



भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

TCN - 01

Ref: PSER:SCT: SAL-E1702-TCN-01

Date:28/10/15

Sub	Tender change notice (TCN) 01.	
Job	HANDLING AT SITE/ STORAGE YARD, TRANSPORTATION TO SITE OF WORK, PRE-ASSEMBLY, ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL & C&I FOR BOILER, ESP,TG SETS FOR UNIT-2 OF 3X250 MW BONGAIGAON TPP,SALAKATI,ASSAM	
Ref	1.0	Tender no PSER:SCT: SAL:E1702:15
	2.0	BHEL's NIT, vide reference no PSER: SCT:SAL:E1702:15:4725 Dated:13/10/15
	3.0	All other pertinent issues till date.

With reference to above, following points, relevant to tender, may please be noted and complied with while submitting offer.

- 1.0 Bidders may note that a Training / Interactive session with MJunction for addressal of queries related to Online bidding process shall be held on 29/10/15 from 10.30 am onwards at BHELP SER , Kolkata Office , in which bidders may participate.
- 2.0 Revised technical spec SCT-SAL-E1702-VOL-1F-TCC-TECH SPEC-PART-1-R01 superseding earlier technical spec SCT-SAL-E1702-VOL-1F-TCC-TECH SPEC-PART-1-R00 attached .
- 3.0 Clarification to bidder's queries is attached vide Annexure-A to this TCN-01.
- 4.0 Revised 'No deviation certificate' as per enclosed Annexure-2. Bidder to submit 'No deviation certificate' as per attached format only.
- 5.0 All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HEAVY ELECTRICALS LTD

DY MGR (SCT)

Encl
As above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091

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PART-A

JOB ERECTION, TESTING, COMMISSIONING OF ELECTRICAL EQUIPMENTS FOR BOILER, ESP,TG SETS & FOR UNIT#2 OF 3 X 250 MW NTPC-BONGAIGAON TPP,SALAKATI,ASSAM.

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This Volume-IF,Part-A & B (scope, technical specification etc.) shall be construed as part of tender document and shall be read along with general conditions of contract (GCC), SCC and other volumes of tender. In case of any conflict or inconsistency between GCC, SCC other volumes and this volume, the same shall be brought out by the bidder in writing to BHEL for clarification, failing which most stringent interpretation/ clause in favour of BHEL shall be adopted and the same shall be binding to the bidder.

CL. NO.	DESCRIPTION
1.0	SCOPE OF WORK
1.1	The scope under this specification shall cover receipt of materials from BHEL/ customer store, site stores/ open yards/ unloading bay of power house, directly from the incoming lorry within the project premises/ within 1 km from the project gates, dragging to position (place of erection)/ loading in the truck/ trailer with the help of crane, handling at site/ dragging to place of erection (wherever applicable), shifting contractors' store and/ or to the floor/ foundation where it is to be installed, protecting it from rain/ water/ fire/ physical damage by properly covering and putting watch and ward for safe custody of materials, inspection of materials, submission of inspection reports for any shortage/ damage or anything else called for, preservation/ conservation, fixing of supports (base channels), pre-assembly, erection of equipment & support structures, leveling, alignment, grouting (grouting materials being in the scope of contractor and its specification given by BHEL at the time of grouting), testing, commissioning, calibration, trial operation, assistance to PG test, and handing over to the entire satisfaction of BHEL/ customer for Unit#2 of 3 X 250 MW NTPC-Bongaigaon TPP,Salakati,Assam for Electronic Control Panel, SPVT & LAVT cubicle for Generator/IPB, Fan Control Cubicle, panels (for ESP & Soot Blower system), LT cabling (for ESP & Soot Blower system), Electrical Control Panel, DC Motor Starters, Push Button, Junction Boxes etc, including earthing with nearest earthing point, etc, reconciliation of materials and returning of unused materials, scrap materials, packing cases/ wooden boxes/ cable drums etc to BHEL or customer's stores/ yards.
1.2	It is not the intent to specify completely here in all details of handling, erection, testing and commissioning of the above equipment. The omission of specific reference to any method, or test & equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such facilities/ services to complete the project or portion of the project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies. Only exclusions specifically mentioned in this tender shall be entertained in all matters.
1.3	Good quality and accurate workmanship for proper performance of the equipment are absolutely necessary. BHEL engineers shall be the deciding authority towards quality requirement.
1.4	Civil works including drilling, chipping, enlarging cut-outs, foundation pockets, cable cut-outs, grouting etc, wherever required will be carried out by contractor at no extra cost. Contractor will have to erect temporary scaffolding (scaffolding materials being arranged by contractor. Only steel/pipe scaffolding shall be allowed to be used) and provide suitable platform at places (as desired by BHEL) for the purpose of inspection/testing by BHEL personnel.
1.5	During welding of supports with existing embedded insert plates are required, the contractor has to chip on the wall for insert plate. Also before grouting of equipment, the contractor has to chip the concrete to get the iron materials for welding of the equipment support. However, in any case, the insert plates are not found in position, the contractor may fix the insert plate by using anchor fastener (the plate being supplied by BHEL and the anchor fastener being in the scope of the contractor). The size of the fastener bolts may be communicated by BHEL at the time of requirement.
2.0	CABLING, PANELS, LT SWITCHGEAR etc
2.1	The panels may be supplied in detachable units housed in wooden case which will be opened properly at the place of erection and will be placed on supports (base

	channels) leveled and aligned and subsequently fixed by welding/ bolting as per drawing. Complete assembly, erection and connection of inter-panel wiring, bus-bars between adjacent panels, mounting of loose supplied component as per drawing will be the responsibility of contractor. If any additional wiring or modification of wiring is required, contractor has to carry out without any extra cost.
2.2	Any minor modification and rectification required for completion installation, testing and commissioning, and satisfactory trial operation and PG Testing will be carried by the contractor at no extra cost.
2.3	Pre-commissioning, checks for correctness of erection to the entire satisfaction of the Engineer in charge is included in the scope of work.
2.4	Independent testing and commissioning of equipments erected by competent commissioning engineers to the entire satisfaction of the Engineer in charge is included in the scope of work.
2.5	Successful trial operation and PG Testing till handing over of the equipments is included in the scope of work.
2.6	If necessary, dismantling of protective relays, switches, fuses, CTs, meters etc and making minor changes in wiring and remounting of such components or mounting of such items supplied loose and connections thereof will be carried out by the contractor at no extra cost.
2.7	Any work beyond the scope of work viz major rectification due to manufacturing defect / modification arising out of design changes or damages in transit and reworks on works already completed satisfactorily for reasons not attributable to the contractor etc will be treated as “Extra work” and the contractor will have to carry out such works at the extra man-hour rate as indicated in this tender.
2.8	Proper records for glands and lugs, if supplied loose & handed over for external & internal cabling will be maintained by the contractor for material reconciliation.
2.9	The contractor shall set each piece of equipment on its foundation or supporting structures. The contractors shall assemble equipment as required. All equipment should be installed with parallel, horizontal and vertical alignments by skilled craftsman.
2.10	Equipment furnished with finished coat of paint shall be touched up by the contractor, so as to attain required dry film thickness, if their surface is spoilt during handling.
2.11	While commissioning of the system covering mechanical, C&I and electrical, BHEL engineer shall coordinate and necessary assistance required by way of labour, supervisor and engineer etc. shall be arranged by the contractor belonging to his scope, at no extra cost.
2.12	The post-commissioning activities will include the trial run and PG testing of all the connected equipment / system which will continue upto the handing over of the unit and performance guarantee test. The contractor shall arrange for sufficient numbers of manpower alongwith engineers and supervisors for carrying out the activities under his own responsibility in coordination with various other agencies.
2.13	In case, any rework is required because of faulty erection by the contractor which is noticed during commissioning, the same has to be rectified by the contractor at his cost.
2.14	The Bill of material for the above equipment / material under the scope is given in the encloser
2.15	The activities in specific but not limited to following for Electrical Control Panels etc. under are detailed below and shall also be under the scope of the contractor.
2.16	Interposing relays will be generally supplied fitted in the switchboard before dispatch. However, if in some cases, the same is supplied loose which will be required to be installed in various switchboards at site as per instruction of BHEL site engineers, it will be done by the contractor at no extra cost.
2.17	The commissioning of LV switch and panels will involve the runs of all connected components like motors, valves, dampers and finally the commissioning of the TG sets. The contractors will have to keep his people round the clock, if necessary,

	during the trial runs and promptly take action for any repair, check and rectification etc required in the equipment erected by him. Checks for Logics – Interlocks & Protection with the system is also part of Commissioning.
2.18	The base channels shall be normally supplied with the switchboards/ Panels. These will have to be aligned, levelled and grouted in position as per approved drawings. Wherever the base channels are not supplied, supporting materials will be supplied by BHEL free of cost and the same will be fabricated and painted at site. Payment shall be made as per applicable item of price schedule. In case BHEL could not supply these materials, the same will be taken from cable tray support material item ie applicable Item of BOQ (Supply) and the same will be fabricated and painted at site. Payment shall be made as per applicable item of price schedule (for supply and erection respectively). Opening will be left on the floor during the time of casting where the base channels will have to be grouted. All minor concrete chipping and finishing works will be included in the scope of job.
2.19	Fabrication, painting and Erection of Cross Channels, may be required to be done at site. Materials will be supplied by BHEL free of cost and the same will be fabricated and painted at site. Payment shall be made as per applicable item of Rate schedule. In case BHEL could not supply these materials, the same shall be taken from cable tray support material item i.e.applicable Item of BOQ (Supply) and the same will be fabricated and painted at site. Payment shall be made as per respective applicable item of Rate schedule (i. e. for Supply and Erection respectively).
2.20	Subject to requirement, the contractor shall fabricate and erect canopy for various equipment erected outside. Necessary structural materials, GI sheets etc will be provided by BHEL free of cost. Payment shall be made as per applicable item of Rate schedule.
2.21	Removable UNDRILLED gland plates with Gaskets may be provided in each panel to facilitate for cable glanding and termination of external cables in the scope of the contractor. If removal gland plates are not provided, making holes on the fixed plate by drilling and glanding, tapping is also under the scope of the contractor for which contractor shall not claim any extra cost.
2.22	Double compression tinned brass cable glands and tined copper lugs of 2.5 Sq. mm wherever supplied loose for each panels will be handed over to the contractor at the time of work and a proper record will be maintained by the contractor for material reconciliation.
2.23	For making holes on removable gland plate or fixed gland plate the contractor shall use suitable drilling machine. No gas cutting will be allowed.
2.24	COMMISSIONING OF EQUIPMENT (ERECTED BY OTHER AGENCIES)
2.24.1	Scope includes Mounting of loose supplied Equipment/Components, Calibration, Testing of individual Equipment/Components and entire system. The scope also includes commissioning of the system from remote.
2.24.2	The Contractor shall inspect the system & prepare a list jointly with BHEL Engineer for the Equipment available and short/loose supplied items.
2.24.3	Commissioning of entire system, trouble shooting, making minor modifications/alterations is included in the scope.
2.25	CABLING
2.25.1	Cables shall be laid as per cable schedule provided. Contractor may have to prepare cable schedule based on input data like Block Diagram, etc furnished by BHEL.
2.25.2	Interconnections/Termination of cables shall be done as per Interconnection diagram provided by BHEL. Contractor may have to prepare Cable Interconnection chart based on the Schemes, etc provided by BHEL.
2.25.3	Contractor shall drill hole in Cable Gland plate as per requirement with approx 10% extra for future provisions.
2.25.4	Cables shall be laid on Cable Tray, through conduits, on wall with saddles, etc as required. Saddles of proper sizes with all acceroies are to be supplied by Contractor and rate quoted shall be inclusive of such contingencies.

2.25.5	For cable of size 2.5 sqmm and below, the cable termination rate (including shortings etc.) Is inclusive of supply of lugs.
2.25.6	After completion of Cable laying in a particular area, the cable should be calmped properly
2.25.7	For proper identification of Cables, Cable Tags shall be provided as per BHEL Standard. For proper identification of Wires/core of cables Intelocking Type ferules shall be used as per BHEL Standard.
3.0	CABLE TRAY WORK & EARTHING WORK
3.1	In respect of scope of installation work for cabling, cable tray work, & earthing work, the work shall be carried out as per drawing. Local routing, etc are to be done as directed by of BHEL.
3.2	The Contractor shall inspect the area prior to commencement of erection and anticipated fouling with other equipment shall be brought to notice and corrective action taken in advance.
3.3	There may be interferences with other equipment after cable trays, etc are erected; Contractor shall re-route/modify as directed by BHEL.
3.4	All supporting structure shall be applied with one coat of red-oxide & two coats of finish paint after fabrication/erection. Shade of finish paint shall be as per approval of BHEL.
3.5	Cable Trays shall be Galvanised. Tray accessories like bends, Tees, etc will not be supplied. Cable trays shall be cut (gas cutting is not permitted) and welded to fabricate such accessories suiting to site requirement. Welded area to be applied with one coat of red-oxide and one coat of Cold Galvanising Paint. No additional payment is admissible for fabrication of Tray accessories.
3.6	For Equipment earthing, Galvanised Earthflats (GI Wire) shall be connected to nearest riser, mat or as directed by Engineer. All welded areas to be applied with one coat of red-oxide and one coat of Cold Galvanising Paint.
4.0	ELECTRICAL PANEL/DESK
4.1	Electrical Control Board will consist of Meters (analogue/digital), Switches, Mimic, Semaphore, Synchroscope, Annunciation Windows, etc.
4.2	Testing/commissioning/calibration of Individual components and operation of connected systems shall be demonstrated.
5.0	AVR
5.1	AUTOMATIC VOLTAGE REGULATOR (AVR)
5.1.1	The AVR Consists of Regulation Cubicles, Thyristor Cubicle & Field Suppression Cubicle and will be supplied in Shipping Sections.
5.1.2	Individual Shipping Sections shall be levelled/aligned, Coupled and Interpanel wiring to be done at site.
5.1.3	Commissioning of the system shall be done as procedure furnished. Storage type Oscilloscopes shall be used for Pulse Input/Out puts of various channels.
6.0	PUSH BUTTONS, STARTER, FUSE FOARD ETC
6.1	The above items shall require to be mounted on wall / column / floor.
6.2	For mounting of above items the required structural steel, like ISMC, ISA and Flat shall be supplied by BHEL free of cost. However, Rowl plug and necessary fixing hard-wares is to be supplied by the contractor at his cost and will be deemed to be included in the rate of erection of the item.
6.3	Checking of components, removal & reinstallation of internal component and re-wiring, testing and commissioning shall be under the scope of the contractor.
6.4	Fabricated Structure to be painted with one coat of Red-oxide & two coats of finished paint.
7.0	DRY OUT & COMMISSIONING OF HT/LT MOTORS
7.1	Motors shall be dried out, if required, prior to Commissioning/Trial run of the Motor. Contractor shall arrange Dry out by External Heating, Dry Air Blowing, Space Heaters, etc as required to achieve required IR/PI Value. Record of Insulation Resistance shall be maintained hourly or as directed by Engineer. HT Motors may be dried out by applying Three Phase LT supply through Main Terminals. The air shall be vented out intermittently to purge out moisture.

7.2	Contractor shall monitor Temperature of Winding through Embedded Temperature Detectors.
7.3	In case of accidental flooding of winding with water during storage or otherwise, end shields or suitable removable part may be taken out for faster dry out.
7.4	Cables of suitable size with Switching Gears as required shall be arranged by Contractor. Power supply shall be drawn from nearby sources as directed by Engineer. All connections shall be done proper size lugs, fasteners, etc as required.
7.5	Prior to commissioning/trial run of motors record of IR/PI/AC and other parameters of winding like Resistance (or LCR) shall be taken. Suitable Instruments with due & valid Calibration Certificates shall be used.
7.6	Contractor shall remove connection of existing cables prior to dryout & measurement of Winding Resistance, etc and restore cable connection after completion of work.
8.0	TESTING ON TURBO GENERATOR, PMG & EXCITER IR/ PI, winding resistance, tan delta, heating/ dryout, exciter dehumidifier/ dry air blower, erection of necessary illumination, stroboscope, loop check for rotor earth fault protection etc are included in the scope of the bidder. However, this list is not exhaustive and additional tests may have to be conducted as per customer requirements. There will not be any separate rate for this job and the vendor has to carry out the job within overall quoted rate.
9.0	FINAL PAINTING Bidder has to supply & carry out application of one coat of primer and two coats of paint on all structures and parts erected (if required) after removal of dust/dirt. The colour of the paint shall be decided by BHEL engineer. Touch up paint should be applied on panels, J.Bs if required. The contractor shall take prior approval of BHEL/NTPC for the make of the paint to be procured for the same application.
10.0	ELECTRICAL INSPECTOR'S APPROVAL AND POLLUTION CONTROL BOARD CLEARANCE The contractor shall arrange to obtain clearance from the Electrical Inspectorate (CEA) and Pollution Control Board and arrange for the Authorities' visit to site, as required. He will also arrange visit of electrical Inspector and obtain his approval for the installation work to be carried out under this scope of work and get the work done by the license holder electricians and supervisors as per local statutory requirement. The statutory fee paid by BHEL.

PART-B

JOB ERECTION, TESTING, COMMISSIONING OF CONTROL & INSTRUMENTAION WORK OF BOILER, TG, AND THEIR AUXILLIARIES ETC. FOR UNIT#2 OF 3 X 250 MW NTPC-BONGAIGAON TPP,SALAKATI,ASSAM.

1.1.0	BRIEF SCOPE OF WORK.
	The scope of work under this specification for control & instrumentation work of boiler and auxiliaries, TG and auxiliaries, C&I of Unit-2 of 3x250 MW sets at NTPC Ltd, at Salakati, Bongaigaon, Assam will comprise of but not be limited to the following:
1.1.1	Identification, receipt, transporting to site of installation / calibration, cleaning and preservative painting including supply of preservatives, pre-assembly of equipment wherever required, inspection or checking, erecting the material, adjusting, aligning, welding, fastening, calibration, testing including carrying out the necessary non-destructive testing as may be required, carrying out necessary statutory tests including PG test, providing services for trial operation, commissioning of complete C&I system including all max system & panels, MMI system for TG, SG C&I controls, and balance system/item including system commissioning and handing over of the units.
1.1.2	As soon as the material is issued to the contractor, all responsibility of proper handling shall be of the contractor and thereafter any loss/damage to the equipment and material due to faulty handling and storage or any other reason attributable to the contractor, shall be made good by the contractor at his own cost.
1.1.3	The contractor shall check, tally and inspect all material consignment issued to him and shall maintain proper record of the receipt of material received and such reports shall be produced by the contractor to the engineer for verification.
1.1.4	The contractor shall clean the surfaces of the material/equipment before erection and any preservative coating which has peeled off, shall be applied /painted by the contractor. The paints etc. required for such touch up painting as per the BHEL specification shall be supplied by the contractor at his own cost.
1.1.5	Any fixture, steel structure, concrete block supports required for temporary supporting for pre-assembly and checking, lifting and handling during pre-assembly and erection shall be arranged by the contractor at his own cost.
1.1.6	It shall be the contractor's responsibility to check the various equipment foundations for their correctness with respect to level orientation, dimensions etc and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping or dressing of foundations up to 50mm for obtaining proper face for packer plates/shims, enlarging of the pockets in foundation etc as may be required for the erection of the equipment's/plants will have to be carried out by contractor without extra cost.
1.1.7	All works, such as cleaning, checking, testing, re-calibration, leveling, blue matching, aligning, assembly, temporary erection for alignment, dismantling of certain equipment for checking/cleaning, surface preparation, fabrication of tubes and pipes and frame support for panels/ JB's etc. at site as per general engineering

	practice, cutting, grinding, straightening, chamfering, filing, chipping, drilling, reaming etc as may be applicable in such work, shall be carried out by the contractor as part of the work.
1.1.8	It shall be the responsibility of the contractor to provide scaffoldings, temporary platforms, supports, ladder on column (pre-fabricated clamping type only) etc. for initial works till such time stairways are completed. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.
1.1.9	No member of the structure/platform should be cut without specific approval of BHEL.
1.1.10	This tender calls for erection, testing and commissioning of complete C&I system including all max system & panels, MMI system for TG, SG C&I controls and balance system/item enumerated in the rate schedule (Vol.- III) as per instruction of BHEL engineer.
1.1.11	Contractor shall arrange all necessary clamps, fasteners, required for supports of all impulse lines, tube, GI pipes. The rates for these items are to be accommodated in the respective pipes' erection rates. For cable dressing, necessary aluminium strips/flats and fasteners for fixing the above also to be arranged by the contractor. The rates for these items are to be accommodated in cable laying. For installation of panels, stanchion etc., concrete anchor fasteners is to be arranged by the contractor. No separate payment shall be made for supply of this item.
1.1.12	Fabrication and erection of necessary steel materials for supports and supply of touch up paints and painting of all steel supports, one coat of red oxide primer and two coats of final paints of approved color to be specified by BHEL engineer, is also included in the scope of the work.
1.1.13	Providing commissioning assistance round the clock as required during commissioning activities, till handing over of the system to the customer. Rate for this assistance should be included in the rate schedule against each item. No separate payment shall be made for commissioning assistance.
1.1.14	Checking, testing, mounting/fixing in the panel/other equipments all loose supplied items modules, relays, switches, lamps, push buttons, meters and all other items.
1.1.15	<u>Major Scope for Assistance for PG test : It is up to the discretion of BHEL to carryout this scope of job.</u>
1.1.15.1	Receipt & unpacking of instruments, Data loggers, PCs, Printers, Impulse pipes, valves, Fittings, supporting structural items, cables etc from main equipment vendor.
1.1.15.2	Identification and tagging of all the Pressure Points, RTD & Thermocouple points, Power meter / transducer points etc as per PG procedure list.
1.1.15.3	Laying, termination & tagging of all the required cables for the PG test.
1.1.15.4	Installation of all the equipments at the respective tapping points with required Impulse piping and supporting structures & frames.
1.1.15.5	Loop checking, charging & commissioning of the instruments upto Datalogger & PCs including attending of leakages and minor repair of PG test instruments, if required.
1.1.15.6	Assistance during preliminary and final PG test with manpower, testing instruments, local measurement and recording of power, level, pressure, temperature, flow and other parameters.
1.1.15.7	Technical assistance to the Main Equipment E&C vendors for the normalization of the PG test items & equipments.
1.1.15.8	PG test impulse piping from first root valve and all cabling works including fixing of instruments is included in the scope.
1.1.15.9	Impulse lines should be cleaned properly with compressed air before erection and before connecting with Pr. / DP transmitter, line should be blown (steam line with steam and water line with water).

1.1.15.10	Arranging 240 V AC supply as required for Data Logger, computer, Power meter / transducer and 24 V DC supply as required for Pressure Transmitter Junction Box.
1.1.15.11	All the cables for T/C, PRT, Pressure / DP / vacuum transmitters are to be terminated to the data logger Junction box with two way and four way socket.
1.1.15.12	Junction boxes to be connected with the Data logger.
1.1.15.13	Pressure, vacuum and DP transmitters are to be calibrated before installation and certificate to be prepared. During PG test also calibration checks may be carried out.
1.1.15.14	Watch and ward staff is to be provided round the clock for the period between start of installation and packing back to stores on completion of PG test.
1.1.15.15	Any other activity required for successful completion of PG test.
1.1.15.16	Tentative BOQ of items viz. instruments, cables, pipes etc. is given in the Rate schedule as separate head. The same may vary during actual operation. The rate quoted against these items will include all works pertaining to PG test, as enumerated above.
1.1.15.17	Prior to installation, all instruments are to be bench calibrated and checked for proper operation.
1.1.15.18	During commissioning, any re-calibration of instrument or checking of cable termination are found necessary, the same shall be done by the contractor..
1.1.15.19	No extra payment shall be made for minor chipping required for fixing of racks, panels, supports etc.
1.1.15.20	All the necessary tools and tackles required for the execution of the work and the instruments, equipment's for calibration purpose will have to be provided by the contractor.
1.1.15.21	It is the responsibility of the contractor to fabricate and erect canopy for the Instruments/ junction boxes erected outside. Necessary structural materials, GI sheets etc will be provided by BHEL free of cost. Quantity / Weight of the GI sheet will be decided by BHEL site Engineer. Payment for such erection shall be made as per applicable item rate of the rate schedule. Supply of touch up paint and its application on the canopy is included in the scope and no separate payment shall be made for it.
1.1.15.22	Whether specifically mentioned elsewhere or not, the following will be supplied/carried out by the contractor at no extra cost- <ul style="list-style-type: none"> - Supply and installation of nylon ties for cable clamping, other types of clamps, PVC straps, aluminium straps, interlocking type ferrules, aluminium/stainless steel tags etc. - Materials eg sand/chips etc. for minor civil works. - Fasteners like nuts, bolts, washers, spring washer, anchoring bolts etc. - Drilling of gland plates of equipment/junction boxes/terminal boxes etc. - Rotating of terminal box of the motors. - Enlargement of cable entry holes. - Drilling, cutting, reaming, threading and relocating holes at actual point of entry of cable or conduit in equipment etc. - Cutting standard tray sections and inserting additional tray fittings to match with the existing arrangement, if required. - Routine cleaning of the equipments erected by the contractor at his own cost.
1.2.0	<u>GUIDELINES FOR HANDLING</u>
1.2.1	<u>Electronic Cubicles/Sub Assemblies/Loose Items</u>
1.2.1.1	After receiving at site, the equipment/instrument shall be inspected for damage, if any. In case of damage, details should be noted and reported to the Engineer.
1.2.1.2	After erection of the equipment/instrument, the packing material should be removed and internals should be checked in presence of BHEL engineer. Silica gel (moisture absorber) placed inside the equipment should not be taken out and periodic inspection of silica gel is necessary. It has to be replaced when de-colourisation takes place.
1.2.1.3	Verify the availability of modules, plugs, relays etc as per the drawing and shipping

	list in presence of BHEL engineer.
1.2.1.4	The keys of the panels should be handed over to BHEL Engineer carefully with proper identification tags.
1.2.2	Solid state module
1.2.2.1	Electronic modules should only be touched when it is absolutely essential and it should be handled by a qualified person and also earth shield to be used.
1.2.2.2	The PCB should always be held by the front panel or the module frame and the electronic components should never be touched.
1.2.2.3	All modules using CMOS components are packed in anti static bags, when transported, to avoid ESD failures
1.2.3	Cabling work
1.2.3.1	This Specification covers the activities mentioned below, as applicable to various areas of power station.
1.2.3.2	Laying of cable trays and accessories generally as per drawing and document and as per the advice of BHEL site engineer.
1.2.3.3	Laying, dressing, glanding and termination of cables.
1.2.3.4	Testing and charging of cables.
1.2.3.5	Supply of miscellaneous items like ferrules, cable tag, nuts, bolts, PVC sleeve welding electrode etc required for it.
1.2.3.6	All associated work for completion of cabling system.
1.2.3.7	Site handling and storage of material.
1.2.3.8	Minor civil works.
1.3.0	Cabling Conceptual Design
1.3.1	In case of multicore cables of dia upto 30mm where not more than 3 cables are taken in one run, these can be directly along structures, walkways, platforms, galleries walls, etc by proper clamping at regular intervals of 750mm or less
1.3.2	Control cables installed along buildings, structures, ceilings, walls etc which are required to be protected against mechanical damage, shall be taken through GI conduits.
1.3.3	GI conduits shall also be used for flameproof installations, wherever required, with sealing at both ends. Conduits shall be supplied by BHEL free of cost.
1.3.4	Where direct heat radiation from equipment/pipes exists, heat isolating barriers for cabling system shall be adopted.
1.4.0	Erection of cable trays, supports and accessories
1.4.1	Erection will be done as per the drawing and the instruction of the engineer.
1.4.2	All welded joints shall be smooth enough to provide a good appearance and shall not cause injury to working personal.
1.4.3	Cable trays in the areas exposed to coal dust shall be installed in vertical formation. Wherever, due to layout constraints, it is not possible to install the trays in vertical formation, laying of trays in horizontal formation may be considered with engineer's prior permission.
1.4.4	For equipment's and devices having GI conduit entry arrangement other than standard GI conduit adopter, transition adopter shall be provided for proper termination. Conduits and accessories as specified will be supplied by BHEL free of cost.
1.4.5	The entire GI conduit system shall be firmly fastened in position. All fittings shall generally be secured independently from the GI pipes entering them.
1.4.6	Plica make heat resistance flexible conduits are generally used for heat zone in boiler and turbine for single core cable /tc cable / control cable from field to junction boxes. These conduits are to be laid in the trays or on solid structure for supporting and firmly fitted with instruments and junction boxes. Materials like flexible conduit, adopters etc. will be supplied by BHEL free of cost.
1.5.0	Welding
1.5.1	All welded connections shall be made by TIG/ electric arc welding as per requirement. All welding work shall be carried out by qualified and experienced welders.

1.5.2	All arc welding shall be carried out as per MU's recommendation and site engineer's instruction.
1.5.3	All welded joints should be allowed to cool down gradually to atmospheric temperature before putting any load on them.
1.6.0	Laying of cables
1.6.1	For laying cables along building steel structure and technological structure/concrete wall, ceiling etc., the cables shall be taken by clamping with MS saddles screwed to the MS flats welded to the structure/inserts.
1.6.2	To facilitate pulling of cables in GI conduits, powdered soft stone, plastic soap or other dry inert lubricant should only be used.
1.6.3	Wherever specific cable routes are not shown in cable schedule, cables shall be laid as directed by engineer.
1.7.0	Cable termination and joining.
1.7.1	In case the equipment are provided with undrilled gland plates for cable/conduit entry, the contractor shall perform all drilling & cutting on the gland plate and any minor modification work required to complete the job at no extra cost. The contractor shall prepare a drawing showing the holes for cable entry in the gland plate and obtain engineer's approval prior to drilling holes. Gas cutting shall not be allowed. In some of the panel wire wrapping connection and soldering connection will be required. Contractor should carry out the same with skilled manpower.
1.7.2	Termination of cables shall be done as per termination drawing & interconnection diagram furnished to contractor. Looping of cores/wires at terminals and, if required, between the panels, is to be done by the contractor at no extra cost.
1.7.3	All unused cable entries in the equipment shall be sealed as per the instructions of the engineer. However, sealing material is to be supplied by the contractor.
1.7.4	Individual cores of control cables shall have ferrules for identification. Ferrule numbers shall be provided as per the control scheme and other related documents supplied by BHEL.
1.7.5	Copper conductor control cables shall be terminated directly into screwed type terminals provided in the equipment. Wherever control cables are to be terminated by means of terminal lugs, the same shall be of tinned copper compression type. BHEL shall supply lugs free of cost (except those as per item no. K.1 of rate schedule).
1.7.6	Cable joint, not more than one in a circuit, shall normally be made at an intermediate point in the straight run of the cable only when the length of the run is more than the standard drum length supplied by manufacturer. In case where jointing is unavoidable the same should be done by means of specified cable jointing kit and junction box should be used for the termination, subject to BHEL site engineers approval. Prior approval of engineer shall be taken for deciding location of joint.
1.7.7	The unit rate of cabling shall also cover all the above activities for cabling including removal and repositioning of gland plate, drilling of gland plate, cable glanding, making plugs & termination at both ends and supply of all items as above.
1.7.8	Cables shall be tagged at both ends at regular intervals of 5.0 mtrs by aluminium tags.
1.8.0	Inspection
	The actual inspection shall be carried out as per the approved field quality plan.
1.9.0	Testing
1.9.1	Prior to installation, cables shall be tested for following and record to be maintained- <ul style="list-style-type: none"> • Continuity of conductors. • Insulation resistance between conductors & earth. • Insulation resistance between conductors.
1.9.2	After installation cables shall be tested for following and record to be maintained- <ul style="list-style-type: none"> • Insulation resistance between conductors & earth.

				<ul style="list-style-type: none"> • Insulation resistance between conductors. • Continuity of conductors.
1.9.3				BHEL/ owner may ask for additional tests at site as found necessary to determine that the works comply with the specification, and relevant standards. No extra payment will be made for the same
1.9.4				The contractor shall have to bring all testing equipment & instrument in sufficient numbers to carry out the job simultaneously in more than one area. All instruments shall be calibrated to the satisfaction of engineer before actual testing and tests shall be conducted by qualified & experienced personnel.
1.9.5				All documents/records regarding test data and all other measured values shall be submitted to engineer for approval and subsequent record. All cables shall be energised only after certification from BHEL. The results of all tests shall conform to the specification requirements as well as any specific performance data guaranteed during finalisation of contract.
1.10.0				Material Reconciliation
				The philosophy is 'contract closing activities right from the day one'. Material reconciliation statement signed jointly by the contractor and BHEL is to be generated and submitted to BHEL by the contractor once in every three months, so that handing over is not delayed by even a single day on account of material reconciliation. In event of failure to do so, the contractor shall be entirely responsible for the delay.
1.10.1				Measurement & return of surplus
1.10.1.1				For payment purposes measurement shall be made on the basis of the execution drawing/actual physical measurements. Physical measurement shall be made by the contractor in presence of engineer. The measurement for cable laying shall be made on the basis of length actually laid from lug including that of loops provided and will be paid accordingly.
1.10.1.2				All the surplus, scrap & serviceable cables cut out of the cables quantity issued by BHEL to the contractor etc., shall be returned back in good condition, as directed by Engineer.
1.10.1.3				Cables of less than 5M length will be termed as scrap. Cables of length 5M and above shall be termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard.
1.10.1.4				Cable of serviceable length being returned to the stores shall have their free end sealed and the balance length shall be noted and certified by the engineer for the purpose of accounting. The above forms the part of scope of work.
1.10.1.5				While carrying out material appropriation with contractor, all the above points will be taken into account. All the serviceable material returned by contractor shall be deducted from the quantities issued for the respective sizes and categories and the balanced quantity(ies) will be taken as the net quantity(ies) issued to contractor. Allowable scrap quantity is calculated as per wastage allowance percentage, as mentioned elsewhere.
1.10.1.6				Any scrap / wastage generated by contractor in excess of allowable percentage shall be charged at the rates decided by engineer whose decision shall be final and binding on the contractor.
1.10.1.7				For steel material supplied by contractor, all scrap shall be returned to BHEL's stores with due accounting.
1.10.2				Cutting And Wastage Allowance
1.10.2.1				Contractor shall carefully plan cutting schedule of each cable drum in consultation with engineer in order to minimise the wastage at no extra charge.
1.10.2.2				Cutting and wastage allowance shall be computed on the length of cables and weight of steel actually used, measured and accepted. The permissible value of wastage allowance is as follows- <ul style="list-style-type: none"> - For cables - 5% - For steel and other materials - 1% - Impulse pipe/ Cu, ss tubes - 2%
1.11.0				As built drawing

1.11.1	After successful completion, testing & commissioning of installation work, BHEL/owner's drawings and documents shall be updated in line with the actual work carried out at site and two marked up copies of the same having approval of engineer should be submitted to BHEL by contractor within one month of completion of major activities.
1.12.0	Scope of work for panel/cubicle/instruments/equipment's/items
1.12.1	Control panel
	These panels shall be of various types like computerised electronic control panel (mAX DNA & PLC), electrical control panel, mechanical instrumentation panel etc. located in control room, field etc. the scope of work shall include but not be limited to the following activities-
1.12.1.1	Checking of foundation and chipping of floor and Fabrication of base frame.
1.12.1.2	Installation of base frame & fixing anti vibration pad.
1.12.1.3	Placement of panels on base frame and panels which are supplied with base frame as integral part, directly on floor.
1.12.1.4	Leveling, alignment of the panel using Packing plate & shims etc, bolting with base frame/ welding of integrated base frame with floor inserts. The contractor shall arrange packing plate, shims etc at his own cost. In case of welding, following procedures shall be adopted. Two separate cables from the welding set, one cable from the electrode holder and other for earth point of welding, i.e. the point of welding shall have earth connection directly from the welding set through cable and not through plant machinery, columns etc.
1.12.1.5	Checking, testing, mounting/fixing in the panel all loose supplied items modules, relays, switches, lamps, push buttons, meters and all other items.
1.12.1.6	Checking and testing of internal wiring/components.
1.12.1.7	Mounting of microprocessor based amplifier chassis (to be supplied by BHEL-Trichy) in mAXDNA FSSS panel (to be supplied by BHEL-EDN)
1.12.1.8	Interconnection among panels, engineering control, diagnostic, plant monitoring system, control desk and field equipment/instruments.
1.12.1.9	Charging the system, checking and testing functional operation, simulation testing, checking signal flow.
1.12.1.10	Software/hardware setting of parameters, logic etc.
1.12.1.11	Software programming, erasing, calibration etc.
1.12.1.12	Commissioning of all auto control loops.
1.12.1.13	All the welding joints of the structure shall be applied with anti-corrosive primer and paints immediately after welding. The contractor shall arrange primer and paint at his own cost.
1.12.1.14	The unit rate shall cover all but not limited to above activities including supply of above items & activities for loose supplied items unless otherwise specified elsewhere
1.12.2	Control desk
	The control desk shall be located in the unit control room. The desk will have the control switches, push buttons, receiver/indicators, annunciation windows/facia, CRT monitor, keyboard/mouse, meters, console, lamps, indicators controllers and such other items. The scope of work shall include but not be limited to following activities.
1.12.2.1	Checking, testing, in the desk all loose supplied items control switches, push buttons, lamps, indicators, meters, console, CRT monitor, keyboard, controllers, receiver, indicator, recorders, annunciation windows, terminal blocks and such other items. Verify the console that 27 pin connectors and pins are available or not.
1.12.2.2	Inter desk loop wiring, desk wiring between components and terminal block laying wires, making plugs, lugging & terminating.
1.12.2.3	Checking & testing of functional operation, simulation, signal flow.
1.12.2.4	Commissioning of all control loops, protection, interlock, indication and annunciation etc with respect to discrete signal, subsystem and total system.
1.12.2.5	Commissioning of all auto control loops under BHEL's scope.

1.12.2.6	All the welding joints of the structure shall be applied with anti-corrosive primer and paints immediately after welding. The contractor shall arrange primer and paint at their own cost.
1.12.2.7	The unit rate shall cover all but not limited to above activities including supply of above items & activities for loose supplied items unless otherwise specified elsewhere.
1.12.3	Impulse pipe/air line/draft line
	The scope of work shall include but not be limited to following activities.
1.12.3.1	All the pipes shall be thoroughly cleaned and foreign particles shall be removed by blowing compressed air or as per BHEL instruction before cutting/laying.
1.12.3.2	All the steel supports shall be fabricated by cutting & welding of steel angle/channel/section. Supports shall be erected by welding with permanent steel structure/anchored with the concrete/brick wall. Anticorrosive primer and paints shall be applied on all welded joints. The contractor shall arrange primer and paints at their own cost.
1.12.3.3	Based on routing, pipe is to be cut to required length by hack saw, cold bent using proper bending machine.
1.12.3.4	Pipe with all associated fitting shall be laid, held firmly with GI clamps keeping flexibility, proper slopes and ensuring adequacy of support and aesthetic look. Anticorrosive primer and paint shall be applied to the welding joints and the paint will be procured by contractor at his own cost.
1.12.3.5	Pipe shall be jointed with pipe, tapping point, root valve, socket, reducer, tee, union, elbow, syphon, manifold, isolation valve and such other items by welding/threading. For welding, the nature of welding such as TIG, arc etc. shall be decided by BHEL and binding on contractor. Depending on the nature of welding, contractor shall arrange welding sets, including welding transformer, generators, rectifier, holder etc and consumables including required electrodes, gases, filler wire etc at their own cost. Immediately after welding, anti corrosive primer and paints shall be applied on the welding joints. For threading, thread cutting shall be done by pipe threading die. In all threaded joints, thread sealing compounds and teflon tape should be used. Contractor shall arrange thread sealing compounds and teflon tape at their own cost.
1.12.3.6	Pipes shall be tagged at both ends at regular intervals by aluminium tags which will be supplied by the contractor within the scope of work.
1.12.3.7	Pipe shall be hydraulic tested/pneumatically tested and leak shall be arrested. Pipe shall be connected at both tapping point and instrument end with required copper washer. The contractor shall supply copper washer at their own cost.
1.12.3.8	Before charging the instruments, connection shall be removed from the instrument end, flushed for clearing, connection restored and then commissioning shall be done.
1.12.3.9	Measurement shall be made on the basis of length actually laid from tapping point to instrument/instrument rack.
1.12.3.10	Cutting schedule shall be carefully planned such that wastage is minimised.
1.12.3.11	Permissible wastage allowance shall be +/- 2%.
1.12.3.12	All necessary hardware, consumables/fasteners & NDT or DP test materials as stated elsewhere, shall be supplied by the contractor at their own cost. The unit rate shall cover all but not limited to above activities including supply of above items and loose supplied items unless otherwise specified elsewhere.
1.12.4	Copper tube/SS tube
	The scope of work shall include but not be limited to following activities:
1.12.4.1	All tubes shall be thoroughly cleaned and foreign particles shall be removed by blowing compressed air .
1.12.4.2	All the steel supports shall be fabricated by cutting & welding of steel angle/channel/section. Supports shall be erected by welding with permanent steel structure/anchored with the concrete/brick wall. Anticorrosive primer and paints shall be applied on all welded joints. The contractor shall arrange primer and paints at his own cost.

1.12.4.3	Tray shall be fabricated by cutting using hack saw, making bend as per layout. Tray shall be laid over steel support, bolted/welded.
1.12.4.4	Tube shall be cut to required length by hacksaw or tube cutting machine & bent by bending machine, laid over the tray/steel support keeping uniform spacing, held by aluminium clamp. Tube shall be joined with other tubes, brass/steel connectors, reducer, tee, elbow, straight connector, bulk head connector, needle valve, root valve, instrument/equipment.
1.12.4.5	All the joints shall be ferrule connection/brazing/welding/flaring. At all the threaded joints, teflon tape shall be used. The contractor shall arrange all equipments/consumables required for these operation at his own cost.
1.12.4.6	Before charging the instruments, connection shall be removed from the instrument end, flushed for cleaning, connection restored and then commissioning shall be done.
1.12.4.7	Measurement shall be made on the basis of length actually laid from tapping point to instrument/instrument rack.
1.12.4.8	Cutting schedule shall be carefully planned such that wastage is minimised i.e. within the permissible range + -2%.
1.12.4.9	All necessary hardware & consumables/fasteners as stated elsewhere, shall be supplied by the contractor at their own cost. The unit rate shall cover all but not limited to above activities including supply of above items and loose supplied items unless otherwise specified elsewhere.
1.12.5	Instrument
	The instrument shall be located in field/unit control desk/panel/rack/gauge board/skid. The scope of work shall include but not be limited to following activities-
1.12.5.1	Fabrication of steel frame/pedestal as necessary, cutting and welding of steel channel, angle, flat section. The frame/pedestal shall be erected with permanent steel structure by welding, anchored with concrete/brick wall. Anticorrosive primer and paint shall be applied at the welded joint and the same shall be arranged by the contractor at his own cost. Instrument shall be erected on this frame/pedestal, control panel.
1.12.5.2	Physical verification, checking/testing of functional operation, calibration /re-calibration, setting /resetting shall be done before erection. Replacement of defective components, rewiring etc should be done.
1.12.5.3	All accessories like thermowell, isolation valve and other fittings shall be erected by welding/screwing.
1.12.5.4	For instruments with capillary, capillary shall be properly laid with uniform spacing in a bunch of capillaries, clamped using proper clamp, tagged at both ends and at regular interval. Aluminium tag shall be used at the instrument end for identification. Immediately after welding, anticorrosive primer and paint shall be applied at welded joints. The contractor shall arrange above tags and primer & paint at his own cost.
1.12.5.5	Charging the instrument, after flushing the connected pipe, shall be done with due care as per procedure.
1.12.5.6	Checking/ testing of functional operation locally, adjustment and local commissioning.
1.12.5.7	Checking/testing and commissioning of operation with interlock protection, indication and loop control.
1.12.5.8	Commissioning with auto control loop.
1.12.5.9	Fabrication of canopy by cutting and welding of steel plate/section. Erection of canopy over the instrument frame/pedestal/installation. All necessary hardware & consumables / fasteners as stated elsewhere including bolts, nuts, screws, insulation tape, primer, paints shall be supplied by the contractor at their own cost. BHEL will supply GI / Aluminium sheets and structural materials for the same free of cost. Payment for this will be made as per applicable item rate of the rate schedule.
1.12.5.10	The unit rate shall cover all (except item at 1.12.5.9 above), but not limited to

	above activities including supply of above items and supply of loose items unless otherwise specified elsewhere.
1.12.5.11	Lab. Instruments: Assistance in setting up, Installation and commissioning. Minor structural work, if required to support Instrument is included in the scope. Arrangement of Power supply and Air supply for Test Bench from termination point is also included in the scope.
1.12.6	Junction box and transmitter rack
	The scope of work shall include but not be limited to following activities:
1.12.6.1	Fabrication of steel frame/pedestal/base frame by cutting and welding of steel channel, angle, flat, section. The frame/pedestal/base frame shall be erected with permanent steel structure by welding/anchored with concrete/brick wall. Anticorrosive primer and paints shall be applied at the welded joints, and the same shall be supplied by the contractor at his own cost. Some of the JBs may require canopy. In that case clause no. 3.12.5.9 will be applicable.
1.12.6.2	Physical verification, checking of terminal block/internal tubing, replacement of terminal block of JB and tubing of TR if required.
1.12.6.3	Placement, leveling and alignment of JB and TR.
1.12.6.4	Numbering of JB & TR by paints. Paint shall be arranged by the contractor at his own cost.
1.12.6.5	Fixing the numbering/tag plate.
1.12.6.6	All necessary hardwares & consumables/fasteners, as stated elsewhere, shall be supplied by the contractor at his own cost.
1.12.7	Plant monitoring system (MMI)
	The scope of work shall include but not be limited to the following activities:
1.12.7.1	Checking of foundation and chipping of floor.
1.12.7.2	Fabrication and erection of base frame by cutting and welding of steel channel/section, welding and grouting base frame.
1.12.7.3	Placement, leveling & alignment of power supply/computer cabinet.
1.12.7.4	Placement of desktop peripherals e.g. keyboard, monitors, printers, mouse, modem.
1.12.7.5	Fixing and installation of monitors.
1.12.7.6	Installation of Hub power supply unit.
1.12.7.7	Laying, termination of interconnecting cables of miscellaneous & special type.
1.12.7.8	Installation of inter plant bus access coupler module.
1.12.7.9	Checking, testing, pre-commissioning.
1.12.7.10	Initialisation, programming and commissioning.
1.12.7.11	Commissioning of the total system.
1.12.7.12	All the necessary hardwares & consumables/fasteners as stated elsewhere shall be supplied by the contractor at his own cost. The unit rate shall cover all but not be limited to above activities.
1.13.0	Pneumatic drives (valve, damper, gate etc.)
1.13.1	Cable checking. Limit switch settings, minor repair of cu -tube etc.
1.13.2	MCC checking.
1.13.3	Commissioning assistance for all valves.
1.14.0	Commissioning of equipments erected by other agencies. Contractor shall have to commission equipments or system erected by other agencies.
1.15.0	FINAL PAINTING
	Final painting is excluded from the scope, except where specifically mentioned. Only Touch up painting, as required, is in the scope of contract. Supply of touch up paint (both primer and final Paints) is under the scope of work of vendor. However, Paint has to be as per BHEL's specification.

1.16.0	MATERIAL HANDLING AND STORAGE
1.16.1	<p>In regard to the scope of material handling and storage , it may specifically be noted that, immediately after placement of Letter of intent and on mobilization, the successful contractor has to engage a dedicated gang comprising of one experienced engineer along with sufficient labours/ riggers/ sarangs etc to carry out the following activities:</p> <ul style="list-style-type: none"> a) Identify all required materials like panels,motors,instruments,valves etc. major important items (as directed by BHEL engineer) dispatched already to site for Unit-2 electrical & C&I E&C work. b) Arrange transportation of the above identified materials to a clear space as provided by BHEL/NTPC inside site premises. c) Inspect those items to find any defect due to prolonged storage and intimate the same to BHEL. d) Stacked properly before start of erection work at the identified space. <p>The above activities should be carried out by the contractor within their quoted rate. It may also be mentioned that preservation work if any, should be done as per Cl. No. 1.17.0 of this specification. Complete material handling for the awarded scope of work as per mentioned in the specification shall be carried out by the successful contractor within their lump sum quoted price.</p> <p>In case of the failure on the part of the contractor in executing above job, BHEL at their discretion may get the work executed by other agency at their risk and cost with applicable overhead.</p>
1.16.2	Contractor shall unload the Panels, cubicals, motors, instruments, cables, trays etc. directly from trailer/ wagon (inside project premises) in respect of the unit and keep the same at designated place shown by BHEL/ customer. Necessary arrangement for transportation/ shifting of the above items from storage place to erection site, if required, shall be under the scope of this tender.
1.16.3	All the equipment furnished under this contract, other than those specifically mentioned in the tender, shall be received from the project sites/ sheds/ yards etc located separately and transported to pre assembly area/ erection site safely and stored in the storage spaces in a manner so that they are easily retrievable till they are erected by the contractor. While drawing/ lifting material from BHEL/ customer stores, contractor shall ensure that the balance/ other materials are stacked back immediately.
1.16.4	Contractor shall ensure that the proper lifting tackle (slings and D-shackles) with test certificates are used during lifting and rigging processes. In case of any damage due to faulty lifting tackles, the cost will be recovered from the contractor.
1.16.5	Approach road conditions from the stores/ yard 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. Bad condition of road can not be cited as the reason for delay. Minor repair/ construction of approach roads inside site shall be arranged by the bidder within the quoted/ accepted price.
1.16.6	Contractor shall be responsible for examining/ verifying all the plant and material issued to him one month prior to requirement and notify the engineer immediately of any damage, shortage, discrepancy etc before they are moved out of the stores/ storage yard. The contractor shall maintain exhaustive record and submit to the engineer every week, a report detailing all the receipts during the week. However, the contractor shall be solely responsible for any shortages or damages in transit handling and or in storage and erection of the equipment once received by him. In case any equipment/ material is lost/ damaged while in the custody of the contractor, the cost of repair/ replacement if any to bring back the equipment in original order shall be deducted from the contractor's bill. BHEL's decision in this regard shall be final and binding on the contractor.
1.16.7	All the materials in the custody of the contractor and stored in the open and 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 sleepers shall be arranged by the contractor at his cost.
1.16.8	If the material belonging to the contractor are stored in area other than those earmarked for his operation, the engineer will have the right to get it shifted to the area earmarked for the contractor, if the contractor fails to do it within reasonable time. Such shifting will be at the risk and cost of the contractor.
1.16.9	All electrical items, if required, shall undergo drying up operation. Contractor shall have to carry out the same as per direction of BHEL within the quoted rates. Necessary Halogen lamps etc. will be arranged within quoted price.
1.16.10	Rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.
1.16.11	The contractor shall ensure that all the packing materials and protective devices used for various equipments during transit & storage are removed before the equipment are installed.
1.16.12	The contractor shall ensure that all surplus damaged unused material, packing wood/ containers/ special transporting frames etc are returned to BHEL/ owner's designated place with proper documentation.
1.16.13	The contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage during the period under contractor's custody till erection.
1.16.14	The contractor shall hand over all parts/ materials remaining extra over the normal requirement with proper identification tags to the BHEL, failing which, suitable recoveries shall be made from bills/ dues of the contractor.
1.17.0	PRESERVATION OF COMPONENTS
1.17.1	It shall be the responsibility of the contractor to apply preservatives / touch up paints primer on equipment handled and erected by him till such time of final painting. It shall be contractor's responsibility to arrange for required manpower, scaffolding materials, cleaning materials like wire brush, emery sheets, grease, etc including paint and thinners. The quoted erection price shall include cleaning of surface, supplying and providing one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. Painting may have to be done as and when required till such time the final painting is carried out. BHEL engineer's decision in this regard is a binding to the contractor.
1.17.2	A separate gang of minimum two persons with all the necessary materials specified above shall be provided by the contractor within the finally accepted rates/ price for preservative/ touch-up painting.
1.17.3	The contractor shall protect finished work from action of weather and from damage or deterioration and shall cover the finished parts then and there for it protection.
1.17.4	Any failure on the part of the contractor to carry out works according to above clauses will entail BHEL to get done the job through any other party and recover the cost from contractor.

ANNEXURE – A TO TCN -01

JOB	HANDLING AT SITE/ STORAGE YARD, TRANSPORTATION TO SITE OF WORK, PRE-ASSEMBLY, ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL & C&I FOR BOILER, ESP, TG SETS FOR UNIT-2 OF 3X250 MW BONGAIGAON TPP, SALAKATI, ASSAM
TENDER NO	PSER:SCT:SAL -E1702:15

Sl no	Reference clause of tender document	Existing provision	Bidder's query	BHEL's clarification
1.	NIT, ANNEXURE-1 , PRE QUALIFYING CRITERIA 3.0 TECHNICAL CRITERION	BIDDER SHOULD HAVE EXECUTED ERECTION AND COMMISSIONING OF THE FOLLOWING DURING LAST 7 (SEVEN) YEARS, ENDING ON LAST DUE DATE OF SUBMISSION OF THE BID. RELEVANT DOC IN SUPPORT OF ABOVE SHALL BE SUBMITTED	PLEASE CONFIRM WHETHER 7 YRS. ENDING ON LAST DUE DATE OF SUBMISSION WILL BE CONSIDERED FROM THE DATE OF ISSUE OF PO OR FROM THE DATE OF COMPLETION.	SHALL BE FROM THE DATE OF COMPLETION.

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
 Power Sector - Eastern Region,
 Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	HANDLING AT SITE/ STORAGE YARD, TRANSPORTATION TO SITE OF WORK, PRE-ASSEMBLY, ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL & C&I FOR BOILER, ESP,TG SETS FOR UNIT-2 OF 3X250 MW BONGAIGAON TPP,SALAKATI,ASSAM	
Ref	1.0	Tender no PSER:SCT: SAL:E1702:15
	2.0	BHEL's NIT, vide reference no PSER: SCT:SAL:E1702:15:4725 Dated:13/10/15
	3.0	BHEL's TCN-01, vide reference no PSER:SCT: SAL-E1702-TCN-01 Dated: 28/10/15
	4.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized
representative of the bidder)