipe lines due to site requirement in general.
1.10	**CABLE LAYING** Laying, dressing & clamping (by Nylon / PVC ties or Aluminium strips or any other method specified by BHEL Engineer) of the cables in the cable trays / angles. The final dressing of cables on cable trays not erected by contractor shall also be done with Nylon Cord / Aluminium strip. **Cost of cable laying as per**

	BOQ Cum Rate Schedule shall include the cost of Nylon / PVC ties & Aluminium strip required for dressing / clamping. The cable run number shall be provided by punching Aluminium Tag plates and tying suitably with nylon ties (at both ends and at regular intervals as advised by BHEL Engineer) which shall be arranged by contractor at his cost. While laying cables, existing cable tray covers and false flooring may require to be removed and re-fixed. The same has to be done at no extra cost to BHEL. The screen of signal cables shall be run in insulated sleeve (of approved quality to be provided by the Contractor) and shall be terminated as per the instruction of the BHEL Engineer. Old cables are also be reused so the contractor has to search the cable at both end and to connect as per revised drawings with proper ferruling and lugging. The dressing of old cables are also in the scope of work.
1.11	**CABLE TERMINATION** **For Cables, The Cost Of Cable Laying As Per BOQ Cum Rate Schedule shall Also Include the cost of Termination With Suitable Crimping Type Lugs and Ferrules.** Only Cable Glands Shall Be Issued By BHEL as Free Issue Item. Drilling of holes in gland plates of HT / LT switchgear, control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL.The contractor shall carryout insulation testing, simulation testing etc. as per the instructions of Engineer at site. Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.
1.12	**ERECTION OF JUNCTION BOX AND PUSH-BUTTONS** Includes assembly / fabrication, welding of semi-prefabricated limbs of the racks / cable ducts / other related supporting structural parts, chipping of floor and grouting etc. drilling of bottom gland plates for cable entry and earthing with earth pads. For fabrication of steel items Hacksaw cutting or shearing by machine only is permitted. **Tenderer may note that fabrication / fixing / painting of JBs, LPBs and LCPs will be included in quoted price of respective equipment. However in case the supporting structure required to be fabricated for installation of above equipment is more than 25 Kg. Per Instrument the contractor will be paid extra for fabrication etc. for excess of structure as per Item rate for structure work.**
1.13	**ERECTION OF COMPUTERS / PLC BASED EQUIPMENTS** All computer related items / equipment like diagnostic station, CRT, monitors, printers, key boards, pre-fabricated connecting leads etc shall be installed in control room and control desk as per direction of BHEL Engineer. **Cost of PC set (including printer, monitor, UPS, interconnecting leads etc) installation as per BOQ Cum Rate Schedule shall also include the cost of installation / placement of furniture (to be issued by BHEL as free issue item) as per requirement / instruction of BHEL Engineer.** The Software installation and commissioning is not included in the scope of this contract. However, any assistance required for testing / commissioning have to be provided by the contractor within the quoted price. Hardware found defective during testing / commissioning and till handing over to Customer, have to be removed for repair / replacement and reinstalled within the quoted rates.
1.14	**ERECTION/ CALIBRATION & COMMISSIONING OF CONTROL VALVES AND ACTUATORS** The work includes cutting of old valves, removal of actuators, erection of valves with proper welding as per BHEL norms & alignment, matching, erection and alignment of actuators, minor rectification / alterations in tubing, servicing of accessories, fitting of regulators, I/P converters, air lock relay, limit switches as per site condition, setting of limit switches, calibration of Actuators and position feedback transmitters.
COMMISSIONING GUIDELINES -	
1.16	**TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST-COMMISSIONING.** Site testing shall be carried-out for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations. Commissioning protocols are to be prepared as advised by BHEL Engineer for getting approved by customer/ Consultant. Testing, and pre-commissioning checks shall be as per relevant codes / practices and BHEL drawings / specifications/ approved commissioning Protocols and same shall include, but not be limited to the following : **INSTRUMENTATION-** All instruments shall be checked for proper installation, supports, impulse lines, cabling etc. and

	corrected, wherever required. All instruments shall be calibrated before installation and proper calibration record shall be maintained to the satisfaction of BHEL Engineer. Instruments received in assembled condition in panels etc. shall also be dismantled, calibrated and re-assembled as per advise of BHEL Engineer. All impulse and pneumatic lines shall be properly cleaned (oil flushed / chemical cleaned / air blown/ steam blown/ **Hydraulic tested** etc.) before being charged. Some of the instruments may require re-calibration during commissioning. The contractor shall remove such instruments, recalibrate and install within the quoted rates. **DRIVES, PANELS AND CONTROLLERS** All drives such as pneumatic / motorised valves / LOPs / solenoid valves etc. and controllers shall be checked for proper installation supports etc. before commissioning. All transmitters, PFT, I/P converter, positioner shall be calibrated and limit switches shall be adjusted. All pneumatic and impulse lines shall be cleaned as per instructions of BHEL Engineer. All drives shall be operated by simulating various conditions to ensure healthiness of components of the system. Re-calibration / rectification wherever required shall be carried out by the contractor within the quoted rates. Remote operation of all drives, valves, dampers shall be checked from control room as per instruction of BHEL Engineer. Contractor shall carry out air leak test, pressure drop test for pneumatic tubes, impulse and air lines to the satisfaction of BHEL's Engineer as per test procedures of manufacturing units or advised by BHEL Engineer.
1.17	**General Conditions for commissioning** • In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc. the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the same shall be done as per Engineer's instructions including repair, rectification and replacement work by the contractor at his cost. The parts to be replaced shall be provided by BHEL. • During this period, though the BHEL's / Client's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision , labour , consumable, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer. • During commissioning activities and for carrying out various tests, gauges, manometers etc. have to be temporarily erected and commissioned to suit the commissioning activities. Contractor will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and to be taken back at no extra cost to BHEL. • During erection of various equipment, prior to commissioning and after commissioning, protocols have to be made with BHEL's customer. The proforma and formats as approved have to be printed by the contractor in adequate numbers. The pre-commissioning activities will start with various trials, commissioning operations shall continue till units are handed over to customer. Simultaneous commissioning activities will be progress in various areas, checking of equipment erected, making ready for trial runs, alkali flushing, chemical cleaning, mass flushing etc., all these works need specialized gangs including electricians / instrument technicians in each area to render assistance to BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted. • It shall be the responsibility of the contractor to provide workmen of various categories in sufficient numbers along with Engineers/ Supervisors including necessary consumables, T&P etc. during pre-commissioning, commissioning and post commissioning period for commissioning of equipment and attending any problem in equipment erected by the contractor till handing over. The rates quoted shall include all these contingencies also. • It shall be specifically noted that the above employees of the contractor may have to work

	round the clock alongwith BHEL commissioning Engineer and hence overtime payment by the contractor to his employees may be involved. The contractor's accepted rates shall be inclusive of all these factors also. • In case, any rework is required because of contractor's faulty erection which is noticed during commissioning , the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during commissioning, the contractor will dismantle / open up the equipment / part and reassemble/redo the work without any extra claim. During commissioning, opening and closing of valves, attending to leakage, changing of gaskets, modifications in wiring, realigning of equipment, re-calibration of instrument, attending to leakage, minor adjustments of erected equipment may arise. The accepted rates shall include all such works.
1.18	FINISH PAINTING- All equipment within the scope of these specifications shall be received duly painted. However during storage and handling the same may get peeled off / damaged / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer / finish paint matching with shop paint / approved final colour. Besides above two coats of approved primer paint and at least two coats of approved finish paint to get the desired dry film thickness, is to be applied on various loose equipment, all impulse lines and structures fabricated and erected at site. **All paints, tools and other consumables including scaffolding materials required for painting shall be arranged by contractor within the quoted rates. Paint and other materials so purchased shall be ISI marked and painting should be as per color scheme and quality approved / specified by Engineer.** Certain equipment shall require spray painting (touch up). The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the owner / Engineer.
1.19	**Testing/Calibration of equipments before erection** **The contractor has to ensure the testing & calibration of equipments like actuators, control valve, power cylinder, solenoid valves and instruments before erection within quoted price. The equipments which are to be erected by other agency and to be commissioned by contractor also to be checked by contractor before erection with in quoted rate. This will facilitate the material healthiness of equipments before erection; will reduce the work during commissioning. For this no extra cost will be payable**
MATERIAL HANDLING AND STORAGE	
1.20	• All the equipment and material furnished under this contract (except those which are mentioned specifically in the scope of work) shall be identified, unpacked and to received from the BHEL/UPRVUNL project stores, sheds/ yards (any place within site & storage area) and transported to be pré-assembly area/ erection site and stored in the storage spaces in a manner so that they are easily retrievable till they are erected by the contractor. While drawings/ lifting material from BHEL/ customer stores, contractor shall ensure that the balance / other materials are stacked back immediately. This is included in the quoted rate and to be done by contractor at no extra cost. • The contractor shall follow the BHEL and UPRVUNL procedure for issuing the material from BHEL/UPRVUNL store yards. • All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes/ slings etc. shall be used for unloading / handling. • Approach road conditions from the stores / yards to the erection site may not be equipped and ideal for smooth transportation of the equipment. Contractor may have to be adequately prepared to transport the materials under the above circumstances without any extra cost to BHEL. • Contractor shall be responsible for examining all the plant and material issued to him and notify the Engineer immediately of any damage, shortage, discrepancy etc. before they are moved out of the stores / storage area. The contractor shall submit to the Engineer every week, a report detailing all the receipts during the week. However, contractor shall be solely

	responsible for any shortages or damages in transit , handling, storage and erection of the equipment once received by him. The contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the engineer at any time. • All the material in the custody of contractor and stored in the open or dusty locations must be covered with suitable weather proof / fire retardant covering material wherever applicable and shall be blocked up on raised level above ground. All covering materials including blocks and sleeper shall be arranged by the contractor at his cost. • Electrical panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energized. Exposed parts those required special protection such as bearings, slip rings, commutators shall be protected against moisture ingress and corrosion during storage and are periodically inspected. • The contractor shall ensure that all the packing materials and protective devices used for various equipment during transit and storage are removed before the equipment are installed. Contractor will return back all the excess materials & defective material to BHEL store with proper procedure. • Party has to arrange own transportation, (hydra and trailor) for transporting material from BHEL/UPRVUNL store to site and yard. Party has to arrange suitable lifting arrangement for lifting the material from different elevation. • ***It shall be the responsibility of the contractor to keep in touch with Engineer at site and find out arrival road consignments. The contractor or his authorized representative shall, collect available GR, RR, LWB, and PWB etc form the transporter. Gate entry of material, unloading of material in the plant premises, verification, stacking, preservation, marking DBC no., making verification report, date entry(computer & documentation) in BHEL store shall be the responsibility of the agency.*** • Detailed verification of materials with reference to packing list and loading advice slip after unpacking of boxes; repacking after detailed verification; preparation of receipt inspection reports in consultation with BHEL store. • **The detention charges, if any, in the event of delay in unloading from the carrier, will be to contractor's account.** • **All existing equipments being dismantled are to be carefully removed, properly identified and shifted to the stores area indicated by the Engineer . Instruments have to be carefully removed, tagged and returned to stores.**
1.20	**Miscellaneous Work** Re-rolling of fresh supplied cables on drums as required by site engineer. Arrangement of missing hardware / substitute hard wares and clamps. Grouting by port land cement including material and arrangement is to be made by the contractor. Providing supports for impulse lines, instruments, air lines, cable trays wherever required by fabricating at site. Required material for these will be provided by BHEL & all consumables including gas, welding electrodes etc. will be arranged by the contractor.
Dismantling Guidelines	
1.21	Dismantling of Panels, Field equipments, cables shall be carried out after disconnection of cable connections in the Panels. Dismantling of required brick wall or glass /aluminum partitions is to be completed before removal of panel. Any requirement of dismantling / cutting of panel/trays/supports will be with prior approval of Engineer. The supports of the equipments are to be removed along with the instruments. The cables will have to be removed completely from the trays without damaging the trays.
1.22	The Panels, Field equipments and actuators, impulse pipe, trays and cables etc are to be transported to the BHEL/ UPRVUNL stores/area after removal as per instruction of BHEL engineer. All equipments are to be properly tagged before transportation.
1.23	After dismantling of equipments "quantity and specification of the dismantled equipments to be recorded jointly with BHEL & UPRVUNL and then handing over of equipments to be done

2.0	COMPLETION PERIOD
2.1	• 5 months for each unit & overall completion period 12 month including 3 month for stabilization, handing over & PG test of unit (Both units are under shutdown and work can be carriedout parallel in both unit as per availability of material). **Depending upon front and material availability, above milestone may be required to pre-poned by 2 to 3 months. Contractor is required to mobilize additional resources to meet above requirement within their quoted lump sum price. Contractor to make all possible effort to match the Boiler lightup, TG barring Gear schedule and synchronization schedule with mechanical works.**
3.0	MOBILIZATON PERIOD
3.1	Mobilization period shall be 7 days on receipt of LOI/ site communication.
4.0	DEFECT LIABILITY PERIOD
4.1	Defect liability period – 12 Months from the date of successful commissioning for each unit. Contractor shall attend the defect noticed during stabilization of unit and defect liability period free of charge.
5.0	TERMS OF PAYMENT
5.1	1. BHEL 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book. 2. Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices. 3. Subject to any deduction that BHEL may be authorised to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder **Progressive Payment Terms of item rate for Erection and Commissioning work-** ***I.* 85 % of item rate payable on fulfillment of following conditions:** **(A) For Equipment / items such as, Panels, cable Trays, JB, where no calibration is required** (i) 60 % of item rate shall be payable on erection / installation, final alignment, welding, clamping, (ii) 20 % of item rate on, testing, pre-commissioning, charging and on final commissioning, finish painting, marking/identification & fire proof ceiling. (iii) 5% on Completing pending work and protocol signing from BHEL, UPRVUNL/Consultant. **(B) Cables** (i) 55 % of item rate shall be payable on laying / installation, glanding. (ii) 25 % of item rate shall be payable on terminations, ferruling, dressing & clamping, tagging, pre-commissioning, charging and on final commissioning and protocol signing from BHEL, UPRVUNL/Consultant (iii) 5% on Completing pending work **(C) Impulse pipe, tubing & GI pipes** (i) 60% of item rate shall be payable on erection / installation, Welding, alignment & Hydro test. (ii) 20% of item rate shall be payable on finish painting, pre-commissioning, charging and on final commissioning (iii) 5% on Completing pending work and protocol signing from BHEL, UPRVUNL/Consultant **(D) For equipment/items where calibration and testing is required.** (i) 20% of item rate on calibration and testing (ii) 40% of item rate on erection, installation, alignment and termination wherever involved, device hydro test. (iii) 20% item rate on charging of instruments and panels, system loop checks, pre-commissioning

	checks by simulation/ field calibration or with actual system operation and on final commissioning. (iv) 5% on Completing pending work and protocol signing from BHEL, UPRVUNL/Consultant. **Progressive Payment Terms of item rate for Dismantling work up to 85 %** (i) 70% of item rate after completion of dismantling (ii) 15% of item rate after handing over of material to BHEL/UPRVUNL store.
5.2	**II. 15 % payment of applicable CV/item rate will be payable on following condition** **1. 5 % Milestone payments of CV** (i) 1 % of CV on for Boiler Light Up . (ii) 1 % of CV on TG on barring Gear (iii) 1 % of CV on Synchronization of Unit (iv) 1 % of CV on Full Loading of Unit (v) 1% of CV on handing over of unit. **2. 5 % on completing pending points.** **3. Final 5% of applicable contract value** on area cleaning and reconciliation of materials, T&Ps with BHEL/UPRVUNL stores, fulfillment of contractual obligations and on submission and passing of Final bill.
5.3	All payment shall be made through e-payment system.

6.0 PRICE VARIATION CLAUSE (PVC) AND OVER RUN CHARGES-

6.1 In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable

6.2 85% component of Contract Value shall be permitted to be adjusted for variation in various relevant indices during execution of work. The remaining 15% shall be treated as fixed component

6.3 The basis for calculation of price variation in each category, their component, base index, shall be as under:

Sl no.	CATEGORY	BASE INDEX	COMPONENT („K")				
			CIVIL PACKAGES (See Note A/B/C)			MECHANICAL PACKAGES	LABOUR ORIENTED PACKAGES (See note D)
			A	B**	C		
i)	LABOUR (ALL CATEGORIES)	MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS" published by Labour Bureau, Ministry of Labour and Employment, Government of India.(Website: labourbureau.nic.in)	40	25	30	65	80
ii)	HIGH SPEED DIESEL OIL	Name of Commodity : HSD OIL Type : INDIVIDUAL COMMODITY (See Note F)	5	3	5	5	5
iii)	WELDING ROD	Name of Commodity : WELDING ROD Type: INDIVIDUAL COMMODITY (See Note F)				15	
iv)	CEMENT	Name of Commodity : GREY CEMENT Type: INDIVIDUAL COMMODITY (See Note F)		20	30		
v)	STEEL (Structural and Reinforcement steel	Name of Commodity : a1. IRON & SEMIS Type: GROUP ITEM (See Note F)		25			
vi)	MATERIALS (Other than Cement and steel)	Name of Commodity: ALL COMMODITIES Type: GROUP ITEM (See Note F)	40	12	20		

Note: A) Cement & Steel : Free Issue (BHEL Scope)

B) Cement & Steel : In Contractor Scope (**: unless otherwise specified in Special Conditions of Contract (SCC))

C) Cement in Contractor Scope, and Steel is Free Issue (BHEL Scope)

D) Predominantly 'Labour Oriented' packages including Material Handling & Management, Insulation, Painting, Electrical and CI or a combination thereof, which are separately tendered and awarded

E) For Composite packages (i.e. Civil+Mechanical+Electrical/CI or Civil+Mechanical or Mechanical+Electrical/CI), the components for various categories shall be as per respective packages

F) As per the 'MONTHLY WHOLE SALE PRICE INDEX' for the respective Commodity and Type, published by Office of Economic Adviser, Ministry of Commerce and Industry, Government of India. (Website : www.eaindustry.nic.in). Revisions in the index or commodity will be re adjusted accordingly.

6.4 Payment/recovery due to variation in Index shall be determined on the basis of the following notional formula without any initial absorption, in respect of the identified components viz LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS

$$P = \frac{K \times R \times (X_N - X_0)}{X_0}$$

Where

P = Amount to be paid/recovered due to variation in the Index for Labour, High Speed Diesel Oil,

	Welding Rod, Cement, Steel and Materials K = Percentage component applicable for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra) X_N = Revised Index No for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials for the billing month under consideration Xo = Index no for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials as on the Base date.
6.5	~~Base date shall be calendar month of the latest date of submission of Tender.~~ Base date shall be the calendar month of the schedule completion date of the contract.
6.6	PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works.
6.7	The contractor shall furnish necessary monthly bulletins for the necessary indices from the relevant websites along with his Bills.
6.8	The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.
6.9	~~PVC shall be applicable for the entire original contract period plus the extended period. However the Total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:~~ PVC shall be applicable only **for the extended period of the contract (if any) after the schedule completion date.** However the total Quantum of Price Variation amount payable/recoverable shall be regulated as follows: For the portion of backlog attributable to the contractor, the PVC will be based on the average of the indices for the period of the original contract period. ~~1. For the portion of backlog attributable to the contractor, the PVC will be based on the average of the indices for the period of the original contract period.~~ For the portion of backlog attributable to the contractor, no PVC shall be paid. 2. For the period of Force Majeure, the PVC will be limited to the indices applicable at the beginning of the force majeure period. 3. For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months 4. The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.
7.0	**OVER RUN CHARGES**
7.1	Over Run Compensation (ORC) is payable for works done during the extension period, by way of rate revisions for periods beyond original contract period subject to the following terms and conditions.
7.2	Rates shall be increased by 10% for the first twelve months of one or more extensions beyond original contract period. For the next twelve months of further extensions if any, rates shall be increased as above by 10% over the previous twelve months, and similarly for each subsequent twelve months extension.
7.3	~~The amount of increase payable per month due to rate revisions is subject to a minimum of Rs 1,00,000/- per month and a maximum of Rs 10,00,000/- per month.~~ **The amount of increase payable per month due to rate revision is Rs. 1,00,000/- per month.**
7.4	Should there be any „Time extension" for reasons attributable only to the contractor, then the work shall be executed by the contractor at the rates applicable for the period the work was planned
	Payment of ORC shall be regulated as follows: i) Contractor is entitled to Over Run Compensation (ORC) only for the portion of backlog attributable to BHEL. ii) ~~50% of the compensation as per clause 2.12.3 is allocated for deployment of resources agreed as per the joint programme drawn vide 2.11.4. Payment shall however be based on the actual deployment of resources for the month as certified by BHEL, as per weightages assigned therein.~~

7.5	50% of the compensation as per clause 7.3 is allocated for deployment of resources agreed as per the joint programme drawn vide 7.4. Payment shall however be based on the actual deployment of resources for the month as certified by BHEL, as per weightages assigned therein. iii) ~~50% of the compensation as per clause 2.12.3, is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. Payment shall be on pro rata basis for actual achieved quantities~~ 50% of the compensation as per clause 7.3, is allocated for achieving of planned progress agreed as per the joint programme drawn vide 7.4. Payment shall be on pro rata basis for actual achieved quantities iv) Total Over Run Compensation shall be limited to 10% of the executed contract value as certified in Final Bill. For this purpose executed contract value excludes PVC, ORC, Supplementary/Additional Items and Extra Works done on Man-day rate basis
7.6	Contractor shall not be entitled for any Over Run Compensation (ORC) for the portion of backlog attributable to the contractor. Such works shall be executed at the rates applicable for the period the work was planned.
8.0	**LIQUIDATED DAMAGE** If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose liquidated damage/ penalty at the rate of 0.5% of the contract value per week of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period of delay shall be the delay attributable to contractor for the completion of work as per contract. Contract value for this purpose shall be the final executed value exclusive of ORC, extra work executed on man day rate basis, supplementary/ additional items and PVC.
9.0	**EXTRA WORK:** BHEL may consider for payment of extra works on manhour basis @ Rs.60/- (Rupees Sixty only) per manhour only for such of those works which: a) Require major revamping or rework and which are totally unusual to normal erection work. b) Require rectification / modification for improvement in the design during commissioning, c) Requiring fresh fabrication of components in place of rejected / replaced components. The rates indicated as above, shall include over time, if any, consumables, supervision, use of tools and tackles and other site expenses and incidentals.
10.0	**REQUIREMENT OF MANPOWER**
10.1	The contractor shall deploy all the skilled workmen like engineers, supervisors, mill wright fitters, welders, gas cutter, masons, carpenters, electricians, instrument technician and unskilled workmen required for all the works of Erection & commissioning of C&I items of U-10 & 11 for completing the work within schedule. A tentative list of manpower is given as below which are to be deputed on requirement basis-

10.2

Man power	Nos	Man power	Nos.
Site-In-Charge	1	Engineer	3
Supervisor (Graduate)	3	Supervisor (Non Graduate)	3
Store Keeper	3	HP Welder	1
Welder (Non-IBR)	2	Millwright Fitter//Pneumatic technician	2
Structural Fitter/Valve technician	2	Pipe Fitter/instruments technician	2
Mason	1	Electrician	6
Brazer	1	Carpenter/painter	1
Jr. Fitter	2	Grinder man	2
Sheet Fabricator	1	Rigger	4
Jr.Electrician	4	Cutter	2
Helper	35		

10.3	The contractor shall also provide the services of skilled/ semi-skilled &Unskilled persons free of cost under this contract to utilize their services exclusive for BHEL use. The manpower detail as follows • Computer Operator – 10 manmonths • Skilled manpower – 10 manmonths • Unskilled manpower – 20 manmonths If contractor fail to provide above manpower, BHEL have right to engage the manpower at their cost and payment shall be deducted from running bill.
10.4	Contractor to ensure services of ONE qualified and experienced Diploma Electronics / Instrumentation Engineer having experience in respective field, for commissioning activities total of 08 manmonths. This shall indicate separately in man power deployment plan to be submitted by contractor. The Engineer shall be reporting directly to the BHEL Engineer. *In case contractor fails to provide above-mentioned manpower as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man months as per above provision, fully or partly, recovery at the rate Rs 15000/- per month will be made from the final bill of the contractor.*
11.0	**GATE PASS AND POLICE VERIFICATION OF PERSONNEL**
11.1	The agency shall arrange entry/exit gate passes for manpower, materials and vehicle from concerned Security agency of customer at their own cost as per the prescribed procedures of the customer. The agency must get the character and antecedents of all personnel deployed to site duly verified from the concerned Police station (Home town police station as per existing rule of Obra TPS).
11.2	The contractor shall ensure compliance to all statutory requirements including but not limited to EPF deposition, Labor License, Insurance under applicable WC act & ESI, falling which shall be liable for penal action as deemed by relevant act.
11.3	Contractor should submit the daily / weekly progress report, man power status, T&P status on regular basis to BHEL. Monthly agreed program to be submitted by contractor on regular basis. Daily review meeting has to be done at BHEL site office and daily plan to be submitted by Contractor in consultation with BHEL. Agreed program can be revised and pre poned by BHEL Engineer seeing the site urgency and work requirements.
12.0	**T&Ps, IMTEs & CONSUMABLES**
12.1	Contractor will have to provide all necessary T&Ps, IMTE's & Consumables required for successful completion of work. A indicative list of IMTEs are given in annexure II.T&P provided by BHEL on charges basis given in Annexure – III. List of IMTEs to be provided by contractors for Electrical work and C&I work is given in Annexure-IV.
12.2	The contractor shall provide all consumables like, gland packing, welding electrodes (including alloy steel Aluminum, stainless steel), filler wires / tig wires, inert / welding gases, soldering material, dye penetrates, other erection consumables such as tapes, jointing compound , grease, mobile oil, M-seal, Araldite , Parmali wood, petrol , CTC / other cleaning agents, petroleum jelly, insulation tape, PVC sealing compound, sleeves , cable ties , cable ferrules, Cable lugs, gaskets and, packing hardware items, fire proof sealing compound required for completion of work except those which are specifically supplied by manufacturing unit. BHEL approved welding electrode shall be used. All charges on account of Octroi, terminal or sales tax and other duties on consumable materials obtained for the works from any source shall be borne by the contractor.
13.0	**HSE & OHSAS:** Contractor will comply with HSE (Health, Safety and Environment) requirements of BHEL. HSE requirements in brief given in SPECIAL condition of contract (SCC) chapter –IX. Safety. Inspection of all T&Ps, lifting tools and tackles and welding machines should be completed before start of work. Party shall submit load testing certificate of lifting equipments. Contractor must ensure implementation of **'Safe work practices'**. During Execution, contractor should exclusively **nominate one safety supervisor** who shall coordinate with BHEL on safety aspects.
14.0	**Work Experience detail** Tenderer must submit their work experience in the format given in Annexure V with the copy of work order/LOI in the proof of same. This is as per requirement of BHEL customer.
15.0	**Facilities to be provided by BHEL to Contractor** i- Open/ close space for office and storage free of cost. ii- Rooms in colony on chargeable basis, if available. iii- Free of cost construction power & water supply in plant area at one place, contractor shall distribute the same.

NIT No:

Annexure-II

INDICATIVE LIST OF T & P TO BE ARRANGED BY THE CONTRACTOR

(a) Suitable capacity trailor/truck with Hydra ---------- As per requirement

(b) Pull Lifts & Ratchet hoist ---------- Adequate Nos.

(c) 5 / 10 T Chain Pulley blocks ---------- 4 Set

(d) Welding Transformers / Welding generators ---------- 2 Nos.

(e) Gas cutting set ---------- Adequate Nos.

(f) Grinders ---------- Adequate Nos.

(g) Pedestal mounted Drill Machine (upto 36 mm) ---------- 1 No.

(h) Portable Compressor for Maxi termination ----------1 No

(i) Hydraulic crimping tool ---------- 1 No.

(j) Hand crimping tools ---------- Adequate Nos.

(k) Blower ---------- 1 No

(l) Vacuum cleaner ---------- 1 No

(m) Tube and Pipe banding machine ---------- 1 No.

(n) Cable Ferrule printing machine ---------- 1 No.

NOTEs:

a. The above list specifies only major T&P (may not be complete to be deployed by the contractor). All additional / other tools and plants in good and safe working conditions which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rates..

NIT No:

Annexure-III

LIST OF T&Ps AND IMTES BEING PROVIDED BY BHEL/UPRVUNL ON HIRE CHARGES ON SHARING BASIS

SL No.	EQUIPMENT	QTY
A: T & P		
1.	EOT crane in TG hall	1 No

.NOTE: 1. In addition to above any special tools and tackles , if supplied by the manufacturer will also be provided to the contractor free of hire charges as and when made available.

2. Other terms and conditions regarding above items shall be as per tender (Tools and Plants / IMTEs)

NIT No:

ANNEXURE-IV

TENTATIVE LIST OF IMTES TO BE DEPLOYED FOR C&I WORK

S.NO	DESCRIPTION	RANGE	ACCURACY	MIN QTY
1	500 V / 1000V, (Hand operated) digital meggar			1 No.
2	2.5 KV (Main operated meggar)			1 No.
3	Digital Multi meters with current probe			6 Nos
4	Tong Testers (various ranges)including mA Range			3 Sets
5	Analog Multimeters			2 Nos
6	Single / three phasee variac			1 Each
7	Dead Weight Tester	0-600Kg/cm2	LC-0.5Kg/cm2	1 set
8	Comparison test set (With standard Press. Gauge)	0-1 Kg/cm2 0-4 k g/cm2 0-4 k g/cm2 0-10kg/cm2 0-25Kg/cm2 0-60Kg/cm2 0-250Kg/cm2 0-400Kg/cm2	±0.25% ±0.25% ±0.25% ±0.25% +0.25%Lc-0.25 Kg/cm2 ±0.25%Lc-1.0 Kg/cm2 ±0.25%Lc-0.20 Kg/cm2 ±0.25%Lc-0.20 Kg/cm2	1 set
9	Variable DC regulated (Electronic voltage source with digital indication).	0-30V DC	0.2%	1 Set
10	Oil bath with thermostat Stirrer and sub-standard Glass Thermometers in Multiple ranges	0-300 Degree Cel		1 set
11	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement	0-760 mm		As per requirement
12	Glass U tube mercury mano-meter with standard steel Scale having leveling arrangement	0-1000 mm		As per requirement
13	Inclined tube manometer	0-1000 mm		As per requirement
14	mA/mV source with Digital display	0-200 mA/200mV		02 Nos.
15	Rehostat	100 Ohm , 10 A		03 Nos
16	Precision Digital Multimeter	4-1/2 Digits		01 No
17	High temperature. Instrument calibration kit	up to 600 deg		01 No
18	Continuity testers			02 No
19	Intercom/telephone set for loop checking			04No

NIT No:

ANNEXURE - V

Work Experience detail to be submitted by the contractor in format given below with the LOI/ work order copy as proof of the same

S. No.	P.O. no./ Organization	Name of firm	Work Detail	Electrical or C&I work	Order value	Worked in period

NIT No:

PRICE BID FOR:

ANNEXURE C

SUBJECT : Dismantling, Erection, Commissioning of maxDNA DCS system for TG autoloop/regenerative/Boiler area for R&M Obra unit-10 & 11, 200 MW, Obra R&M 'B' thermal power station, Obra, Sonebhadra U.P.

Tender No. : Tender No. :

NAME & ADDRESS		
OFFER NO		
OFFER DATE		

Rate are quoted as below and are exclusive of Service Tax and after considering CENVAT

1	**Lumpsum (LS) price for the entire scope of work as per Annexure-A (inclusive of all consumables, input materials and supervision)** (FOR BOTH UNIT 10 &11)	(Amount In Figure) Rs. : (Amount in words)Rupees:
2	**Extra work rate on per man-hour basis (inclusive of supervision, T&P, consumables and all other costs).**	Rs. 60 ONLY
Note:- Rate to be quote in Annexure 1 as per given below ***a. ERECTION & COMMISSIONING = 70 ± 5 % of CV*** ***b. DISMANTLING OF C&I ITEMS = 25 ± 3 % of CV*** ***c. SERVICING of C & I Items = 5 ± 2 % of CV*** ***Total of a + b + c = 100 % of CV***		
3	LUMPSUM (LS) PRICE FOR THE ENTIRE SCOPE OF WORK OF UNIT NO. 10	50.0% QUOTED VALUE AT Sl. No. 1
4	LUMPSUM (LS) PRICE FOR THE ENTIRE SCOPE OF WORK OF UNIT NO. 11	50.0% QUOTED VALUE AT Sl. No. 1

Sign of contractor:_____

SEAL

09/02/2015
(LOKESH KUMAR)
Sr. Engineer