FOR OFFICIAL USE ONLY
NOT FOR PUBLICATION

TENDERER'S COPY
ORIGINAL COPY

T E N D E R S P E C I F I C A T I O N

TENDER NO. BHEL:NR(SCT):SGR 6:ECI:518

FOR

ERECTION, TESTING, COMMISSIONING TRIAL OPERATION AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION PACKAGES FOR 1X250 MW, UNIT-6, SURATGARH THERMAL POWER STATION (STPS, STAGE-IV), SURATGARH (DISTT.-GANGANAGAR, RAJASTHAN) OF RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LIMITED.

PART I – TECHNICAL BID

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA

INDEX

ISO 9001-2000, ISO 14001
and OHSAS 18001
certified company
SubContract and
Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
Fax 091-0120-2515464 / 2515467
Email: sku@bhelpsnr.co.in / swapan@bhelpsnr.co.in

TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for the "Work of erection, testing, commissioning, post commissioning, trial operations and handing over of all Electrical and C&I Equipments for 1X250 MW, Unit- 6, Stage-IV, Suratgarh Thermal Power Station, Suratgarh (Ganganagar, Rajasthan) of Rajasthan Rajya Vidyut Utpadan Nigam Limited."

TENDER NO. BHEL:NR(SCT):SGR 6:ECI:518

QUALIFYING REQUIREMENTS:

(i) "Tenderers who wish to participate should have executed similar nature work in 60 MW Unit or higher capacity (consisting mainly of Boiler & Turbine control panels and related field instrumentation works, Power Transformers, Isolated Bus duct) in Power Projects / Industrial Projects during last seven years".

(ii) Party should also have an average annual turnover of minimum of Rupees 68 Lacs (Rupees Sixty eight lacs only) during preceding three years (2004-05, 2005-06, and 2006-07)." The bidders shall submit audited balance sheets in support of this.

Bidders are allowed to have tie up/ JV arrangement for the work, which is not executed by them against Qualifying Requirements. The composition of tie up arrangement and role and responsibility of each constituent must be well defined and the document submitted shall clearly indicate who shall be the lead partner.
The bidder shall give an undertaking that the responsibility of execution of entire work shall lie with the lead partner and that in case of dissolution of tie up/ JV, the lead partner shall be liable for completing the work as per the terms of contract without affecting the Project Schedule and that the lead partner shall have to make immediate alternate tie up/ JV arrangement with another party meeting the QR requirement of the NIT (subject to BHEL's approval).
In case the same is not arranged, BHEL will be free to get the work done through alternate source at their (contractor's) risk and cost.
Note: The turn over shall be considered of the lead-partner only and not of the agency with whom they may have tie up.

NOTES:

(i) **The Tender Documents comprise of following;**

(a) General Conditions of Contract(GCC), Special Conditions of Contract(SCC),Tender Notice, Project Synopsis, etc.
(b) Rate Schedule.

(ii) Tender Documents with complete details are hosted on BHEL's web page www.bhel.com. Bidder(s) intending to participate may download the tender document from the web site. Bidder(s) downloading the tender documents from the web site, shall remit Rs.1000/- (Rupees One thousand only) in the form of crossed demand draft (non-refundable), in favour of BHEL, NOIDA along with their offer

(iii) Bidder(s) can also purchase hard copy of tender documents from this office. Tender documents (non transferable) will be issued on all working days between 09.30 Hrs. to 12.30 Hrs within the sale period i.e ***upto 09.06.2008*** on payment of Rs.1,000/- (non-refundable) either in cash or by crossed demand draft in favour of BHEL, NOIDA. Request for issue of tender document should clearly indicate Tender No. and work.

(iv) Tenders must be submitted to the undersigned (Room No. 104) at the address given above **latest by 09.06.2008** before opening of technical bids commences. Technical bids shall **be opened at 15.30 Hrs. on 09.06.2008**. Tenders received after the due date & time shall be liable to be summarily rejected.

(v) Earnest Money Deposit (EMD): Refundable, Non-interest bearing **EMD of *Rs 1,50,000/-*** shall be deposited by Account Payee Pay Order 'OR' Demand Draft in favour of " Bharat Heavy Electricals Limited" payable at Delhi/NOIDA . Those bidders who have already deposited ' One Time 'EMD' of Rs. 2,00,000/- with BHEL, PSNR, NOIDA need not submit EMD with the present tender.

(vi) Tenders not accompanied with Full Earnest Money Deposit, as indicated above, will not be considered.

(vii) All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in this web page and not in the newspaper. Bidders shall keep themselves updated with all such amendments.

(viii) BHEL reserves the right to accept or reject any or all tenders without assigning any reason whatsoever.

(ix) BHEL takes no responsibility for any delay/loss of documents or correspondences sent by courier/post.

(x) **BHEL reserves the right to go for a Reverse Auction instead of Opening the submitted sealed bid, which will be decided after technical evaluation. As such, the bidders should submit their best prices in the 'Sealed Price Bid'. However, bidders are required to confirm their acceptance of "General terms and conditions" governing RA specifically in their technical bid. The "General terms and**

conditions" governing RA are given in the SCC of the NIT. Bidders are also required to furnish following details in their techno-commercial bid, for this purpose (RA).

Authorization of representative who will participate in the on line Reverse Auction Process;

a. Name and Designation of official
b. Postal Address (Complete)
c. Telephone Nos. (Land line & Mobile both)
d. FAX No.
e. E-mail address
f. Name of Place/State/Country, wherefrom he will participate in the RA.

(xi) Bids, once submitted, shall not be returned.

(xii) Unsolicited discount/rebate shall not be accepted after bid opening.

(xiii) Purchase Preference will be given to CPSU's as per Govt. Guidelines.

DGM/SCP

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Deptt.

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301.INDIA
Phone: 0091-0120-2515476 / 2515464 / 2515479
Fax 091-0120-2515464 / 2515467
Email: sku@bhelpsnr.co.in / swapan@bhelpsnr.co.in

DOMESTIC NOTICE INVITING TENDER

LAST DATE OF SALE : 09.06.2008
DATE OF OPENING (Tech. Bids) : 09.06.2008

NIT NO. / NAME OF WORK
TENDER NO. BHEL:NR(SCT):SGR 6:ECI:518 **Sealed tender are invited from the contractors fulfilling qualifying requirements for "Work of erection, testing, commissioning, post commissioning, trial operations and handing over of all Electrical and C&I Equipments for 1X250 MW, Unit- 6, Stage-IV, Suratgarh Thermal Power Station, Suratgarh (Ganganagar, Rajasthan) of Rajasthan Rajya Vidyut Utpadan Nigam Limited."**

NOTES: 1. Purchase Preference will be given to CPSU as per Govt. Guide lines.
2. Please visit our website at www.bhel.com for downloading complete tender document.

DGM / SCP

BHARAT HEAVY ELECTRICALS LIMITED

(A GOVERNMENT OF INDIA UNDERTAKING)
POWER SECTOR (NR): SUB CONTRACTS
PLOT NO.25, SECTOR 16-A, NOIDA
DISTRICT GAUTAM BUDH NAGAR
PIN-201301 (U.P)

IMPORTANT NOTE

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S----------

PROJECT SYNOPSIS

Rajasthan Rajya Vidyut Utpadan Nigam Limited has entrusted BHEL for Design, Engineering, Manufacturing, Supply, Installation, Testing and commissioning of Steam Generator, Turbine Generator packages along with their auxiliaries, Isolated Busduct and Generator Transformer for 1 x 250 MW, Unit # 6, Stage – IV, SSTPS, Suratgarh, Distt.- Sri Ganganagar (Rajasthan).

Nearest railway siding is available at the plant. Suratgarh Railway station is about 30KM away from the project. Nearest highway no. 15 Bikaner- Ganganagar section is about 15 KMs from the project site.

BHARAT HEAVY ELECTRICALS LIMITED
(A GOVERNMENT OF INDIA UNDERTAKING)
HRDI & PSNR COMPLEX, PLOT NO. 25 SECTOR-16A, NOIDA,
DISTT. -GAUTAM BUDH NAGAR –201 301

PROCEDURE FOR SUBMISSION OF SEALED TENDERS:

The tenderers must submit their tenders as required in **two parts** in separate sealed covers **prominently superscribed as Part-I Technical bid and Part-II ,Price bid** also indicating on each of the cover tender specification no., date and time as mentioned in tender notice.

TECHNICAL BID (COVER-I)

Except **Price bid Part-II**, complete set of tender document consisting of General conditions of Contract, "Technical specification & Special terms and condition" (Part-I) issued by BHEL shall be enclosed in **Part I Technical Bid only**. All schedules, data sheets and details called for in the specification shall also be submitted along with technical bid. All details / Data / Schedules including offer letter duly signed and stamped are to be **submitted in duplicate**.

PRICE BID (COVER-II)

Tenderers may please note that price bid is **to be submitted only in original copy** of Tender i.e. Price bid (Part-II) issued by BHEL and no duplicate copy of same is required.

These Two separate covers i.e. cover I & II shall together be enclosed in a **third envelope (Cover-III)** and this sealed cover shall be superscribed with tender specification No., due date, time and submitted to officer inviting tender as indicated in tender notice on or before due date as indicated.

SPECIAL CONDITIONS OF CONTRACT (PART-A)

SECTION-III
PART-A

SPECIAL CONDITIONS OF CONTRACT

INDEX

SECTION-III
PART `A'

SPECIAL CONDITIONS OF CONTRACT

34.0 GENERAL

34.1 The intent of this specification is to provide services for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, 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 services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / price shall deem to be inclusive of all such contingencies.

34.2 The contractor shall carry out the work in accordance with standard practices / codes /instructions /drawings/ documents / specification supplied by BHEL from time to time.

34.3 The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be effected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.

34.4 Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices :

(a) Provision of all types of labour, supervisors, Engineers, watch and ward as required, tools & tackles, calibrated inspection, measuring and test equipment as specified and otherwise required for the work and consumable for erection, testing and commissioning including material handling.
(b) Proper out-turn as per BHEL plan and commitment.

(c) Completion of work as per BHEL Schedule

(d) Good quality and accurate workmanship for proper performances of equipment

(e) Repair, rectification and modification in electrical circuits/wiring involving removal of connections & redoing as per modification.
(f) Preservation / Reconservation of all components during storage / erection till handing over

34.5 BHEL-Power Sector (NR) is ISO 9001-2000, ISO 14001-1996, OHSAS 18001-1999, BS 7799 and SA-8000 certified company. Quality of work, to customer's satisfaction and system requirements is the essence of these certifications. The contractor in all respects will organize his work, systems, environment, process control documentation, tools, plant, inspection, measuring and testing equipments etc. as per instructions of BHEL engineer.

The contractor shall also comply with applicable legislation and regulations with regards to Health, safety and environmental aspects for minimizing risk arising from

occupational health, safety hazards, controlling pollution and wastage and he will be responsible for Health, Safety & Environment management at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC.

34.6 Contractor shall ensure following :

34.6.1 Contractor has to maintain contact with local hospital having ambulance, scanning & other ultra modern medical facilities including ambulance required during emergency.

34.6.2 Contractor has to ensure pre employment medical check for all staff & workers.

34.6.3 Contractor has to ensure that adequate First Aid facilities with trained male nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, the following

a) Male nurse (in shifts)
b) Oxygen set up
c) Breathing apparatus
d) Eye wash facility
e) Stretcher
f) Trauma blanket
g) Medicines.

In addition to above, BHEL (through its other contractor) has arranged ambulance at work site for emergency purpose, which can be utilized by contractor in case of emergency. In case , under unavoidable circumstances , if the ambulance is not available , the contractor will have to arrange for the same as under clause 34.6.1.

34.6.4 **The contractor shall comply with following towards Social Accountability:**

(a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged ,the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
(b) The contractor shall not engage Forced / Bonded Labour and shall abide by abolition of Bonded Labour System(Abolition) Act, 1976.
(c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour(Regulation & Abolition) Act,1970.
(d) The Contractor shall abide by UN convention w.r.t Human Rights and shall be liable for Discrimation/Corporal punishment for failure in meeting with relevant requirements.
(e) The Contractor shall abide the requirement of Contract Labour(Regulation & Abolition) Act,1970 for working hours.
(f) The Contractor shall abide by the statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
(g) The Contractor shall arrange potable drinking water to its employees & workers.

34.6.5 **It may be noted that non-compliance to safety norms will result in penal action as may be decided by BHEL.**

The Contractor shall be fully responsible for accidents caused due to him or his agents or workmen's negligence or carelessness in regard to the observance of the safety requirements and shall be liable to pay compensation for injuries. **It may be noted that non-compliance to HSE requirements will result in penal action. In case of violations of safety requirements, the Contractor shall be liable for a penalty of Rs. 200/- for the first violation and Rs. 500/- for the subsequent violations. For serious lapses, as decided by BHEL Engineer, fines upto Rs. 5000/- at a time can be imposed.**

The amount towards penalties as above will be deducted from running bills of the Contractor. The amount so collected above will be utilized for supporting the safety activities at site. The decision of BHEL on above will be final and binding on the Contractor.

34.6.6 In order to meet the environmental concerns it is expected that the contractor shall plant , protect and maintain at least 100 trees in the vicinity of the project as per the advice of the Engineer . In case no area is earmarked for tree plantation, the contractor may take up any other equivalent environment related project after due approval of the BHEL Engineer.

35.0 CIVIL WORKS, FOUNDATIONS AND GROUTING:-

35.1 Foundation for all equipment shall be provided by Customer. The dimensions and locations of the foundations, pockets, and anchor bolt pitch shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All minor adjustments of foundation level, dressing and chipping of foundation surfaces upto 50mm, enlarging the pockets in foundations etc., increasing the existing floor opening for cable entry, fixing panels and repair of same as may be required for the erection of equipment / plants shall be carried out by the contractor.

35.2 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor is to arrange additional packing plates as per requirements provided it is allowed by BHEL Engineer.

35.3 The contractor shall ensure perfect matching of structure / equipment, packer plates including machining, scraping and blue matching with foundation by dressing the foundation. BHEL at its discretion can accept rough chipping of foundations, embedding packer plates in cement mortar.

35.4 All grouting (supply & application) shall be done by RRVUNL. Entire grouting work of foundation bolt holes of structure/ equipment including complete encasing of equipment bases using port land cement will be carried out by another agency carrying out Civil work for BHEL. Contractor for subject work has to offer neat & clean foundations to the Civil Contractor to ensure perfect grouting.

35.5 All the matching joints which are not to be grouted shall be kept free from the grouting mixture by contractor by applying tape or any other alternative method approved by Engineer.

35.6 Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation / casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc. any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.

36.0 CONSUMABLES

36.1 The contractor shall provide within finally accepted rates, all consumables like, gland packing, all welding electrodes (including alloy steel, Aluminum, stainless steel), Aluminum filler wires , tig wires , all inert / welding gases, soldering material, dye penetrants, 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 , gaskets and shims , wooden, sleepers, steel required for temporary works such as supports, packing hardware items, paints, sealing compound required for completion of work except those which are specifically supplied by manufacturing unit.

Supply of copper tinned lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the quoted rates for cable laying. The quality of material shall be got approved from BHEL engineer prior to their use on job. However if any of above material is supplied with the main supplies shall be provided to contractor free of charge for erection. Contractor shall take care of above while bidding for the work.

36.2 It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.

36.3 It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc. before procurement of welding electrodes / TIG wires. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch No. date of expiry etc. and produce test certificate for each lot / batch with correlation of batch / lot no. With respective test certificate. No electrode will be allowed to be used without valid test certificate.

36.4 BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure display of shelf life on consumable wherever required & records maintained.

36.5 Storage of all consumables including welding electrodes shall be done as per requirement / instruction of the Engineer by the contractor at his cost.

36.6 In case of improper arrangement for procurement of any consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges of BHEL from time to time

(30% at present). Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the contractor.

36.7 All lubricants and chemicals required for testing, pre-commissioning, commissioning, preservation and lubricants for trial runs of the equipment shall be supplied by BHEL /BHEL's client. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. The consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked and returned to stores.

36.8 Transportation of Oil Drums from stores, centrifuging and first filling of Oil, subsequent topping / makeup till the unit is commissioned and handed over to the customer is included in the scope of this contract. The contractor shall have to return all the empty drums to BHEL / BHEL client's store at no extra cost. Any damage / loss of above drums shall be to the contractor's account.

36.9 All charges on account of Octroi, terminal or sales tax and other duties on materials obtained for the works from any source shall be borne by the contractor.

37.0 TOOLS AND PLANTS / IMTE's

37.1 The operation of all BHEL's T&Ps being provided free of hire charges shall be in the scope of the contractor. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation. **(Operator for some cranes if provided by BHEL and issued to contractor for work free of hire charges then one helper, fuel and other consumables shall be provided by the contractor within the finally accepted prices).** All lubricants shall be provided by BHEL free of cost. The contractor will give the requirement well in advance.

The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.

37.2 Besides the T&Ps and IMTEs being made available to contractor free of hire charges by BHEL, all other T&Ps and IMTEs which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor **(As per Annexure-II & III)** at his own cost in working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps and IMTEs , BHEL will be at liberty to arrange the same at the risk and cost of contractor and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.

37.3 All distribution boards, connecting cables / welding cables, wire ropes, hoses etc. including temporary air/water / electrical connections etc. shall have to be arranged by the contractor at his own cost.

37.4 In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.

37.5 The operation of all BHEL's T&P being provided free of hire charges shall be in the scope of the contractor. The contractor shall arrange at his own cost operators, fuel, and other consumables etc. for the operation. All lubricants, hydraulic oil and grease will be provided by BHEL free of cost for which the contractor will give the requirement well in advance.

37.6 The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve contractor of his responsibilities for proper and safe handling of equipment, consistent good performance and regular performance evaluation of operators.

37.7 The day to day and routine maintenance of BHEL's T&Ps should be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. These shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps which shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor BHEL at its own discretion get the servicing / repair of equipment done at the risk and cost of the contractor with BHEL overheads.

37.8 The contractor shall arrange at his cost all spares needed for upkeep of all T&Ps other than cranes supplied by BHEL. For cranes, repair / replacement of filter, batteries, self, dynamo, gaskets, hoses , oil seals and rubber parts shall be the responsibility of the contractor. However, the charges of the replacement of the other damaged/worn out parts of BHEL cranes will be borne by BHEL provided the damage is not due to the negligence of the contractor. However, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be to the account of contractor and shall be recovered from his RA bills.

37.9 All supervision and labour required for maintenance and attending breakdowns shall be arranged by the contractor at his own cost. Specialist supervision shall be arranged by BHEL as assessed by BHEL Engineer.

37.10 Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost. All necessary manpower, tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost.

37.11 Consolidation of ground and arrangement of sleepers / sand bag filling etc. for safe operation/ movement of equipment including cranes / trailers etc. shall be the responsibility of the contractor at his cost.

37.12 In the event of contractor not using and maintaining BHEL T&Ps and IMTEs according to BHEL's instructions, BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.

37.13 Any loss / damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.

37.14 It shall be responsibility of the contractor to take delivery of T&Ps and IMTEs from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store/ place as intimated by BHEL Engineer in project site in good working conditions after use.

37.15 The contractor shall return BHEL T&Ps and IMTEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of work load). If return of T&P and IMTE is delayed by contractor, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return. Hire charges shall also be charged on the T&Ps and IMTEs returned in damaged / unserviced condition to BHEL till its satisfactory repair. T&Ps & IMTEs returned in damaged / unserviced condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.

37.16 Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and IMTEs shall be recovered from the contractor's running bills.

37.17 Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, Manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Identification for such T&Ps will be done as per BHEL Engineer's advice.

37.18 Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection measuring and Test equipment). The IMTEs shall have test/ calibration certificates from authorised / Govt. approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

37.19 Retesting/ re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer with in the contract price. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. Also if any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall i.e.repeat the readings taken by that instrument, failing which BHEL may deploy IMTEs and retake the readings at contractor's cost.

37.20 BHEL shall have lien on all T&Ps, IMTEs & other equipment of the Contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of Contract. No material brought to the site shall be removed from the site by the Contractor and/or his Sub-contractors without the prior written approval of the Engineer.

37.21 The **monthwise T&P deployment plan to be submitted as per format (at Annexure-D to General Conditions of Contract)** is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required T&Ps, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.

37.22 Regular utilisation report of the BHEL T&Ps and IMTEs as per requirement of BHEL shall be furnished by the contractor.

38.0 SUPERVISORY STAFF AND WORKMEN

38.1 The contractor shall deploy all the skilled workmen like mill wright fitters, welders, gas cutter, riggers, sarangs, masons, carpenters, electricians, instrument technician etc., in addition to other skilled, semi-skilled and unskilled workmen required for all the works of handling and transporting from site storage to erection site, erection, testing and commissioning as contemplated under these specification. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary. BHEL reserves the right to decide on the suitability of the workers and other personnel who will be deployed by the contractor. BHEL reserves the right to ask for removal of any employee workman of the contractor at any time, if they find him unsuitable and the contractor shall forthwith remove him.

38.2 The adequate supervisory staff, including qualified Engineers, shall be deployed by the contractor to ensure proper out-turn of work and discipline on the part of the labour put on the job by the contractor and in general see that the works are carried out in a safe and proper manner and in coordination with other labour and staff deployed directly by BHEL or other contractors of BHEL or BHEL's client / other agency.

38.3 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with other personnel / contractor, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

38.4 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that assembly and workmanship conform to the dimensions and tolerances given in the drawings /documents/ instructions given by BHEL Engineer from time to time.

38.5 The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.

38.6 During the course of erection,

- if the progress is found unsatisfactory or
- if the target dates fixed from time to time for every mile stones are to be advanced or
- in the opinion of BHEL, if it is found that the skilled workmen like fitters, Electricians , operators, technicians etc. deployed are not sufficient,

BHEL after giving reasonable opportunity to the contractor, will induct on the work the required workmen in addition to contractor’s workmen to improve the progress and recover from the contractor’s bills any charges incurred for engaging the additional workmen with overheads.

38.7 It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the targets set by BHEL and also during the period of commissioning and testing of unit. The contractor's finally accepted rates / prices shall include all these contingencies.

38.8 If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road kerb, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wire, trees or any other property or to any part of erected components etc., the contractor shall make the same good at his own expense or in default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses (of which BHEL's decision is final) from any money due to the contractor.

38.9 **The monthwise manpower deployment plan to be submitted as per format (at Annexure-C to General Conditions of Contract)** is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required man power, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account. Separate persons shall be identified at site for quality control and safety by the contractor.

39.0 MATERIAL HANDLING AND STORAGE

39.1 All the equipment and material furnished under this contract (except those which are mentioned specifically in the scope of work) shall be received from the project stores, sheds/storage yards (any place within site) and transported to be pre-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 materails are stacked back immediately.

39.2 While BHEL will endeavour to store/ stack/ identify materials properly in their open / close / semi closed / tarpaulins covered storage yard/ shed, it shall be contractors responsibility to assist BHEL in identifying materials well in time for erection, taking delivery of the same, following the procedure indicated by BHEL and transport the material safely to pre-assembly yard/ erection site in time, according to programme.

39.3 The contractor shall take delivery of components, equipment / consumables from storage area after getting the approval of BHEL Engineer on standard indent forms.

39.4 The contractor shall identify and deploy necessary Engineers/ supervisors / workmen for the above work in sufficient number as may be needed by BHEL, for areas covering their scope.

39.5 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. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

39.6 Contractor shall ensure that while lifting slings shall be put over the points indicated on the equipment or as indicated in the manufacturer's drawings. Slings/ shackles of proper size shall be used for all lifting and rigging purposes. All care shall be taken to safe guard the equipment against any damage. In no case piping should be dragged. In case of any damage, the cost shall be covered from the contractor.

39.7 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.

39.8 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, the contractor shall be solely responsible for any shortages or damages in transit , handling, storage and erection of the equipment once received by him. As the erection work will be spread in different areas / locations of the project, contractor has to arrange sufficient no. of watch/ward personal to avoid any pilferage of material. 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.

39.9 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.

39.10 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.

39.11 All electrical panels, control gear, motors and such other devices shall be properly dried by heating before they are installed and energised. 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. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.

39.12 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 moved to the area earmarked for the contractor at the contractors risk and cost.

39.13 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.

39.14 The contractor shall be responsible for making suitable indoor storage facilities to store all equipment (drawn by the contractor from BHEL / customer stores) which require indoor storage till the time of their installation. The Engineer will direct the contractor in this regard, which item in his opinion will require indoor storage and the contractor shall comply with Engineer's decision

39.15 **The contractor shall ensure that all surplus / damaged / scrap / unused material, packing wood / containers/ special transporting frames etc. are returned to BHEL at a place in project area identified by the Engineer.** An account will be maintained by the

contractor for all such items received and returned to BHEL and duly reconciled before closing of the contract.

39.16 The Contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the concerned BHEL / Customer or at aplace in project area as directed by BHEL Engineer.

40.0 PRESERVATION OF COMPONENTS

40.1 After taking delivery from BHEL / customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.

a) Items stored outdoors shall be stored in such a way that item is at least six inches (6") above the ground

b) Motors, valves, electrical equipment, control equipment and instruments etc. shall be stored indoors in warehouse provided by contractor. Motor windings shall be kept dry by use of external heat or space heaters.

c) Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.

40.2 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 paints (Primer), thinners, labour, scaffolding materials, cleaning materials like wire brush, emery sheets, etc., cleaning of surface and provide one coat of preservatives / paints (primer) from time to time as decided by BHEL engineer. The accepted rate shall include this work also. It is to be noted that such painting may have to be done as and when required till such time the final painting is carried out.

40.3 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts then and there for their protection.

40.4 Any failure on the part of contractor to carry out works according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.

41.0 WELDING and NDT

41.1 The method of welding (**ARC, Gas, TIG, MIG** or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

41.2 All welders including tack welder, structural and busduct welder shall be tested and approved by BHEL Engineer / Customer before they are actually engaged on work. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. All charges for testing of contractor's welders including destructive and non

destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. The test coupons raw material will be supplied by BHEL free of cost

41.3 Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection of joints welded by a particular welder which, in the opinion of the Engineer will adversely affect the quality of the welding though the welder has earlier passed the tests prescribed by Engineer. The welder's having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.

41.4 Faulty welds shall be cut and re-welded at the contractors expenses. The procedure for the repair of defective welds shall be approved by the Engineer prior to any repair being made. Records of such repairs and defects shall be maintained by the contractor as per BHEL Engineer's advice

41.5 All charges for testing of contractor's welders including destructive and non destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only.

41.6 Only BHEL approved make electrodes will be used. All electrodes shall be baked and dried in the electric electrode baking oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. Electrodes from holding oven shall be transferred to portable ovens. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate will have co-relation with the lot No. / batch No given on electrode packets. No electrodes will be allowed to be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards will be submitted to BHEL before putting the oven in use. Periodical calibration for the same shall also be arranged by the contractor within the finally accepted rates.

41.7 The regulators used on welding machines shall be calibrated before putting these into use for work. Periodic calibration for the same shall also be arranged by the Contractor at his cost.

41.8 All welds shall be painted with anticorrosive red oxide paint. Necessary consumables and scaffolding etc. Including paints shall be provided by contractor at his own cost. Daily welding reports in the proforma suggested by BHEL should be submitted without fail.

41.9 Non-destructive testing are part of erection work and shall be carried out by the contractor in accordance with the quality plan and as per instruction of Engineer. Decision of Engineer shall be final and binding on the contractor.

42.0 PROGRESS REPORTING

42.1 Contractor is required to draw mutually agreed monthly erection programmes in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed programme and shall also timely arrange additional resources considered necessary at no extra cost to BHEL

42.2 Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled programme shall be discussed for actions to be taken for achieving

targets. The programme for subsequent week shall also be presented by contractor for discussions. The contractor shall constantly update/revise his work programme to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.

42.3 The contractor shall submit daily, weekly and monthly progress reports, manpower reports , materials reports, consumables (gases / electrodes) report and other reports as per proforma considered necessary by the Engineer.

42.4 The progress report shall indicate the progress achieved against planned, with reasons indicating delays, if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original programme and the slippages do not accumulate and effect the overall programme.

42.5 The daily manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

43.0 DRAWING AND DOCUMENTS

43.1 The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.

43.2 Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.

43.3 The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and returning to BHEL.

43.4 The data furnished in various annexures enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work.

43.5 Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.

43.6 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL.

44.0 TAXES & DUTIES

44.1 **TDS under Income Tax, Sales Tax, Vat etc,** if any, shall be deducted at prevailing rates on gross invoice value from the running bills unless Exemption Certificate from appropriate Authority / Authorities is furnished.

44.2 **Price quoted shall be inclusive of all taxes except service tax.** The service tax, as legally leviable & payable by the contractor under the provisions of applicable law/act, shall be paid by BHEL as per contractor's bill. However, contractor shall have to submit proof of service tax deposited by them immediately after the deposit but not later than the next bill submitted after the due date of deposit. The contractor shall furnish proof of Service Tax registration with Central Excise Division covering the services covered under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project The contractor shall obtain prior approval of BHEL before billing the service tax amount.

With introduction of Cenvat credit rules 2004 which came into force w.e.f. 10.09.2004, excise duty paid on input goods including capital goods used for providing the output service and service tax paid on input service can be taken credit of against the service tax payable on output service. **As such, while offering the rates, the contractors may take into account the benefit of above provisions as the cost of input to contractors will be the cost net of excise duty and service tax and adjust their offer price accordingly to make it more competitive.**

44.3 In VAT applicable States, "Tax Invoice" if required under the relevant State VAT law shall be submitted along with other compliances as per concerned VAT Act.

44.4 Contractor shall get his organization registered with concerned sales tax/VAT authorities within 15 days of award of this contract, if applicable. The delay on this account and delay in bringing the material shall be to contractor's account and no extension of time shall be allowed on this account. The sales tax/VAT registration for this contractor shall be forwarded to BHEL within 30 days from the date of LOI. In case the contractor is already registered for sales tax/VAT with Govt. Authorities he must quote his registration no, while submitting their tender.

44.5 Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing their materials, plants, and equipment at site for the execution of the work under this contract.

45.0 EXTRA WORK:

45.1 BHEL may consider for payment of extra works on manhour basis @ Rs.30/- (Rupees thirty 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.

45.2 The rates indicated as above, shall include over time, if any, consumables, supervision, use of tools and tackles and other site expenses and incidentals.

45.3 The extra works, if any, shall be carried out by a separate gang or beyond working hours which can be identified for certification of man hours. Log book should be maintained and should be signed jointly by the contractor's representative and the BHEL Engineer on day to day basis. However, signing of the log book does not necessarily mean acceptance of the extra works which would be identified by Engineer whether work is covered in one of the above categories. Only those works and man hours which are certified by the BHEL Engineer-in-charge will be considered for payment. The decision of BHEL in this regard shall be final and binding on the contractor.

46.0 PRICE VARIATION

46.1 The finally accepted rates for scope of work as defined in this tender are subjected to price variation provisions as per following formula:

$$P1 = \frac{0.75 \times P0\ (F1 - F0)}{F0}$$

P_1 = Increase/Decrease in billing amount (variation) for the particular month of billing.

P_0 = Billing amount calculated as per contract provisions.

F1 = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 2001 =100) applicable for the month under consideration i.e. for which bill has been raised.

F0 = All India CPI published by Labour bureau, Simla, Govt. of India, for Industrial workers (Base 2001 =100) applicable for the month of opening of technical bid

46.2 The contractor will be required to raise the bills for price variation payments on a monthly basis irrespective of the facts whether any increase or decrease in CPI. Price variation as per above formula will be calculated and paid/deducted on the total contract value (excluding payments towards extra works and over run, if any) on month-to-month basis from the date of award. BHEL however reserves the right to freeze variation for that much of duration of delays, from time to time, which are entirely attributable to the contractor. **Average of applicable price indices paid shall be taken as index for PVC for final 4% amount.**

46.3 With the provision of price variation as above NO CLAIM / COMPENSATION on account of any increase whatsoever, (irrespective of whether variation are steep / unanticipated or not compensated by the above variation provisions in full towards minimum wages, consumables, electrodes, gases or any other item / reason) will be payable during the entire period of execution including extended period, if any.

47.0 RATE SCHEDULE

47.1 Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under these specifications shall be covered within the quoted rates / price.

47.2 **The tenderer shall quote the rates / Price as per the rate schedule only, in Part-II price bid (Original). Conditional price bids or price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.**

47.3 Contractor's total quoted price as per rate schedule will be taken as tentative only. The contractor undertakes to erect / commission actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments will also be regulated for the same. The quantities indicated against each item may vary to any extent and no compensation will be payable in variation of Individual quantity. **However, in case of over all variation in Contract value (w.r.t the awarded value indicted in the LOI), beyond (minus) 30%, the contractor will be eligible for compensation as per the following provision:**

"The total executed value shall be raised by 10 % subject to the condition that the total value of work executed plus increase as above shall be limited to 70 % of the awarded contract value"

Contractors are requested to take above into account while quoting. The contractor confirms that unit rates quoted above takes care of such variation during execution stage.

48.0 INSTRUCTIONS TO TENDERER

48.1 Offers received without data / information required to be submitted under tender clauses-11.1 to 11.7 are liable to be rejected. All these data / information should be duly supported by documentary evidences (Refer note below clause-11)

48.2 No deviations to the tender conditions will normally be accepted.

48.3 The tenderers are advised to actually visit the site and fully acquaint themselves with site conditions, location of stores, transportation routes, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non-familirisation of site conditions. Once the tenderer has quoted for the work, it is implied that he has ascertained various site condition and NO CLAIM whatsoever will be entertained by BHEL on any such account.

48.4 The contractor in the event of this work awarded to him, shall establish a site office at site and keep posted an authorised responsible officer who should hold a valid power of attorney for the purpose of the contract. Any order or instruction of the Engineer or his duly authorised representative shall be communicated to the contractor's representative at site office and the same will be deemed to have been communicated to the contractor at his legal address.

48.5 Offers of Tenderers with unsatisfactory past performance in any of the BHEL's Power Sector Regions will be rejected.

49.0 LIQUIDATED DAMAGES (LD)

49.1 For delay in completion of work attributable to the contractor, the LD shall be applicable at the rate of ½% of the contract value per week of delay or part thereof limited to a ceiling of 10% of the contract value as mentioned under clause no.25.5 of the GCC of the tender.

50.0 SECURITY DEPOSIT

50.1 The contractor shall submit Security Deposit within 15 days from the date of issue of LOI as per clause no. 16.2 of the General Conditions of Contract (GCC). In case the contractor opts to furnish Bank Guarantee as a part of Security Deposit, the BG shall be issued as per the Performa enclosed as per Annexure-H of the GCC and also that the BG should be issued preferably through any of the Member Banks listed on Page No. 34(a) of the GCC;

For BG through any other Nationalized Bank (Not covered in the list of Member Banks of GCC), the discretion of its acceptance shall lie solely with BHEL.

51.0 OTHERS

51.1 In case of any contradiction between General Conditions of Contract(GCC) and Special Conditions of Contract (SCC), the latter shall prevail.

51.2 The tenderer shall specifically confirm he has inspected the site of work and is fully conversant with the prevailing conditions under which work is to be executed and will not raise claim of any nature due to lack of knowledge of site condition. He will also confirm that local taxation laws at the site have been clearly understood by him.

51.3 The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of pre-qualification evaluation / Techno-commercial bids and acceptance of customer. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

SPECIAL CONDITIONS OF CONTRACT

PART-B

I N D E X

SECTION-III

SPECIAL CONDITIONS OF CONTRACT

PART-B

52 SCOPE OF WORK

52.1 BHEL has been awarded the work of Design, Manufacture, supply, installation, erection, testing & commissioning of 1x250 MW, UNIT # 6 at Suratgarh Thermal Power Station of Rajasthan Rajya Vidyut Utpadan Nigam Limited at Suratgarh, Ganganagar, Rajasthan, on main plant equipment basis. Scope of these specifications cover complete work of handling, transportation of materials from Project storage yard / stores to erection site / place of erection, storage at erection site, preservation, watch and ward, dressing, chipping and leveling of foundations, cleaning, checking, testing, pre-assembly, erection, calibration, alignment, grouting, welding, NDT wherever required, preservative/ touch-up painting including supply of paints etc, earthing of equipment, including other activities required for erection, testing, commissioning, post commissioning, trial operations & handing over of ELECTRICAL, CONTROL & INSTRUMENTATION equipments and items indicated in the rate schedule covered within the scope of these specifications for 1x250 MW , UNIT # 6 at Suratgarh Thermal Power Station of Rajasthan Rajya Vidyut Utpadan Nigam Limited at Suratgarh, Ganganagar, State of Rajasthan.

52.2 The scope of work shall also include the following within the quoted item rates:

(i) Re-rolling of cables on drums as required by site engineer.

(ii) Providing missing hardware/ substitute hard wares and clamps.

(iii) Grouting by port land cement including material and arrangement is to be made by the contractor.

(iv) 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.

(v) Obtaining provisional and final approvals from Electricity Authorities.

52.3 The scope of work also covers all performance tests necessary to ensure that workmanship confirms to relevant standards and that such tests are adequate to demonstrate that the installations complies with the requirements of this specification. All arrangements for conducting tests are to be made by contractor within their quoted rates and tests may have to be repeated to satisfy BHEL / RRVUNL.

52.4 Contractor shall erect, test, commission all the equipment, cabinets, panels, instruments etc. as per sequence prescribed by BHEL Engineer at site. The sequence of 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 erection / commissioning adopted in erection / commissioning of similar jobs elsewhere or for any reasons whatsoever.

52.5 The customer RRVUNL may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the Engineer. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way if pointed out by the Engineer, without any cost implication to BHEL.

52.6 Contractor shall plan and transport equipment / components from storage yard sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Contractor shall plan activities considering plying of his vehicles on ring road also. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL at contractor's risk and cost.

52.7 Contractor to ensure services of ONE qualified and experienced Diploma / degree Electrical Engineer having experience in respective field and qualified and FOUR experienced Diploma / degree Instrumentation Engineer having experience in respective field, entirely for the commissioning activities from second month of mobilisation till contract completion. This shall be indicated separately in manpower deployment plan to be submitted by contractor. These Engineers shall be reporting directly for the execution of main work to the BHEL Engineer at work site.

All Supervisors/ Engineers shall be equipped individually with all independent groups comprising of workforce like electrician, technicians and helpers etc. and required T & P and IMTE's for effective work outputs.

52.8 The contractor under this contract shall also provide free of cost services of skilled persons for a total period of **32** Man-months exclusively for use by BHEL. This manpower will be required for following services

- Qualified computer operators (minimum 'O' level qualified) capable of operating the material management software package / other packages available at site or for office work for total **8** man months,
- Skilled workers for working in store, colony and for maintenance of office for a total **16** man months and
- Unskilled workers for working in store, colony & office for a total **8** man months.

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.

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 of the prevailing minimum wages at SURATGARH for the categories given plus 10% will be made from the final bill of the contractor.

52.9 The scope of work will also include providing free of cost services of experienced and **qualified Engineers** by contractor for direct supervision of various works of power plant preferably works other than the scope covered under this tender. The qualification and experience of the engineers shall be acceptable to the Construction Manager BHEL Suratgarh site. These qualified Engineers shall be provided for **twelve (12) man-months** as per site conditions. The Engineers shall possess a minimum qualification of a mechanical / electrical engineering degree and working experience in power plants. They shall be deployed in all areas covered under various specifications as well as other related areas as may be deemed essential based upon work requirements, though not specified. They shall be guided by BHEL Engineers to ensure smooth work progress as and when /where required /deployed. No separate payment shall be paid for providing the services as per this clause. The contractor shall provide these free of cost services within the quoted rates as per Rate Schedule.

In case contractor fails to provide above-mentioned engineers 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. In case BHEL is not able to utilize the man months as per provision, a lump sum of Rs.10,000/- (rupees ten thousand only) per man month for the un-utilized man months will be recovered from the bills of the contractor.

52.10 The brief *description of major equipment/ items to be erected tested and commissioning under the scope of subject work is as described below*. However change in design/specification may occur as is usual in any such large work for which no compensation will be payable. Contractor shall complete the entire work as detailed in tender specification including dry out / centrifuging of transformers within the contractual rates. In case during testing, commissioning, post commissioning, trial operation the IR valves of electrical equipment is found low, the contractor shall make arrangements and dry out the equipment within the quoted rates. Removing & reconnection of equipment will be the part of scope at no extra cost to BHEL. The work is further detailed as below:

ELECTRICAL, CONTROLS & INSTRUMENTATION

A) Generator Transformer- 235 / 16.5 KV, 315 MVA, OFAF Generator Transformer, approx. Weights and dimensions-

Overall dimensions : 17000 x 9400 x 7500 mm
Overall weight : 297 MT
Shipping weight : 200 MT (N2 filled)
Oil Quantity : 66000 Liter

B) Generator Isolated Bus Ducts Isolated Phase Bus ducts (IPB) for STG with associated accessories like support structures, CTs, PTs, LAVT, SA, NGR/ NGT, etc. Approximate route_
Length of main IPB (1070 dia, 8TK enclosure, 16TK x 530 dia Cond) = 170 mtr approx.
Length of tap-off IPB (780 dia, 6.35TK enclosure, 152 x 152 box cond) = 80 mtr approx.

IP busduct details per unit (1x250 MW, Unit 6) are as : 3nos. 16.5KV, 12500A, Al Conductor, Al Alloy Enclosure Bus ducts. The Bus duct connects Gen Transformer to the Generator and has Tap Off for 2 nos UAT, LAVT and NG Cubicle. In the Neutral Side, the Star Formation is made to form the star point and the Generator is earthed thru the NG Transformer. The approximate total route length of the Main Run & UAT / LAVT Tap Off is 250 m approx.. The conductor section in the Main Run is Circular shape 465 mm dia duct, 15 mm thick. The duct diameters for Main is 1000mm, 8mm thk. The appx weights of the supporting structure are 10 MT (estimated).

In addition, there is 1 set of 3 nos LAVT per set having dimensions 3300 mm x 2250 mm x 2650mm (estimated) and having weight of 3 MT each approx. 1 no. NG Cubicle consisting of 1 no. NGT and 1 no. NGR and having a total weight of 1.8 MT is envisaged.

Hot air blowing Unit having a total weight of 1.0 MT is envisaged. Seal Off Bushing and Rubber bellows are also provided in the bus duct.

C) Control & Protection Relay Panels –AVR Panels

D) Cabinets and Misc. Electrical Equipment (JBs, Welding Sockets, Local PBs etc.)

E) Cabling:- The Cabling system consists of Cable Tray installation, Cable laying and Cable termination as per BOQs.

F) PANELS – Max Control / Distribution / Starter Panels Etc

G) Control, Monitoring & information system based on BHEL make max DNA system for:

a) Steam Generator Controls comprising of:
Electronic System Cabinets catering to:
FSSS & Soot blowers

b) Steam Turbine Controls comprising of
Electronic System Cabinets catering to

- Electro-Hydraulic Turbine Controls (EHTC)
- Automatic Turbine Run-up System(ATRS)
- Gland Steam Pressure Controls (GSPC)
- Turbine Stress Evaluator (TSE)
- Automatic Turbine Tester(ATT)
- Turbine Protection (TP)
- HP/LP bypass (HP/LP BP)

H) Man Machine Interface & Data Acquisition System comprising of:

- Operator Workstations (max Station)
- Engineering station (common for SG/TG)
- Computers / PLC based Equipments
- Laser printers
- Ethernet Switches

I) Erection of miscellaneous Material for TG/SG C&I Controls

- Junction boxes
- CJBs
- Cable Trays (short length)
- Clamps
- Mounting Frames
- Power cylinders
- Rigid Pipe / Conduits
- Pneumatic Tubes (Copper/ SS Tubing)
- Impulse line(CS/SS)

J) Instruments (Transmitters / Gauges / Switches / Temperature Sensing Elements Like RTD's & Thermocouples

K) Detectors /Vibration, Speed & Other Turbovisory Pick Ups

L) Sample Handling System / Analyzer System

M) Control Valves Calibration

N) Electronic Water Level Indicator System

O) DC System / BATTERY CHARGERS / DC BATTERY / UPS system

- o Erection of Panels after foundations checking / fabrication of base frames or stools (wherever applicable) and carrying out minor modification wherever required; Joining of panels, inter-panel wiring, busbar & earthbar connections, mounting of loose supplied items,

- o Erection of Isolator Fuse Boxes ; Testing of complete board & including testing / calibration of all instruments and schemes; Dummy load test of Chargers including arranging of dummy load and temporary power supply etc.

P) Functional Electrical Site Testing of LT/ HT Motors

52.10 **Contractor shall erect, test, commission all the equipment, cabinets, panels, instruments etc. as per sequence prescribed by BHEL Engineer at site.** The

sequence of 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 erection / commissioning adopted in erection / commissioning of similar jobs elsewhere or for any reasons whatsoever.

52.11 The customer NLC may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the Engineer. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way if pointed out by the Engineer, without any cost implication to BHEL.

52.12 Contractor shall plan and transport equipment / components from storage yard sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Contractor shall plan activities considering plying of his vehicles on ring road also. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL at contractor's risk and cost.

53 ERECTION

53.1 All works such as cleaning, checking, leveling, aligning, assembling, temporary erection for alignment, dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, straightening, blue matching, chamfering, filing, chipping, drilling, machining, surface grinding, shaping, fitting up etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily and shall be carried out by the contractor as part of the work.

53.2 Any fixtures, scaffolding materials, concrete block supports, steel structures required for temporary supporting, for pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.

53.3 The following provisions cover the technical requirements for some of equipment installation. The brief idea about the work involved is indicated below however the work is to be carried out in accordance with the recommendations of the equipment manufacturer drawings, documents furnished to the contractor by BHEL or as directed by BHEL Engineer.

53.4 Any cutting of masonry work, which is necessary shall be done by the contractor at his own cost and shall be made good to match the original work. The Contractor shall obtain prior approval before cutting any masonry / concrete work.

53.5 Conduits shall be thoroughly cleaned before pulling in the cable.

53.6 Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends upto 80 mm Nb will have to be fabricated at site.

53.7 In case of Transformers if any leakage / sweating is observed from field assembled / shop assembled gasket joints, valves, welded joints the same shall be attended by the contractor including draining of oil, refilling of oil & centrifuging if required at no extra cost to BHEL till handing over period. Sealing compound and any other consumable, if needed, shall be arranged by the contractor with in the quoted rates.

53.8 Calibration log-sheets / history cards of all the instruments, panels, drives, relay testing etc. under the scope shall be recorded and submitted on BHEL approved formats. Proper logging will form a part of calibration / erection activity for the purpose of monthly running bills payments.

53.9 The contractor shall use only SHEARING machine or HACKSAW for cutting angles, flats, channels and trays. No gas cutting is permitted. Drill machine shall be used for drilling holes.

53.10 The contractor should note that after execution of work they will hand over marked up drawings "as erected" drawings to BHEL Engineer at site for preparation of firm "as built" drawings. "As erected" drawings will bear the signature of BHEL Engineer and contractor.

53.11 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 the contractor. Contractor at his cost shall also arrange the adhesive etc.

53.12 Contractor shall fabricate and erect stands / supports for Junction boxes, push button stations, fixing of push button and plugging of holes in JB's. This is considered inclusive in the item erection.

53.13 DRIP SHIELDS shall be fabricated for all field mounted panels / instruments / instrument racks / JB Racks / control cabinets etc. The hardware / material shall be supplied by BHEL. The fabrication forms part of erection work.

53.14 The Motors, power cylinders, control valve actuators, motorised valves actuators and solenoid valves will be erected by other agency. However their electrical and C&I commissioning is to be carried out by the agency within the subject scope of work. The staff earmarked for commissioning will carry out the work in association and guidance of BHEL Engineer as a part of system commissioning for which no extra cost will be paid by BHEL.

53.15 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 this 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.

53.16 Contractor shall fabricate and erect stands / supports for Junction boxes, push button stations, fixing of push button and plugging of holes in JB's. This is considered inclusive in the item erection.

53.17 For calibration of pneumatic valves / controllers / power cylinders etc., the contractor shall attend to minor leakages from the tubing etc., and prepare exact cam-profiles as part of the work, if required

53.18 **ELECTRICALS, CONTROLS & INSTRUMENATATION**

(A) GENERATOR TRANSFORMER

Scope of work includes checking and preparation foundation (Foundation checking and carrying out minor modifications wherever required), erection of accessories and auxiliaries, carrying out minor modification wherever required; Preparation of oil and oil filing under vacuum, dry out of transformer, testing of transformer, oil and other auxiliaries, laying of cable trays upto marshalling box, cabling upto marshalling box and termination for auxiliaries, earthing of accessories to earth conductor / riser, testing of all auxiliaries, pre-commissioning and back charging of transformers.

(B) ISOLATED PHASE BUSDUCT

Foundation checking and carrying out minor modifications wherever required, erection of Structure , Busduct , LAVT , NG Cubicle etc , alignment of total busduct and readiness for welding , Welding of Bus , Ducts and shunts , by MIG /TIG and NDT and X-ray tests . Fixing of Rubber Bellows, SOBs, Wall Frame assembly, Flexible and Rigid Bus Connections, CTs , VTs , NGT and NGR . Erection of earth Conductors, Air Pressurization equipment and carrying out Water and Air Tightness Tests**.** Cabling of CTs upto Marshalling Box after MB erection , testing of CTs and wiring and other tests , Hipot of Main Busduct.

Painting of IPB as approved by BHEL Engineer is in the scope of contractor including all consumable

(C) DC SYSTEM

DC battery *chargers and UPS-*

Erection of charger and UPS Panels , fabrication of base frames or stools (wherever applicable) and carrying out minor modification wherever required; Joining of panels, inter-panel wiring, busbar & earthbar connections, mounting of loose supplied items,. Erection of Isolator Fuse Boxes; Testing of complete board & including testing / calibration of all instruments and schemes; Dummy load test of Chargers including arranging of dummy load and temporary power supply etc.

DC Battery—

Erection of batteries after assembly of battery stands, inter-connection of batteries and first charging; Capacity testing using dummy load and subsequent recharging (in case of failure of capacity test, the charging Discharging cycle is to be repeated) Dummy load test of chargers includes arrangement of dummy load and temporary connection in absence of regular power supply.

(D) CABLING _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 Engineers instruction , erection and fixing of cable trays and racks by welding or by bolts and nuts. Weight per unit metre of trays

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. The cutting & welding points on trays will be painted by primer & Al paint by the contractor including supply of paint within the erection price and no extra cost to BHEL Materials for support fabrication like flats, channels, angles etc. shall be supplied by BHEL free of cost. All support structure erected is to be painted by 2 coats of primer and 1 coat of synthetic enamel paint to obtain a proper finish within quoted price .

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.

Ladder, prefabricated, slotted or duct type cable trays shall be supplied. Cable tray erection work as per BOQ Cum Rate Schedule shall include fabrication of supports to suit site requirement, fixing of support in position by welding as per requirements / engineers instruction. Fixing of cable trays and racks shall be by welding or with the fasteners. No separate payment will be released for fabrication / fixing / painting of support structure for cable trays (Including supply of paint).

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 & Aluminium paint by the contractor including supply of paint within the erection 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 temperature Thermocouples.

In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and lying of cables 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 are to be used.

(E) 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 all cables laid by the contractor and in all cable trays erected by the 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 be removing and re-fixing. 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.

Nylon / PVC ties & Aluminum strip required to be provided for cable tags within a span of 5 mtrs / as per documents and specifications shall have to be provided by the Contractor.

(F) 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 and cable lugs shall be issued by BHEL as free issue item which ever are supplied by BHEL. 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.

Supply of copper tinned lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the quoted rates for cable laying. The quality of material shall be got approved from BHEL engineer prior to their use on job. However if any of above material is supplied with the main supplies shall be provided to contractor free of charge for erection. Contractor shall take care of above while bidding for the work.

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.

(G) PANELS – Max Control / Distribution / Starter Panels, LT MCCs, AVR, CONTROL PANELS, etc.)

Erection at site / control room including chipping of floor, fabrication and fixing of base channel frame, levelling & alignment with spirit level, welding the base channel to the embedded plates / channels, grouting , fixing of anti-vibration pads, termination of inter panel connections, mounting / connections of loose instruments, inter panel bus bar connections, commissioning including loop checking, system checking, and putting necessary controls on automatics. Tenderer may note that fabrication / fixing / painting of base channel (including supply of paints) / suitable steel stool, if required, is included under the scope of this work. Contractor will be paid for fabrication / erection as per applicable rates for structural steel fabrication / erection. Checking of internal wiring, rectification, testing and calibration of equipment mounted inside is in the scope of contractor. The contractor may have to change / replace items found faulty without any extra cost, however materials for this shall be provided by BHEL. Mostly panels will be delivered fully wired. However wherever required termination of loose wires, bus wires is to be done. Canopy for panels will be supplied loose & shall be installed by the contractor after erection of panels. 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. 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 . 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.

(H) INSTRUMENTS (TRANSMITTERS / GAUGES / SWITCHES / 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.

Some instruments may need repeated calibration / replacement. The same will be carried out by the contractor at no extra cost to BHEL 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. The contractor, as directed by BHEL Engineer, will provide tags on all the instruments at no extra cost to BHEL. Tenderer may note that fabrication / fixing / painting of stands (including supply of paints) including fabrication / erection of Instrument canopy (wherever required) for instruments will be included in quoted / accepted price of respective instrument. No separate payment will be released for erection of gauge board as this will be included in item rates of instruments mounted on the gauge board. Contractor will be paid extra for fabrication / erection of stand only for the weight in excess of 25 kg per instrument and this extra weight will be paid as per applicable rates for structural steel fabrication / erection.

(I) DETECTORS / VIBRATION, SPEED & OTHER TURBOVISORY PICK UPS:

Blue matching with the assembly fixtures / main equipment surface, trial fixing, fixing by drilling / tapping, final doweling. Moreover some detectors may have piggy-backs signal detectors mounted on them as such these forms part of detectors assembly. The integral cables of the above shall be routed & dressed properly up to their JB / Proximitors. Erection of proximitors, proximitor housings/JB required for respective pick up and calibration / commissioning of pick ups will be included in quoted / accepted item rate of respective pickup.

(J) 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.

(K) IMPULSE LINE (AS / CS / SS)

Fabrication and erection of channel / angle / slotted angle supports, cleaning impulse pipe with wire brush and compressed air, edge preparation, cold bending, laying to the required slopes, clamping, welding of isolation / drain valves and fittings by butt / socket welding / swoze lock joints. Servicing of valves, connecting with the process end and to the instruments, NDT, Hydraulic testing the impulse lines, and painting the lines as per requirement of BHEL engineer. The impulse line may have to be cleaned chemically for removing grease / rusting. Proper tagging of valves and impulse lines 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 Impulse / draft pipe lines due to site requirement in general

(L) COMPUTERS / PLC BASED EQUIPMENTS

All computer related items / equipment like diagonastic 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.

(M) ELECTRONIC WATER LEVEL INDICATOR SYSTEM

EWLI incudes fixing of electrodes, local and remote indicator panel / display units and interconnection of these by cables. Only cost of laying cables for interconnection of EWLI system shall be measured and paid separately. Erection of all other equipments / panels/ display units forming EWLI system shall be included in the quoted rate per system.

(N) CALIBRATION OF CONTROL VALVES

The work also includes minor rectification / alterations in tubing, servicing of accessories, setting of limit switches, calibration of Actuators and position feedback transmitters.

(O) SAMPLE HANDLING SYSTEM / ANALYZER SYSTEM

Includes installation of main analyzer panel, analyzer, probes, sensors and other accessories like sample gas cylinders, mechanical / electrical interconnections (including SS Tubing & Electrical heat Tracing, wherever required) between various components, energizing, testing & commissioning

(P) POWER CYLINDER ERECTION

Platforms on which Power Cylinders are to be mounted are usually provided by the Civil Contractor / other agency. However minor structure work required shall form a part of the work within the quoted rate of the respective cylinder . Fabrication / erection of stands for mounting of the cylinders The work also includes minor rectifications/ alteration the tubing , servicing of accessories , setting of limit switches , calibration of actuators and feedback position transmitters .

(Q) CALIBRATION OF CONTROL VALVES

The work also includes minor rectification / alterations in tubing, servicing of accessories, setting of limit switches, calibration of Actuators and position feedback transmitters.

(R) 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 and LPBs will be included in quoted / accepted price of respective equipment.

Scope also includes fabrication / fixing / painting of stands for junction boxes / push buttons / frame mounted panels etc will be included in quoted / accepted price of respective item. Tenderer may note that fabrication / fixing / painting of stands for junction boxes / local push buttons / indication boxes etc. will be included in quoted / accepted price of respective item. No separate payment will be released for fabrication / erection of these stands.

(S) RIGID PIPE/CONDUITS

Cutting / threading of standard lengths of conduits, laying on fabricated supports or on floor, using screwed fittings, clamping, sealing of open ends. Approved Good quality sealant shall be used to make the joint water proof.

(T) PLICA FLEXIBLE CONDUIT

Laying of conduits in cable trays, end connection with instrument / J.B. / panel, using suitable connectors / unions etc. (which shall be supplied by BHEL). Suitable thread / Plica sealant shall be used to make the conduit system water proof. Aluminum painting, clamping and tagging in tray / angle forms part of erection job

(U) EARTHING

Earthing work mainly involves laying and tack welding of conductors on columns / beams at every one meter interval and bolted connections with equipment at least at two points. Low hydrogen content electrodes shall be used for welding. All the galvanized items shall be given surface treatment (by thoroughly cleaning with sand paper and / or cotton cloth to make the surface clean, smooth & free from any type of spots) at the welded joints & the places where galvanizing has been damaged. Welded joints shall be applied with two coats of cold zinc paint whereas portions with damaged galvanizing shall be applied with single coat.

54 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST- COMMISSIONING.

54.1 Site testing shall be required for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations.

54.2 Commissioning protocols are to be prepared as advised by BHEL Engineer for getting approved by customer / Consultant.

54.3 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:

I. TRANSFORMERS

(a) Insulation resistance and earth resistance checks.
(b) Oil cetrifuging

(c) Checking and calibration of WTI, OTI test etc.
(d) Functional testing of transformer protection
(e) Winding resistance, vector group, turns ratio test on different taps, magnetizing current, core balance check etc.
(f) Turns ratio, polarity, insulation resistance and winding resistance checks on all CT's.
(g) Misc. tests as suggested by BHEL.

II. BUSDUCTS

- Insulation and earth resistance checks. Cleaning of Bus duct.
- High voltage test on Bus bars after drawing out VTs and disconnecting lightning arresters surge capacitors and other connected equipment e.g. generator, generator transformer etc.
- Torque testing of Bolted Connections
- Measurement of contact resistance of joints, bus bar loop resistance etc.
- Testing of CTs, VTs, NGT including primary and secondary injection tests.
- Making all arrangements for testing of the Generator, Gen Trf and UAT
- Testing pre-commissioning & trial run of Air Pressurization Equipment.

III. BATTERY, BATTERY CHARGER, UPS

- Checking of battery charger panel.
- Calibration of all indicating and measuring instruments.
- Dummy load test of battery charger.
- Charging of battery and recharging after carrying out battery discharge test/ capability test of battery using dummy load.
- In the absence of regular power supply to battery chargers arrangements are to made for battery charging from temporary construction power supply points.

(IV) CONTROL & PROTECTION PANELS

(a) Checking of complete wiring and insulation resistance.
(b) IR test and loop checking of all field wiring in the panel.
(c) Checking of all protection, metering and indicating schemes.
(d) Calibration of all indicating and measuring instruments, relays, timers.
(e) Checking of all auxiliary schemes e.g. space heating, illumination.
(f) Checking of operation of all relays, switches and other indicators.
(g) Commissioning of total scheme including relevant internal equipment.
(h) Carrying out suitable modifications as per system requirement.
(i) Carrying out primary injection, secondary injection, stability checks etc.

VI. INSTRUMENTATION

(a) All instruments shall be checked for proper installation, supports, impulse lines, cabling etc. and corrected, wherever required.

(b) 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 advice of BHEL Engineer.

(c) All impulse and pneumatic lines shall be properly cleaned (oil flushed / chemical cleaned / air blown/ steam blown/ Hydraulic tested etc.) before being charged.

(d) Some of the instruments may require re-calibration during commissioning. The contractor shall remove such instruments, recalibrate and install within the quoted rates.

(e) Various type of Control Panels- Turbine and its auxiliaries Protection Panels, Boiler and its auxiliaries Panels have to be checked.

VII. DRIVES AND CONTROLLERS

(a) All drives such as power cylinders, pneumatic / motorised valves / dampers etc. and controllers shall be checked for proper installation supports etc. before commissioning.
(b) All transmitters shall be calibrated and limit switches shall be adjusted.
(c) All pneumatic and impulse lines shall be cleaned as per instructions of BHEL Engineer.
(d) All drives shall be operated by simulating various conditions to ensure healthiness of components of the system
(e) Re-calibration / rectification wherever required shall be carried out by the contractor within the quoted rates.
(f) Remote operation of all drives, valves, dampers shall be checked from control room as per instruction of BHEL Engineer.

54.4 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. 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.

54.5 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.

54.6 During commissioning activities and for carrying out various tests, special instruments etc, have to be temporarily erected and commissioned to suit the commissioning activities. Contractor will provide the necessary 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.

54.7 During erection of various equipments, 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; all these works need specialised

working group setups 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.

54.8 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.

54.9 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with 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.

54.10 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.

54.11 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.

55 TOUCHUP AND FINISH PAINTING

All exposed metal parts of the equipment, structure and other items (covered within the scope of this contract) after installations are to be painted. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same may be inspected and approved by the engineer before painting.

All the equipment (bus duct, transformers, switchgears, control-panels etc.) within the scope of these specifications shall be received duly painted. The type of painting to be carried out as specified in the tender specification. For panels, 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 along with required tools within the awarded price of contract.

.

Besides above two coats of approved primer paint and at least two coats or more of approved finish paint to get the desired dry film thickness are to be applied on various loose equipments and all steel structures fabricated and erected at site.

All paints (synthetic enamel, epoxy, heat resistant or any other specified paint required as per drawing, documents or other specifications), primers, tools and other consumables including scaffolding materials required for painting shall be arranged and provided by contractor within the quoted rates. Paint and other materials so purchased shall be ISI marked and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test certificate for the paint so supplied shall be made available before use

of the same on work. The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lumpsum price/rates. The contractor shall provide legend on equipment in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages. The painter has to under go test and only qualified painters will be allowed to work.

Certain equipment shall require spray painting (touch up). The contractor shall make arrangements of the required equipment for spray painting of such equipment ***including supply of paint,*** at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the owner / Engineer.

56 FACILITIES TO BE PROVIDED BY BHEL/ CONTRACTOR

56.1 BHEL / RRVUNL shall provide adequate storage sheds and open space for temporary storage / fabrication, free of all costs, to contractor with drainage, drinking water, electricity and sanitation facilities within the plant boundary. It is the responsibility of the contractor to construct their office sheds, provide all utilities and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.

56.2 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

56.3 RVUNL / BHEL shall provide **area for labour colony** on **free of rental charges** at a location outside the project premises. For labour colony the RVUNL shall provide connection for drinking water and electricity connection points as decided by BHEL / RVUNL and sanitation & drainage facilities, further distribution is to be made by the contractor. The **water shall be provided free of charges** however the **electricity consumption shall be chargeable** at standard rates applicable. Contractor shall install calibrated energy meter for metering electricity consumption.

56.4 **Construction power, for construction purposes will be provided free of cost** at one point (at a distance upto 500 meters). The contractor shall submit to the Engineer his electrical power requirements. Contractor at his cost shall do further distribution of power. The contractor shall install his power distribution board and all wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply.

NOTE:

- The contractor will be provided construction power free of charge.
- They will however ensure that there is no wastage. Periodical audits will be held to ensure that these resources are being optimally used. For this the contractor has to provide an energy meter at his end.
- In case any wastage is observed BHEL reserves the right to recover any charges / penalty as deemed fit.
- Contractor will have to provide proper insulated cables for power distribution and joints, if any, will be done with proper jointing kits.

56.5 **RVUNL/ BHEL shall supply free of charge water through pipe connection at suitable points for construction and electricity** at required voltage (415V, 3 phase and 230 V single phase max. upto 1000 kVA) **for construction**, operation of EOT cranes, plant start-up, pre-commissioning, commissioning activities including testing. Electricity for construction power and light will be brought by RVUNL / BHEL at one point. Contractor shall arrange further distribution of water for construction purposes.

56.6 Permanent lighting inside the powerhouse will be provided at a later stage. Till such time such arrangements are made, the contractor at his cost should arrange for temporary lighting in and around his work area. **Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. within finally accepted rates**.

56.7 BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.

56.8 Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.

56.9 The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points:

i) All electrical installations should be as per Indian Electricity rules.

ii) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.

iii) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.

iv) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.

v) Contractor has to make their own earthing arrangement for their equipment / DB earthing.

vi) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.

vii) Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.

viii) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.

ix) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

x) ELCB will be tested once in a week by actually stimulating the earth leakage for all installations and the same shall be recorded in the log book maintained by the contractor.

xi) ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.

56.10 In case of power cuts / load shedding, no compensation for idle labour or extension of time for completion of work will be given to contractor.

56.11 Adequate lighting facilities such as floodlights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. Within finally accepted rates.

56.12 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expanses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

56.13 Contractor should install a PC ALONG WITH MODEM to connect with our server (LAN) AT SITE

57.0 TIME SCHEDULE

57.1 The contractor is required to commence the work within 10 days from the date of issue of letter of intent unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor.

57.2 Entire work as detailed in tender specification shall be completed within **9** months from the scheduled date of start of work as per the programs / milestones indicated by BHEL from time to time. Contractor has to mobilise adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

57.3 In case due to reasons not attributable to the contractor, the work gets delayed and additional manpower / resources have to be mobilized so as to expedite the work to meet various milestones, same shall be done within the quoted rates as per Rate Schedule, at no extra cost to BHEL. In the event the contractor fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of General Conditions of Contract:

Various mile stones to be achieved, for UNIT #6, are as below:

MILESTONES	PERIOD
Start of Erection of this package	within10 days from issue of LOI
Boiler Light-up readiness	2nd month
Generator Transformer, IPB readiness	5th Month

Turbine on Barring Gear	5th Month
Rolling & Synchronisation Readiness	7th Month
Trial operation readiness & handing over	9th Month

Notes:

Depending upon front and material availability all or some of the above milestones may be required to propone by one month. Contractor is required to mobilise additional resources to meet above requirement within their quoted lumpsum price.

Contractor has to mobilise all required resources including manpower to achieve above schedule for which no compensation will be payable. However in case of contractor discharges his contractual responsibility even before schedule contract period, he will be allowed to wind up his set up without any financial implications on either side

57.4 The work under the scope of this contract is deemed to be completed in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.

58.0 OVER RUN

58.1 In case due to reasons not attributable to the contractor, the work gets delayed and scheduled completion gets extended, the contractor shall not be entitled for any over run compensation for a period of first 2 (Two) months after the contractual completion date. In case the scheduled completion time gets extended beyond **2** (Two) months as stated above, the contractor shall be considered for payment of fixed over run charges @ Rs. 50,000/- (Rupees Fifty thousand only) per month on receipt of advance notice intending to claim over run & on fulfillment of following conditions:-

a) The reasons for delay in completion of work are not attributable to contractor but however subject to the provisions of clause - 31.

b) The targets fixed during the over run period are achieved by contractor.

58.2 Once the claim of over run charges is admitted no other compensation whatsoever (like for delays in receipt of materials, availability of fronts etc.) will be entertained.

58.3 The contractor shall maintain sufficient workforce and other resources required for completion of the job expeditiously for the entire contractual period including total extended period.

59.0 TERMS OF PAYMENT

59.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

59.2 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.

59.3 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder;

I. 88 % of contract value shall be payable on fulfillment of following conditions:

(A) ***For Equipment / items such as Panels, JB, impulse pipe, tubing etc. where no calibration and testing is required***

A.1 45% of item rate shall be payable on erection / installation /cable laying

A.2 23% of item rate on final alignment, welding, clamping, termination etc.

A.3 15% of item rate on testing, pre-commissioning, charging etc. (with certification of BHEL commissioning Engineer)

A.4 5% of item rate on pending point clearance

(B) ***For equipment/items where calibration and testing is required.***

B1 20% of item rate on calibration and testing

B2 30% of item rate on erection, installation alignment and termination wherever involved.

B3 18% of item rate on individual device loop checking / hydro test/ charging of installation and panels.

B4 15% of item rate on system loop checks, pre-commissioning checks by simulation/ field calibration or with actual system operation.

B5 5% of item rate on pending points clearance.

(C) **For Equipment / items such as GT & its accessories, IP BUSDUCTS etc.**

C1 20 % of item rate shall be payable on placements

C2 45 % of item rate shall be payable on erection / installation.

C3 15% of item rate on final alignment, oil centrifuging, welding, clamping, termination etc.

C4 5% of item rate on testing, pre-commissioning , charging etc. (with certification of Bhel commissioning Engineer)

C5 3% of item rate on pending point clearance

NOTE:-Further percentage break up for payments against above, if required will be mutually discussed and finalized at site.

II Milestone payments 6 % of awarded Contract value (CV)

- 1.25% of CV on readiness for Boiler Light-up.
- 1.00 % of CV on GT readiness for charging.
- 0.5 % Isolated phase bus duct readiness for charging.
- 1.25% of CV on Unit Synchronization.
- 1.00% of CV on Unit trial operation.
- 1.00% of CV on Full loading of Unit.

NOTE: If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site Incharge, at his discretion, after recording reasons for exercising such option, can split and release payment upto 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone / commissioning activities.

III. 1% of CV payable on completion of painting work.

IV **An amount limited to 1.0 % of the awarded contract value shall be payable in one or more installments**, solely at the discretion of Construction Manager/ BHEL at different stages of the contract execution to facilitate resource augmentation or to meet any exigency of work. In case of its non utilization 'OR' its part utilization, the entire/balance payment against this category shall be released along with full loading of unit.

IV **2.0% of CV** shall be payable on handing over of the unit to BHEL's customer or 3 months after the contractor has discharged his responsibilities as stipulated in this contract, whichever is earlier, provided delay in handing over of the unit is not attributable to contractor. The unit shall be deemed to be handed over on completion of trial operation.

V The balance **2.0% of CV** will be payable on completion of all pending work, rework wherever required, reconciliation of materials, clearance of site and labour colony area in all respects and on submission and passing of final bill.

NOTE: Above payment at IV shall be released after adjustment of the contract value based on actual work carried out.

Annexure-I

LIST OF T&Ps AND IMTEs BEING PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS

SL No.	EQUIPMENT	QTY	Remarks
1.	Suitable capacity crane (14 / 20 T)	1 No.	
2.	EOT crane in TG hall	1 No	

.**NOTES**:

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. BHEL at entirely its discretion may provide hire capacity crane for handling equipment which can not be handled with above crane or any of the lifting tackles of the contractor deployed in this contract. The fuel and operation of such crane shall be in the scope of contractor. All other clauses shall be as per the clauses applicable for the T & P Items specified in this contract.

3. Other terms and conditions regarding above items shall be as per tender clause 37. (Tools and Plants / IMTEs)

Annexure-II

TENTATIVE LIST OF T&P TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST.

Sl.No.	EQUIPMENT	QTY
1.	Suitable Capacity trailer with pulling unit and truck	As per requirement
2.	Hydra crane 8 / 10 / 12T	As per requirement
3.	6000 LPH Hi Oil Filter Machine suitable for HT Transformers	As per requirement
4.	10 Kl oil tank	As per requirement
5.	Suitable capacity Hydraulic Jacks for handling of HT transformers	Adequate Nos
6.	MIG / TIG Welding Machine for aluminium welding	Adequate Nos.
7.	Welding Transformers / Welding generators	Adequate Nos.
8.	Gas cutting set	Adequate Nos.
9.	Grinders	Adequate Nos.
10.	Calibrated Torque wrenches for Bus duct application	2 Sets
11.	Pedestal mounted Drill Machine	1 No.
12.	Vacuum Cleaner	1 No.
13.	Hydraulic crimping tool	2 No.
14.	Hand crimping tools	Adequate Nos.
15.	Industrial vacuum cleaner	1 No
16.	Blower	1 No
17.	Hydraulic pipe bending machine	as per requirement
18.	Hydraulic test Pump	1 No.

NOTEs:

1. The above list specifies only major T&Ps (may not be complete to be deployed by the contractor) to be deployed as per site requirement. 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.

2. Other terms and conditions regarding above items please also refer clause 37 (T&Ps / IMTEs).

Annexure-III

Indicative list of IMTEs to be arranged by the **CONTRACTOR** for **ELECTRICAL and Control & Instrumentation**

Sl. No.	EQUIPMENT	QTY
1.	100V/ 250V / 500 V / 1000V, (Hand operated) megger	1 No.
2.	2.5/5 KV (Motor operated megger)	1 No.
3.	Transformer Oil Testing Kit (Motor operated) 0-100 KV	as required
4.	HV Test Kit (ac/dc) 0 to 60 KV (100mA leakage current)	as required
5.	Digital Multimeters with current probe	5 Nos
6.	Tong Testers (various ranges, ac/dc)including mA Range	2 Sets
7.	Micro ohm meter with 100Amps DC Source	as required
8.	PPM Measuring Kit	as reqd.
9.	Mill volt drop test kit with 100 Amps source	as required
10.	.Analog Multimeter	1 No
11.	Single phase variac	1 No
12.	Motor checker	1 No

For The Calibration of Instrumentation equipments:

S.NO.	DESCRIPTION	RANGE	ACCURACY	QTY
1.	Dead Weight Tester	0-600Kg/cm2	LC-0.5Kg/cm2	01 Set
2.	Comparison test set (With Sub-standard Pressure gauges)	0-1 Kg/cm2	±0.25% Lc-0.02Kg/cm2	01 Set
		0-4 k g/cm2	-----do----------	
		0-6 Kg/cm2	-----do----------	
		0-10kg/cm2	-----do----------	
		0-25Kg/cm2	+0.25%Lc-0.25 Kg/cm2	
		0-60Kg/cm2	1±0.25%Lc-1.0 Kg/cm2	
		0-250Kg/cm2	±0.25%Lc-2.5 Kg/cm2	
		0- 400Kg/cm2	±0.25%Lc-2.5 Kg/cm2	
3.	Variable DC regulated (Electronic voltage source with digital indication).	0-30V DC	0.2%	1 No
4.	Oil bath with thermostat, Stirrer and sub-standard Glass Thermometers in Multiple ranges	0-300 Degree Cel.		1 set.
5.	Glass U tube mercury Mano-meter with Standard steel Scale Having leveling arrangement.	0-760 mm		As per requirement

S.NO.	DESCRIPTION	RANGE	ACCURACY	QTY
6.	Glass U tube mercury Mano-meter with Standard steel Scale having leveling arrangement.	0-1000 mm		As per requirement
7.	mA/mV source with Digital display.	0-200 mA/200mV		01 No.
8.	Rheostats	100 Ohm , 10 A		03 Nos.
9.	Precision Digital Multimeter	4-1/2 Digits		01 No.
10.	Digital multimeters	3-1/2 Digits		04 Nos
11	High temp. instrument Calibration kit	upto 600 deg.		01 No
12	Decade Resistance box	upto 10 L ohms		01 No
13	500 V / 1000V, (Hand operated) megger			01 No
14	Single phase variac,	15 A		01 No.
15	Hydraulic test pump	upto250 Kg/mm2	+0.25 %	01 No.
16	Continuity testers			as per requirement.
17	Intercom / telephone set for loop checking			as per Requirement.

Notes:

1. The above list of testing instruments / equipment required for testing / commissioning is only for guidance to contractor and not complete. Any other / additional testing instruments / equipment required for timely and satisfactory completion of job will also be arranged by contractor at his own cost.

2. Contractor must re-ascertain /recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment of IMTE's

3. Other terms and conditions regarding above items shall be as per clause no. 37 (Tools & plants / IMTEs).

ANNEXURE-IV

CERTIFICATE OF DECLARATION FOR CONFIRMING THE KNOWLEDGE OF SITE CONDITIONS

We,…… Hereby declare and confirm that we have visited the project site under the subject namely, ……and acquired full knowledge and information about the site conditions and work involved. We further confirm that the above information is true and correct and we will not raise any claim of any nature due to lack of knowledge of site condition.

Tenderer's Name and Address.

Place: (Signature of the Tenderer's With stamp)

Date:

ANNEXURE-V

NON DISCLOSURE AGREEMENT
Memorandum of Understanding

BHEL PSNR is committed to Information Security Management System as per Information Security Policy.

M/s……, providing……..service to BHEL PSNR, Noida hereby undertake to comply with the following in line with Information Security Policy of BHEL PSNR;

To maintain confidentiality of documents & information which shall be used during the execution of the Contract.

The documents & information shall not be revealed to or shared with third party which shall not be in the business interest of BHEL PSNR.

( ) ( )
M/s. BHEL, PSNR

ANNEXURE-VII

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

Against this NIT for the subject work, **tender may be processed through Reverse Auction mode i.e., ON LINE BIDDING ON INTERNET. The General Terms and Conditions of the RA shall be as follows;**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
3. BHEL will inform to the vendor in writing, in case of reverse auction along with the details of Service Provider to enable them to contact & get trained.
4. **'Business rules'** like event date, time, Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to Participate in the event.
6. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Contract Value (Tentative) Based on Rate Schedule/BOQ".
7. Reverse auction will be conducted on scheduled date & time.
8. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
10. During Reverse Auction, if no bid is received within the specified time, BHEL at its discretion, may decide to revise opening price/scrap the reverse auction process/proceed with conventional mode of tendering.
11. **Sealed bid Reverse Auction:** The opening bid (In the initial auction) of the bidders shall be same as that quoted in their Final Sealed price submitted to BHEL. **The bidders shall confirm in writing to BHEL that their opening bid (In both cases) shall be same as that quoted in their final sealed price bids submitted to BHEL against this NIT along with Technical Bid (Part-I)**.
12. BHEL reserves the right to cancel Reverse Auction (RA) without assigning any reasons and resort to considering the sealed bids submitted by vendor for processing and finalizing the tender.
13. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.
14. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.
15. Bids-given by the bidders during the Reverse Auction process will be taken as an offer to execute the work. Bids once made by the bidder, can not be cancelled/withdrawn and bidders shall be bound to execute the work as mentioned above at the final bid price. Should be bidder (Lowest) back out and not execute the contract as per the rates quoted, BHEL shall take action as appropriate.

ANNEXURE - VIII

FORMAT OF UNDERTAKING

(To be submitted in the bidder's letter head)

REF: **Dt.**

Bharat Heavy Electricals Limited
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar,
NOIDA – 201 301.INDIA

Sub.: **Work of erection, testing, commissioning, post commissioning, trial operations and handing over of all Electrical and C&I Equipments for 1X250 MW, Unit- 6, Stage-IV, Suratgarh Thermal Power Station, Suratgarh (Ganganagar, Rajasthan) of Rajasthan Rajya Vidyut Utpadan Nigam Limited.**

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited Suratgar 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 and in case of 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 and confirm our acceptance to reverse auctioning process and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT. 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 strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative)