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

TENDER NO. BHEL: NR (SCT): PARBATI III: HTG: 594

FOR

Erection, testing, commissioning & trial operation of Francis type turbines, generators, transformers, switchgear and bus duct, excitation system, C & I etc of 4x130 MW PARBATI STAGE III HEP of NHPC LTD (NHPC) at BEHALI KULLU DISTRICT, HIMACHAL PRADESH.

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

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 / pshiv@bhelpsnr.co.in

TENDER NO. BHEL:NR(SCT): PARBATI III:HTG:594

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----------

INDEX

ISO 9001-2000, ISO 14001 and OHSAS 18001 certified company
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TENDER NOTICE

Sealed tenders are invited from the contractors fulfilling qualifying requirements for "Erection, testing, commissioning & trial operation of Francis type turbines, generators, transformers, switchgear and bus duct, excitation system, C & I etc of 4x130 MW PARBATI STAGE III HEP of NHPC LTD (NHPC) at BEHALI KULLU DISTRICT, HIMACHAL PRADESH".

TENDER NO. BHEL:NR(SCT): PARBATI III:HTG:594

QUALIFYING REQUIREMENTS:

" Tenderers who wish to participate should have carried out erection, testing & commissioning work of at least three Hydro Turbine Generator set of 10 MW each or higher rating in the last seven years and also have an average annual financial turnover of minimum of Rs. 300 lacs during last three years (2005-06,2006-07 & 2007-08)". Bidders selection is subject to approval of the BHEL`s Customer."

NOTES:

(I) The Tender Documents comprise of following;
(a) General Conditions of Contract
(b) Special Conditions of Contract, Tender Notice, Project Synopsis etc
(c) Rate Schedule

(II) Tender Documents with complete details are hosted in this web page. 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. Only Hard copies of drawings are available and Bidder(s) can collect hard copy of these drawings from this office.

(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 28.01.2009*** 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 in Room No. 104 **latest by 15:00 Hrs. on 29*.01.2009.*** Technical bids shall **be opened at 15.30 Hrs. on 29*.01.2009***.

(V) Earnest Money Deposit (EMD) : Refundable, Non-interest bearing **EMD of *Rs 2,00,000/-*** 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 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;

1. Name and Designation of official
2. Postal Address (Complete)
3. Telephone Nos. (Land line & Mobile both)
4. FAX No.
5. E-mail address
6. Name of Place/State/Country, wherefrom he will participate in the RA

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

(XI) Purchase Preference will be given to CPSUs as per Govt. Guidelines.

DGM/SCP

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DOMESTIC NOTICE INVITING TENDER

LAST DATE OF SALE	**: *28.01.2009***
DUE DATE OF SUBMISSION	***: 29.01.2009 (15:00 Hrs.)***
DATE OF OPENING	***: 29.01.2009 (15:30 Hrs.)***

NIT NO. / NAME OF WORK
TENDER NO. BHEL:NR(SCT): PARBATI III:HTG:594 **Sealed tenders are invited from the contractors fulfilling qualifying requirements for "Erection, testing, commissioning & trial operation of Francis type turbines, generators, transformers, switchgear and bus duct, excitation system, C & I etc of 4x130 MW PARBATI STAGE III HEP of NHPC LTD (NHPC) at BEHALI KULLU DISTRICT, HIMACHAL PRADESH".**

NOTES

1. Purchase Preference will be given to CPSU as per Govt. Guidelines.
2. Please visit our website at www.bhel.com for details of NIT including Qualifying Requirements.

DGM/SCP

Project Synopsis

4X 130 MW PARBATI ST III HYDRO ELECTRIC PROJECT

M/S NHPC Limited (NHPC) has awarded a contract on BHEL for supply, transportation, storage and material handling at site, erection and commissioning of 4 x 300 MW Francis turbines, generators, transformers along with all the auxiliaries and BOP on a lump sum basis.

On the part of BHEL it has to create its own storage and office facility at site. BHEL has acquired open land for development of infrastructure at site and BHEL shall have to develop it for construction of closed and open storage yard, and office complex.

Parbati ST-III Hydro Electric Power Project , an underground Power House is essentially a run of river scheme utilizing outflow of Parbati ST-II, inflow of Sainj river and unutilized inflow of Jiwa Nallah for power generation

The project is situated in village Behali in Kullu district of HP is located about 3 Kms from Largi dam, about 250 kms from Chandigarh. The project can be reached by road by Kiratpursahib-Bilaspur- Mandi-Manali road. Nearest railhead is Kiratpursahib about 180 kms . Nearest airport is Kullu airport at Bhunter about 25kms from project site.

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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'

INDEX

SECTION III-A
SPECIAL CONDITIONS OF CONTRACT

34.0 GENERAL

34.1 BHEL has been awarded the work of Design, Manufacturing, supply, installation, erection & commissioning including handing over of 4X130 MW units for PARBATI STAGE III HEP of M/s NHPC Ltd (NHPC). The equipment consist of Hydro Turbine (FRANCIS type), Main Inlet valve, governor, Transformers & associated equipment, Generator, Excitation system, Panels & associated equipment, control & monitoring systems, Mechanical auxiliaries such as cooling water, drainage, Oil Filtration Plant, dewatering & compressed air system and bus Duct and other Balance of Plant. BHEL units of Haridwar, Bhopal, Jhansi & Bangalore and their vendors shall supply all this material.

34.2 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 methods, 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/ lumpsum price shall deem to be inclusive of all such contingencies.

34.3 The contractor shall carry out the work in accordance with standard practices/ codes/ instructions/ drawings/ documents/ specification supplied by BHEL/ Customer (M/s NHPC) from time to time.

34.4The work shall confirm 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.

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

(a) Provision of all types of Skilled labour, Adequately qualified and experienced supervisors, Engineers, Watch and ward as required, Tools & plants, Calibrated IMTE equipment as specified and otherwise required for the work and consumables for fabrication, erection, testing and material handling for the entire scope under this contract.

(b) Proper out-turn as per BHEL plan and commitment.

(c) Completion of work as per Schedule given by BHEL.

(d) Good quality and accurate workmanship for proper performances of equipment to the satisfaction of BHEL/ CUSTOMER.

(e) Repair and rectification as per instruction of BHEL engineer.

(f) Preservation / Re-conservation of all components during storage/ erection till handing over.
(g) Keeping all the erection area neat and clean on regular basis.
(h) Documentation and records (Films/Movies/Photographs) from embedment to evacuation

34.6 The contractor under this contract shall also provide free of cost services of skilled persons for a total period of 360 Man-months exclusively for use by BHEL. This manpower will be required for following services:

- Highly skilled workers (Qualified computer operators) for office and stores work for **60 manmonths**,
- Skilled workers for office, colony, stores, maintaining material record for BHEL and non BHEL packages, helping in material identification and dispatch of BHEL T&P items as well as office and site closing ie, dispatch of material for **120 manmonths**.
- Unskilled workers for office, colony, stores for **180 manmonths**.

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 manmonths as per above provision, fully or partly, recovery at the rate of the prevailing minimum wages at Site for the categories given plus 10% will be made from the final bill of the contractor.

34.7 Health, Safety & Environment management (HSE)

34.7.1 BHEL-Power Sector(NR) is ISO 9001-2000, ISO 14001-1996, OHSAS 18001-1999, ISO 27001 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 will be responsible for Health, Safety & Environment management (HSE) at site for the construction activities to be carried out by them in accordance with requirements given under section I (a) of GCC and elsewhere in this tender document. The contractor, who is awarded the work, shall have to sign an MOU w.r.t implementation of HSE conditions with BHEL.

The Contractor shall ensure deployment of Qualified & Experienced Safety Engineers / Officers at site. 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 each 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.

34.7.2 Contractor shall arrange for following provisions of HSE.

i. Contractor has to maintain contact with local hospital having scanning and other ultramodern medical facilities and ambulance services on call required during emergency. The addresses of local hospital shall be prominently displayed.

ii. Contractor has to ensure that availability of adequate First Aid facilities at site.

34.8 In order to meet the environmental concerns it is expected that the contractor shall **plant at least 50 trees and maintain the trees throughout the period of Contract** in the vicinity of the project as per advise of Engineers.

34.9 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.

35.0 PRELIMINMARY & CIVIL WORKS

35.1 The contractor shall as a first field activity check all the foundations for the correctness of the same as per the drawings and satisfy himself in all respects such as location of foundations, absence of voids, **levels**, correctness of **bolt holes, pocket levels**, centre lines etc. and all measurements should be recorded and submitted to engineer **for approval** before erection.

35.2 Before starting erection job contractor shall ensure that area connected to his scope of work is sufficiently enclosed against ingress of dust and water and all debris have been cleared of from the floor to a designated area as per instruction of engineer. The contractor shall arrange to get the working area and surroundings cleared daily to ensure the dust free atmosphere **and free from seepage water** for working and shall maintain sufficient labour and general cleaning of work areas. Delay of work on this account will not be acceptable.

35.3 The contractor shall cover all opening on floor and put temporary hand railing on all sides of the floor to avoid any accident to the working personnel. *

35.4 Contractor shall fix up and maintain plates, supports for X & Y axis and elevation at different locations as required for each unit and **transfer the same from bench mark and XY axis given at one point by BHEL's client.** Joint protocol records for such benchmarks shall be got signed from BHEL's Engineer, customer's Supervisory and QA Engineer.*

35.5 Once X-Y axis and elevation are fixed at different floors and protected marking for Other equipment's shall be transferred from these and joint protocol as above shall be got signed for each equipment or as required as per drawings.*

35.6 All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filling and blue matched. Wherever necessary sealing/lubricating/anti-sieze compounds shall be applied as per recommendation of Engineer. Machining/grinding required for fitting of keys, pins, packers , dowels etc. shall be carried out by contractor.

35.7 The accuracy of all equipment/ instruments and their functioning shall be established before they are permitted for use on the job. If the Engineer doubts the accuracy of the precision tools, any time during erection, the contractor shall arrange the checking of tools/ equipment/ instruments at his cost.

35.8 All the works shall be performed to the lines, grades and elevations indicated on the drawings. The contractor shall be responsible to locate and layout the works. The horizontal & vertical control points established by the engineer shall be used as datum for the works under this contract. Any work done without being properly located may be removed and dismantled by the Engineer at the contractor's expenses if the contractor refuse to do it.

35.9 The contractor shall create all the facility of storage at erection site as per the tender scope of work for safekeeping and proper record, relocation and well protected. No material should be lying loose any where in the power house as well as stores .

35.10 De-watering in general will be carried out by M/s NHPC. However contractor has to take care of general cleanliness in his area of work. For area cleaning within the premises of his work, the cleanliness shall be the total responsibility of contractor. Contractor within his scope of work shall keep the separate gang of workers for cleanliness operations. If the area under the scope is found unclean, BHEL can take measures on its own for cleaning and deduct the amount so spent from the running bills of contractor.

35.11 Necessary civil works shall be provided by BHEL client. The dimensions & locations shall be checked by the contractor for their correctness as per drawings. Further, top elevation and axis/ centrelines of all the foundations shall be checked with respect to benchmark etc. During the civil works, contractor shall check for all the block-outs, dimensions as required in their various mechanical drawings for installation of components/ assemblies and help BHEL wherever required for checking. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 25

to **50** mm, enlarging the pockets in foundations etc., and repair of same as may be required for the erection of equipment shall be carried out by the contractor within the finally accepted rates.

35.12 Besides above, any 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 scaffoldings etc. or any other temporary supports shall also be the contractor's responsibility. For these works all materials including cement/ steel and required facilities will have to be arranged by contractor at his own cost.

35.13 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required as per drawings/ manufacturing unit, the embedded sole plates shall be scraped and checked with Prussian blue to get the required contact with frames at no extra cost to BHEL.

35.14 The contractor shall ensure perfect matching of packer plates including scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer.

35.15 The contractor shall provide his tool stores for special tools and instruments at a convenient place near to the working area.

35.16 Not applicable

35.17 BHEL shall be providing the security arrangement at stores and powerhouse. Whereas necessary watch and ward shall be the responsibility of the contractor for the items and equipments under his custody.

36.0 CONSUMABLES

36.1 The contractor shall provide within finally accepted price, all consumables like gaskets for temporary work, gland packing, general purpose welding electrodes, filler wires, all gases (for inert, welding & cutting), soldering material, dye penetrants, radiography source, films, chemicals etc and other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, Parmali wood, petrol, CRC/ other cleaning agents, wooden sleepers, steel required for temporary works such as supports , packing , H&S , shims etc. hardware items, sealing compound required for completion of work. The consumables, which are supplied by manufacturing units along with plant material, shall be issued to contractor for subject work only. Contractor shall maintain proper records for all those consumables.

36.2 All the shims & gaskets which go finally as part of equipment shall be supplied by BHEL free of cost.

36.3 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.

36.4 It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding supplies of consumables such as welding electrodes/ filler wires/ gases lubricants etc. before procurement. On receipt of consumables at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform to BHEL all details regarding type of consumable 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 consumable will be allowed to be used without valid test certificate.

36.5. Only special welding electrodes for the Turbine, shall be supplied by BHEL manufacturing unit. The contractor shall keep the record of the use for these electrodes. All other electrodes shall have to be arranged by contractor. In case the electrodes supplied by BHEL are found to be inadequate/ unusable, contractor has to arrange the same from the market as per provisions of clause No. 36.4 on actual procurement cost basis for subject work.

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

36.7 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). The decision of Engineer in this regard shall be final and binding on the Contractor.

36.8. Special consumables that are supplied by manufacturing units for erection and commissioning purposes will be issued by BHEL as free issue item. However the contractor shall use them to the satisfaction of BHEL Engineer and keep proper records for accountability

36.9. All lubricants and chemicals required for pre-commissioning, commissioning and testing, and lubricants for trial runs of the equipment shall be supplied by BHEL/ its 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/ packed and returned to stores.

36.10 It shall be responsibility of the contractor to arrange the complete Radiography equipment & Dark Room and the required consumables and the U/T equipment for NDT at site. For carrying out these tests for turbine components, the contractor has to do the work as per drawing requirements with the quoted price.

36.11 Filling of oil for flushing, first filling of oil and subsequent change over or topping/ making up for generator, turbine, transformer etc till the unit is fully commissioned and handed over to customer is included in scope of BHEL. The contractor shall not waste any oil during flushing/ filling. Such wastages shall be on the account of contractor. The

contractor shall return all the empty drums to BHEL / BHEL's client store at no extra cost. Any loss/ damage to above drums shall be to contractor's account.

37.0 TOOLS AND PLANTS / IMTE's

37.1 T&Ps and IMTEs (Inspection, Measuring & Testing Equipment), provided by BHEL/ Customer to sub-contractor free of hire charges shall be shared by other sub contractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.

37.2 Besides the T&Ps and IMTEs being made available to contractor free of hire charges by BHEL/ Customer, 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 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, mobil oil, grease and other consumables/ lubricants etc. for the operation.

37.6 The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps and IMTEs. Their skill/ performance will be checked by BHEL Engineer before they are allowed to operate the same.

37.7 The day to day and routine maintenance of BHEL's T&Ps and IMTEs is to 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 and IMTEs 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 and IMTEs, 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 mobile cranes and Hydraulic Test pumps supplied by BHEL. For cranes, repair / replacement of filter, batteries, self, dynamo shall be the responsibility of the contractor. However, the charges of the replacement of the 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 Supervision and labour required for Routine 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 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.

37.11 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.

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

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 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.

37.16 The contractor shall return all BHEL T&Ps and IMTEs issued to him in good working condition (as handed over to him) 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/ un-serviced 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.

37.17 The Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, Manila ropes, winches and slings etc. History card , maintenance and valid fitness certificates of 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 Re-testing/ 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 re-take 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 or his Sub-contractors without the prior written approval of the Engineer.

37.21 The month-wise 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&P, 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.

38.0 SUPERVISORY STAFF AND WORKMEN

38.1 The contractor shall deploy all the skilled, semi-skilled and un-skilled workmen and experienced supervisors/ engineers required for all the work under this specification. Only fully trained and competent persons with previous adequate 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 insist on 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 supervisory staff deployed by the contractor, shall 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 co-ordination with other labour and staff deployed directly by BHEL or other contractors of BHEL or BHEL's client / other agency.

The bidders may note that they have to deploy ADEQUATE Engineers (Degree holders) and Supervisors (Diploma holders) for all major areas having at-least 3 years of working experience at Hydro Electric project powerhouse within the

manpower deployment plan submitted for entire period of the contract as per the plan given by the BHEL site incharge. Minimum numbers are as under:

i) Engineers (Degree holders)	**2 nos**	**50 manmonths MINIMUM**
ii) Supervisors (Diploma holders)	**6 nos**	**150 manmonths MINIMUM**
iii) Welding/ NDT Level II engineer	**1 no**	**25 manmonths MINIMUM**
iv) Safety supervisor	**1 no**	**25 manmonths MINIMUM**

If the contractor fails to deploy this minimum manmonths (MM) then deduction shall be made from his bills at the rate of Rs 25000/= per MM for (i) and (iii) and Rs 15000/= per MM for (ii) & (iv)

The contractor shall specifically mention the deployment of the above persons in the deployment plan so submitted by him along with the tender.

38.3 The work shall be executed under the usual conditions without affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall co-operate with other personnel / contractor, co-ordinating 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/ certified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.

38.6 It is the responsibility of the contractor to engage his workmen in **THREE** shifts & 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.

38.7 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, 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.

38.8 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 manpower, 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 as per ISO9002/ OHSAS18001 REQUIREMENT.

39.0 MATERIAL HANDLING, STORAGE & SAFETY IN POWERHOUSE/SERVICE BAY

39.1 All the equipment furnished under this contract shall be issued by BHEL or the client M/s NHPC. Contractor shall plan in consultation with BHEL engineer and the agency for material handling of equipment / items/ plant material to be made available in Power House (PH) as per erection progress / schedule and fill in the requisite formats in standard forms. Contractor has to assist, in checking and verification of materials on submission of indent. Contractor has to give indent/ notice at least seven days in advance for drawing material so that necessary arrangements for transportation and the EOTcrane could be made in advance.

Note:- Material management in general shall be in the scope of separate agency for Material Handling , therefore pre-planning for requirement of equipment items for erection shall be done on weekly basis and contractor for Material Handling shall be informed in advance , How ever in the event of urgency any such work done by this agency shall be paid separately on prorata basis of Material Handling Contract. This will be on the discretion of BHEL.

39.2 Contractor has to take delivery of plant material in the power house/ service bay / 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. Only special slings/ handling equipment, if supplied by the manufacturer will be issued to the contractor for such material handling.

39.3 The contractor shall identify and deploy necessary Engineers / supervisors/ workmen in sufficient number as may be needed by BHEL, for above work.

39.4 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.

39.5 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.

39.6 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 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. As per General Conditions of contract under provisions of clause No 29 BHEL will reserve the right to recover the cost of repair / replacement , if any, to bring back the equipment in original order, in case the equipment / material is lost / damaged while in the custody of the contractor. BHEL's decision in this regard shall be final and binding on the contractor.

39.7 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.

39.8 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.

39.9 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 contractor’s risk and cost.

39.10 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

39.11 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. The contractor for all such items received and returned to BHEL will maintain an account. Any shortage in returning such items shall be chargeable to the contractor excepting an amount of 5% allowable against wastage for packing wood only.

39.12 The contractor shall hand over all parts / materials remaining extra over the normal requirement with proper identification tags to the concerned BHEL engineer.

39.13 Contractor shall ensure that while lifting of any item , for transporting, slings shall be put over the points indicated on the equipment or as indicated in the Manufacturer’s

drawings. Slings over casing shall have gunny bags or soft wood packing to avoid the scratches and nicks on the equipment. Slings/D-shackles of proper sizes shall be used for all lifting and rigging purposes. All care shall be taken to safeguard the equipment against any damage. In case of any damage, the cost shall be recovered from the bills of contractor.

40.0 NOT APPLICABLE

41.0 PRESERVATION OF COMPONENTS IN POWERHOUSE/SERVICEBAY.

41.1 After taking delivery from BHEL/ customer/ transporter of manufacturing units/ 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 blocked up above the ground suitably

b) Generator stator, poles, insulating materials, valves, electrical equipment, control equipment and instruments, rubber items etc. shall be stored indoors in warehouse provided by BHEL/ its Client. 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.

d) Insulation materials shall be stored indoors/ protected against getting wet.

41.2 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.

41.3 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.

41.4 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.

42.0 CLEANING OF EQUIPMENT

42.1 The contractor shall thoroughly clean all the components before installation of the components whose surfaces are coated with protective coating and sent to site are to be thoroughly cleaned by suitable mechanical/ chemical means as per the approved procedure.

42.2 Contractor shall ensure that the items identified by BHEL shall be cleaned with kerosene/ petrol/ CRC before assembly and erection of the equipment. For cleaning purposes he shall use only soft cotton cloth. Contractor shall never use cotton waste for cleaning any equipment. The electrical equipment before erection shall be cleaned with dry air/ vacuum cleaner.

42.3 The contractor shall clean inside of all pipes and fittings from dirt, sand and loose scales, mechanically/ chemically and by air blowing before being erected. All pipe lines be thoroughly blown/ flushed. If necessary certain pipelines may have to be cleaned by acid pickling/ chemical cleaning. The procedure for the same shall be provided by BHEL. All chemicals and inhibitors shall be arranged by the contractor with in the contract. Disposal of chemical has to be carried out by the contractor at his own cost.

43.0 ERECTION

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

43.2 Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost within the finally accepted rates.

43.3 No members of the ladder/ structure/ platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify/ repair in a manner acceptable to BHEL/ customer without any additional cost.

43.4 The contractor shall erect scaffolding/ temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion & removed from work site.

43.5 Corrections like straightening of ladders, tube support plates adjustment/ removal of ovulates in pipes and opening or closing the fabricated bends of piping to suit the layout shall be considered part of the work and the contractor is required to carry out such work within finally accepted price/ rate as per instructions of Engineer.

43.6 The contractor shall fabricate pipes, special bends, etc. threading and welding as required and carry out the chemical cleaning of fabricated piping.

43.7 The servicing and realignment of skid-mounted equipment if required or if directed by BHEL shall be carried out by the contractor at no extra cost to BHEL.

43.8 The contractor shall completely erect & test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves & accessories in accordance with the drawings furnished. This includes all necessary bolting, welding, pre-heating, stress relieving, testing, cleaning & painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged screwed or other type joints are specified or shown on the drawings. All piping shall be erected true to the lines & elevation as indicated in the drawings.

43.9 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 may have to be fabricated at site.

43.10 The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.

43.11 Certain adjustments in length may be necessary while erecting pipelines. The contractor should remove the extra lengths/ add extra lengths to suit the final layout after preparing edges a fresh by adopting specified heat treatment procedures, at no extra cost.

43.12 It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.

43.13 The contractor shall be responsible for any modifications of shop fabricated pipes prior to installation to accommodate minor site alteration in pipe routing at no extra cost.

43.14 All vents and drains for piping equipment covered in the scope whether shown in the drawings or not shall terminate in atmosphere and to pit as directed by BHEL.

43.15 Wherever piping erected by the contractor is connected to equipment/ piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor of this specification.

43.16 Normally the valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like `T' pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection after chemical cleaning and during commissioning.

43.17 The contractor shall be responsible for correct orientation of all valves so that seats, stems & hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.

43.18 Suspension for piping, etc., will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.

43.19 The adjustment of all supports erected for maintaining the proper slopes of piping wherever required is also included in the scope of the contractor.

43.20 No temporary supports should be welded on the piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases heat treatment if required, shall be carried out by the contractor as part of subject work.

43.21 All supports and anchors shall be installed as per drawing to obtain safe and reliable and complete pipe installation as per instructions of Engineer. Any additional support as called for by Engineer shall have to be fabricated and provided by the contractor. The raw materials required for fabricating such supports shall be arranged by BHEL.

43.22 Contractor shall install piping in such a way that no excessive or destructive expansion forces exist under any condition.

43.23 The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The methods used, the tools and the equipment deployed shall be subject to the approval of Engineer. All the torque wrenches shall be calibrated at the start of each days work and at least once during the day. The bolting work shall be carried out by the competent technicians.

43.24 The contractor shall ensure that all supporting elements, anchors & restraint have been installed and adjusted in accordance with the drawings / sketches & other written instructions of the Engineer.

43.25 Layout of small bore piping as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection or from aesthetic point of view which should be carried out at no extra cost.

43.26 All the valves, including motorised valves, flap valves, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.

43.27 Additional platforms and ladders of permanent nature incidental to the job for approaching different equipment/ valves as per site requirement, which may not be indicated in drawings, shall be fabricated and installed by the contractor. The materials required will be supplied by BHEL free of cost.

43.28 Erection and welding of necessary instrumentation tapping points, valves to be provided on equipment, auxiliaries and pipe lines covered within the scope of this specification, will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer at no extra cost.

43.29 All the items will be supplied in pieces/ loose and are to be assembled bolted and welded at site. Contractor has to work as per the drawings and instruction issued at site

for erection and testing purposes. Weights for handling and erection in the annexures are indicative only. **No claim will be entertained on account of variations in weights or change from conventional design e.g. from bolted to welded connections and vice versa, increase in number of pieces etc. The bidders should take care of this point while quoting lumpsum price for subject works for handling and erection works.**

44.0 WELDING, HEAT TREATMENT, RADIOGRAPHY (NOT APPLICABLE) AND OTHER NON-DESTRUCTIVE TESTING

44.1 The equipment and piping shall be erected in conformity with the provisions of standard/ specification and as may be directed by BHEL 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.

44.2 Welding being a special process, all-welding shall be carried out by skilled and experienced welders holding valid certificates as per requirements of ISO 9001. The certificate shall be checked by BHEL before allowing the welders to be engaged on welding. BHEL at its own discretion may ask any or all welders to under go welder Qualification Test as per Standard Procedure in accordance with requirements of ISO 9001 and as per welding manual of BHEL**. The deployment of qualified welder and subsequent site testing of requisite numbers of welders shall be one of the prerequisite of contractors site mobilisation completion.**

44.3 All welders including tack welder, structural and pipe welder shall be tested as per ASME section IX and approved by BHEL Engineer before they are actually engaged on work though they may possess the certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor in Performa given by BHEL Engineer shall maintain the records of qualification of welders. All the welders qualified for the work will be issued an identity card by BHEL Engineer and welder will keep the same with him at work place.

44.4 BHEL 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 contractor of contractual obligation to continuously check the welder's performance.

44.5 Faulty welds caused by the poor workmanship shall be cut and re-welded at the **contractor's expenses including cost of materials**. The Engineer prior to any repair being made shall approve the procedure for the repair of defective welds. Radiography or any other NDT on completed field welds shall be conducted as per drawings or instructions of BHEL engineer.

44.6 The contractor shall carry out the root run welding of all piping, valves, instrumentation, tapping points etc. by TIG/ SMAW / MIG welding process. The contractor shall have to carry out full TIG welding of butt weld joints of tubes/pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during

welding have to purge the pipes with inert gas in case of stainless steel. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.

44.7 All charges for testing of contractor's welders including consumables for welding / 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.

44.8 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.

44.9 Only **BHEL approved electrodes and filler wire** will be used. All electrodes shall be baked and dried in the electric electrode-drying 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. 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 also 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.

44.10 All butt / fillet welds shall be subject to dye penetration test as per drawing and document requirement and have to be carried out as per the instructions of the engineer within the quoted / finally accepted rates for this contract .

44.11 The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld and maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final. All site welding joints shall be subject to acceptance by BHEL Engineer

44.12 All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost.

44.13 The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL. Wherever possible machining or automatic flame cutting will be allowed only wherever edge preparation otherwise is impractical. All slag's / burrs shall be removed from cuts and all the hand cuts shall be ground smooth to the satisfaction of engineer.

44.14 Pre-heating, radiography(not applicable) and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in

accordance with the instructions of Engineer. All equipment and consumables essential for carrying out the above process shall be arranged by contractor at his cost.

44.15 Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. Also the contractor shall have to arrange for labour, heating elements, thermocouples, etc. insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL. The contractor has to provide thermal chalks, temperature recorders, thermocouple attachment units, graphs sheets, etc. for checking within the finally accepted rates. All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost. The contractor shall obtain the signature of BHEL Engineer or his representative on the chart of the recorder after setting up the weld joints for heat treatment operation prior to the starting..

44.16 The contractor shall also be equipped for carrying out other NDT like DP/ MPI / UT etc. as required as per welding schedule/ drawings within the finally accepted price/ rates.. Necessary help including surface preparation and scaffolding required for conducting all the shall be rendered by contractor at his own cost.

44.17 The technical particulars, specification and other general details for NDT work shall be in accordance with ASME, ISO or as specified by Drawings and Manuals of BHEL / NHPC.

44.18 Low speed high contrast, fine grain films (D-7 or equivalent) in 10cm. width only be used for weld joint radiography. Film density shall be between 2.0 to 4.0.

44.19 Iridium – 192/any other source as specified by BHEL/CUSTOMER shall be used by contractor for radiography work. The geometric un-sharpness shall not exceed 0.05 mm. Taking adequate safety precautions shall be the responsibility of the contractor while carrying out radiography. Necessary safe guards required for radiography (including personnel from BARC) shall be arranged by contractor at his own cost.

44.20 All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.

44.21 Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract no., joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.

44.22 Lead intensifying screens for front and back of the film should be used as per the above referred ASME specification.

44.23 The joint is to be marked with permanent mark A, B, C, etc. to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down stream side of the weld.

44.24 For multiple exposure, an overlap of about 25 mm of film should be provided.

44.25 Radiography personnel with sufficient experience and certified by M/s BARC as Radiographer for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed . These personnel should also be registered with BARC for film badge service.

44.26 All arrangements for carrying out radiography work including dark room with air conditioner/ blower and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and/or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.

44.27 The contractor shall have a dark room fully equipped with radiography equipment, film (unexposed), chemicals and any other dark room accessories such as Airconditioner/ Blower etc. There should be adequate number of radiography personnel with sufficient experience and certified by M/s BARC as Radiographer for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection. These personnel should also be registered with BARC for film badge service.

44.28 Contractor shall note that 100% radiography will be done at the initial stages on all the welding joints as specified in the drawings. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out.

44.29 All the Radiographs shall be properly preserved and shall become the property of BHEL.

44.30 Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC certificate/permission letter to be provided before taking up the work.

44.31 Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of HP welders. If the performance of welder is unsatisfactory, he shall be replaced immediately.

44.32 Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radio graphed and re-shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if the defect persists after first repair, as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radio graphed at contractor's cost.

44.33 If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.

44.34 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.

44.35 The contractor shall assist BHEL Engineer in preparing complete field welding schedule/procedure for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. Such schedules shall be strictly adhered to by the contractor.

44.36 The radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.

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

45.1 On completion of erection of equipment, the contractor shall get the equipment checked up by the Owner (M/s NHPC) and their deputed supervisors, specialists concerned with the particular item of work. The testing of various equipment will be carried under the supervision of BHEL/ NHPC with the assistance of the Contractor in the manner decided by and in the presence of the owner and other authorized supervisors concerned, and to their entire satisfaction. On completion of these preliminary checks by the equipment supplier, the contractor shall make the equipment ready for conducting the test. The contractor shall rectify all defects found during the checking / testing as directed by the BHEL/ Owner to ensure satisfactory operation of the equipment.

45.2 The contractor shall carry out the required tests as instructed by BHEL using contractor's own consumables, labour and scaffoldings.

45.3 All the tests shall be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. Contractor shall also carry out repair of all the welded joints (site and suppliers) failed during testing.

45.4 The scope of testing activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, chemical cleaning, or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents.

45.5 For testing of spiral casing, the necessary test pump and bulk heads shall be supplied by BHEL. Any other item which may be required additionally shall be arranged by

contractor. The necessary bulk heads etc for testing of piping system including hardware shall be arranged by the contractor within his scope of work.

45.6 It shall be the responsibility of the contractor to provide various category of workers in sufficient numbers along with Supervisors including necessary consumables, T&Ps, IMTEs etc., and any other assistance required during testing of equipment and attending any problem in the equipment erected by the contractor till handing over. Association of BHEL's/ Client's staff during above period will not absolve contractor from above responsibilities.

45.7 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractor's finally accepted rates/ price shall be inclusive of all these factors also.

45.8 In case, any rework is required because of contractor's faulty erection which is noticed during testing, the same has to be rectified by the contractor at his cost. If any equipment/ part is required to be inspected during testing, the contractor will dismantle /open up the equipment / part and reassemble / redo the work without any extra claim.

45.9 During testing, opening/ closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price shall also include all such work.

45.10 The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydro test on al piping equipment covered in the specification at no additional cost.

45.11 In case any defect is noticed during tests 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.

45.12 The contractor shall carry out cleaning and servicing of valves prior to testing of the equipment under his scope. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves are left un-serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.

45.13 Cleaning & servicing of all the filters/ strainers, toppings of oils coming in the system shall be done by the contractor within the accepted price.

45.14 At the time of each inspection, the contractor shall take note of the decisions / changes proposed by the Engineer and incorporate the same at no extra cost.

46.0 PROGRESS REPORTING

46.1 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

46.2 Weekly progress review meetings will be held at site during which actual progress during the week vis-a-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.

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

46.4 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 slippage's do not accumulate and effect the overall programme.

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

47.0 **DRAWING AND DOCUMENTS**

47.1 The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These document 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.

47.2 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.

47.3 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.

47.4 The data furnished in various annexes 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.

47.5 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.

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

48.0 INCOME TAX, SALES TAX, VAT ETC.

48.1 **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.

48.2 **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.**

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

48.4 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.

48.5 Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax Authorities, for bringing his materials, plants and equipment at site for the execution of the work under this contract. No road permit shall be issued by BHEL for contractor's materials/equipments.

49.0 **EXTRA WORK**:

49.1 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 testing/ commissioning,

c) Requiring fresh fabrication of components in place of rejected/ replaced components.

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

49.3 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. Logbook 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 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.

50.0 PRICE VARIATION

50.1 The finally accepted rates for scope of work as defined in this tender are subjected to price variation provisions as per following formula. The required documents shall be submitted by contractor.

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

P1 = Increase / decrease in billing amount (variation) for the particular month of billing.

P0 = Gross billed amount for the month 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.

50.2 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 on month-to-month basis from the date of award. BHEL however reserves the rights to freeze variation for that much of duration of delays, from time to time, which are entirely attributable to the contractor. Average of applicable index of PVC paid shall be taken as index for PVC for final **5%** amount.

50.3 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 escalation 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.

51.0 RATE SCHEDULE

51.1 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 lumpsum price.

51.2 The tenderer shall quote the 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.

52.0 INSTRUCTIONS TO TENDERER

52.1 Offers received without data/ information required to be submitted under tender clauses-11.1 to 11.11 are liable to be rejected. Documentary evidences should duly support all these data/ information.

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

52.3 The tenderers are advised to actually visit the site and fully acquaint themselves with site conditions, location of stores, transportation routes, Local taxes, toll charges and levies, local labour minimum wages & prevailing wage agreements at site, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non-familiarisation 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.

52.4 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.

4X130 MW PARBATI HEP—STAGE III

SPECIAL CONDITIONS OF CONTRACT

SECTION III-B

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4X130 MW PARBATI HEP—STAGE III

SPECIAL CONDITIONS OF CONTRACT

SECTION III-B

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53.0 SCOPE OF WORK

53.1 Scope of these specifications cover complete work of

Indenting and identifying material in store, receiving of material in service bay / at erection site, levelling, matching, assembly, fabrication, erection, alignment, welding, NDT (DPT, Radiography, UT etc.), testing / Commissioning & Trial run operation, Material Reconciliation, any other activity to complete the work till handing over of Francis Turbines, governors, Transformers, & associated equipments, Generators, Generator Fire Protection System, Excitation systems, control & monitoring systems, , Protection System, Power & Control cables, 11KV Switchgear and 13.8KV bus Duct , Mechanical auxiliaries such as cooling water, drainage, Oil Systems, HP & LP compressed air system of 4x130 MW PARBATI STAGE III HEP of NHPC Ltd (NHPC)

Details of the major equipment under scope of works are as under:

S no	Description of Major Equipment
1	Hydro Turbine and Associated equipment.
2	Hydro Generator and Associated equipment.
3	Static excitation system including excitation transformers and DVR
4	Control and Monitoring (SCADA) system
5	Digital Governing system and Accessories.
6	220V &48V DC system
7	Main Inlet valve (spherical) with Accessories
8	HP & LP Compressed Air system
9	Cooling Water System
10	Drainage System and dewatering system
11	Protection systems
12	Cabling system with Accessories -Power house - Optic fibre link between PH ST III and Dam/Power house ST II
13	Lubricating Oil system
14	Insulating Oil system
15	13.8 KV Bus Ducts
16	13.8/400-/3 53 MVA 1 PHASE Generator Step Up

	Transformers , Unit tap off Transformers,Station Aux. transformers
18	11KV and 415V Switchgear
19	Documents & Records(films/movies/photographs) from embedment to evacuation and handing over spares, tools and instruments for above packages

General Scope of work has been indicated but not limited to details given in- Annexure II

53.2 The equipment and piping shall be erected in conformity with the provision of standard/ specification and as may be directed by BHEL. The method of welding (Arc, gas, TIG, MIG/MAG or other method) may be indicated in the detailed drawing/ schedules. BHEL engineer will have option of changing the method of welding as per site requirements.

53.3 Not applicable

53.4 2 NOS EOT cranes of 170/30/10T for power house are being installed by BHEL. The EOT cranes shall be provided free of hire charges and on sharing basis. The AMC of the cranes shall be carried by the BHEL. The day-to-day routine maintenance shall be in the scope of the present contractor for the period of crane being used for his scope of erection works. During the maintenance the contractor shall arrange to replace any component, which is not available as the spares. The actual cost of the component shall be reimbursed to the contractor by BHEL. The said contractor shall also deploy the requisite number of crane operators in different shifts as per the instructions of BHEL engineer for operation of the crane for his scope of work in connection with Electromechanical works of BHEL. The crane operator may have to work in overtime also depending upon the work conditions for which no extra shall be payable to the contractor. The said contractor will also provide the EOT crane services to the other contractors working in the powerhouse for civil and mechanical works.

53.5 NA

53.6 NA.

53.7 Details with weights & Dimensions of Major equipment supplied by BHEL to be assembled, installed, tested under this scope are given in **Annexure-I** and details given in Technical Section-Annexure II. However, changes in design may occur as is usual for which no compensation will be payable and contractor shall complete the entire work as detailed in the tender specifications within finally accepted rates/ prices.

53.8 The EOT crane will not be available for the erection of lower pit liner and first stage embedment / piping including draft tube. The contractor has to carry out the works of lower pit liner and first stage embedment/ piping manually or by his own T&P or by mobile crane of BHEL/CUSTOMER within the scope of work.

53.9 Inspection of the generating unit and water path at various stages during pre-commissioning and commissioning, after load throw off tests, trail run etc shall be carried out and any discrepancies observed shall be corrected like re-tightening of any fasteners, generator wedges etc. For such inspections, some components like generator air baffles, flooring plates, spiral csing and draft tube man hole covers etc may have to be opened and re-assembled for which no additional payments shall be made since such works form part of the normal work.

Similarly, various links, flexible connections in generator main and neutral terminals, bus duct, LAVT, transformers etc shall have to be disconnected and re-connected number of times for various tests during pre-commissioning, commissioning. For these works also no separate payments shall be made as these form part of the testing."

54.0 FINISH PAINTING

54.1 Primer painting wherever peeled off or damaged or if required is to be carried out after thoroughly cleaning of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL and the same being inspected and approved by the engineer before painting. Bare surfaces / unpainted surfaces shall be provided with two coats of suitable primer. The gas cut stubs / weld seams would require to be cleaned / ground before painting. After applying the primer paints all the equipments / items shall be finished with two coats of enamel paint or any other paint as issued by BHEL. The exterior surface may have to be cement / coal tar painted as directed by BHEL

54.2 While the primers and paints will be issued by BHEL as free issue item, all tools and other consumables including scaffolding materials required for finish painting shall be supplied by contractor within their quoted rate.

55.0 FACILITIES TO BE PROVIDED BY BHEL/ CONTRACTOR

55.1 BHEL / NHPC shall provide limited open space for site office and store free of rental charge. It is the responsibility of the contractor to construct temporary sheds for his use, and to dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.

55.2 BHEL shall not provide space for labour colony . Contractor shall have to build his own colony/ quarters for his workmen/ staff on his own land or can take housing on rental basis in nearby places. Contractor shall be responsible for providing all necessary facilities to staff and workmen like construction of residential accommodation with electricity & water inside the rooms, proper sanitation, transport, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations.

55.3 The contractor shall arrange for his electrical power requirements. for the purpose of Erection & Commissioning. Contractor at his cost shall do further distribution. All wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply. **One DG set, provided by BHEL, shall be**

installed, Operated and maintained by the contractor at his own cost including cost of diesel and lubricants. In case BHEL HAVE MADE ANY ADVANCE ACTION FOR ELECTRIC POWER SAME SHALL BE RECOVERED FROM THE BIDDER.

55.4 The contractor shall have to arrange the water for construction purpose by himself for powerhouse and stores. Any further distribution will also be the responsibility of the Contractor as a part of his work.

55.5 Provision of distribution lines of electrical power 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.

55.6 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.

55.7 Adequate lighting arrangement such as flood lights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, storage area etc within finally accepted rates.

55.8. 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 instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the Engineer will be done it and expenses incurred shall be recovered from the contractor along with prevailing overhead. The decision of BHEL Engineer in this regard shall be final.

55.9 **1 NO LAPTOP WITH COLOUR PRINTER FOR EXCLUSIVE USE OF SITE INCHARGE DURING PERIOD OF CONTRACT INCLUDING EXTENSION PERIOD WILL BE PROVIDED BY CONTRACTOR**.

56.0 TIME SCHEDULE

56.1 The contractor is required to commence the work within 15 days from the date of issue of letter of intent unless BHEL decides to fix any other later date. However, BHEL Engineer will certify the actual date of start of work after adequate mobilisation of manpower, T&P and other pre-requisites as stated in the contract.

56.2 Entire work as detailed in the tender specifications shall be completed within 29 months from the date of start of erection work. Units 1 to 4 shall be commissioned by 26, 27, 28 & 29 months respectively. This schedule may have to be pre-poned by one month if so desires by BHEL/NHPC within the accepted rates.

56.3 Three shift working will be required to meet the overall completion schedule.

56.4 In case if there is suspension in work beyond three months due to reasons not attributable to contractor**, then the contractor will be permitted to demobilize their man power and establishment subject to the condition that the required manpower with T & P's will be made available for balance works, which will be as per scope / condition of the contract. In such case, the contractor has to remobilize required manpower Tools and Plants etc & take up the site works within fifteen days of intimation. For this purpose the contractor shall be paid a fixed lumpsum of Rs.2,00,000/- towards demobilization and remobilization. Out of this Lumpsum amount of Rs.2,00,000/- for this activity, Rs.80,000/- will be paid after demobilization and Rs.120,000/- will be paid after complete remobilization as per site requirement. No over run shall be paid for this period**

56.5 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.

57.0 OVER RUN

57.1 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 **three months** after the contractual completion date. In case the scheduled completion time gets extended beyond **three months** as stated above, the contractor shall be considered for payment of fixed over run charges **@ Rs. 1,00,000/- Per Month (Rupees One lakh per month only**) on receipt of advance notice intending to claim over run & on fulfilment of following condition:-

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.

57.2 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.

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

57.4 The ORC amount shall be restricted to 10% of the contract value.

58.0 TERMS OF PAYMENT

58.1 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.

58.2 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.

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

(A) ITEM 1 OF THE RATE SCHEDULE AND CLAUSE NO 56.5

I) 92% of contract rate of item No. 1 of rate schedule shall be payable on prorata basis as detailed in Annexure - A enclosed

NOTE: Further break-up of above terms of payment, if required can be carried out at site entirely at the discretion of BHEL.

II)a An amount limited to 1.7% 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 commissioning of HTG.

II)b An amount limited to 1.3% of the awarded contract value shall be payable in 26 monthly instalments @0.05%/month, solely at the discretion of Construction Manager/ BHEL on account of maintaining cleanliness at work places and following safety norms.

III) 5% of the balance value shall be payable as under

1 2.5% of the **contract value will be payable** on completion of all pending work, rework wherever required, area cleaning and reconciliation of materials as indicated in Annexure - **A**.

2. The balance 2.5% of the **contract value** will be payable after 3 months on contractors discharging his responsibilities as stipulated in this contract and on passing of final bill as indicated in Annexure - **A**.

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

59.0 LIQUIDATED DAMAGES(LD)

59.1 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.

60.0 SECURITY DEPOSIT

60.1 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 in 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.

61.0 OTHERS

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

61.2 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.

61.3 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.

62.0 INSURANCE

62.1 All equipment will be insured by M/s BHEL upto the time of completion of their erection, testing and commissioning within the comprehensive MCE policy. The MCE policy so taken shall have provisions for deductible franchise of 5% of the claim amount with a minimum value of Rs. 20,000/- during erection and Rs. 80,000 during testing. Subject to provisions of GCC clause No. 29.0 the deductible franchise shall be borne by contractor. The Contractor shall take an insurance policy for his T&P, for all the

workmen employed by him against accidents and injuries, under workman compensation, group insurance and as per the statutory requirements.

ANNEXURE - A

BILLING BREAK UP FOR SUB CONTRACTOR FOR PARBATI ST III ETC TENDER

SL no.	ACTIVITY		UNIT NO.				COM-MON	TOTAL
			I	II	III	IV		
1	**TURBINE**	26						
i)	Embedded parts comprising pier nose, primary embedded piping, DT elbow liner etc		1	1	1	1		4
ii)	Foundation parts comprising stayring, spiral csing including hydralic testing, secondary embedded piping, inlet pipe etc		1.5	1.5	1.5	1.5		6
iii)	Runner and shaft assembly		0.1	0.1	0.1	0.1		0.4
iv)	Guide apparatus trial and final assembly		1.25	1.25	1.25	1.25		5
v)	MIV(spheerical), inlet pipe,outlet pipe,,accessories, servomotors assy & testing		0.55	0.55	0.55	0.55		2.2
vi)	Guide bearing including pad scraping		0.4	0.4	0.4	0.4		1.6
vii)	Shaft sealing		0.1	0.1	0.1	0.1		0.4
viii)	OPU, pressure accumulator, governor etc		0.1	0.1	0.1	0.1		0.4
ix)	OPU adjustment, Dry stroking and time adjustment of Guide Apparatus		0.15	0.15	0.15	0.15		0.6
x)	Oil, air, water , MIV piping etc		0.75	0.75	0.75	0.75		3
xi)	Instrumentation and box up for readiness for spinning		0.1	0.1	0.1	0.1		0.4
xii)	Pre commissioning checks		0.5	0.5	0.5	0.5		2
								26
2	**GENERATOR**	30						
i)	Dressing of foundations		0.05	0.05	0.05	0.05		0.2
ii)	Stator assembly, joint winding, HV etc		1	1	1	1		4

BILLING BREAK UP FOR SUB CONTRACTOR FOR PARBATI ST III ETC TENDER

SL no.	ACTIVITY		UNIT NO.				COM-MON	TOTAL
			I	II	III	IV		
iii)	Stator shifting to pit and its alignment, levelling etc		0.1	0.1	0.1	0.1		0.4
iv)	Rotor assembly in service bay, HV etc		2.2	2.2	2.2	2.2		8.8
v)	Rotor lowering in pit		0.1	0.1	0.1	0.1		0.4
vi)	Lower bracket assembly in service bay		0.05	0.05	0.05	0.05		0.2
vii)	Instt of lower brkt in pit, alignment etc		0.1	0.1	0.1	0.1		0.4
viii)	Assembly brake, jack system, HS lub system		0.2	0.2	0.2	0.2		0.8
ix)	Upper bracket assembly including flooring sheets in service bay		0.25	0.25	0.25	0.25		1
x)	Instt of upper brkt in pit, alignment etc		0.1	0.1	0.1	0.1		0.4
xi)	Blue matching of bearing pads and thrust bearing components		0.2	0.2	0.2	0.2		0.8
xii)	Shaft and thrust bearing assembly in service bay		0.25	0.25	0.25	0.25		1
xiii)	Shifting thrust bearing, shaft assembly to pit incl final installation		0.05	0.05	0.05	0.05		0.2
xiv)	Installation of stator air coolers.		0.2	0.2	0.2	0.2		0.8
xv)	Fire protection system of generator and brake dust collector		0.2	0.2	0.2	0.2		0.8
xvi)	Generator instrumentation, gauge panel including caliberation		0.25	0.25	0.25	0.25		1
xvii)	Rotor/ turbine shaft coupling including any correction for alignment		0.1	0.1	0.1	0.1		0.4
xviii)	Rotor/ generator shaft coupling including any correction for alignment		0.1	0.1	0.1	0.1		0.4
xix)	Extension shaft, slip ring, brush gear, CCL etc		0.5	0.5	0.5	0.5		2

BILLING BREAK UP FOR SUB CONTRACTOR FOR PARBATI ST III ETC TENDER

SL no.	ACTIVITY		UNIT NO.				COM-MON	TOTAL
			I	II	III	IV		
xx)	Unit axis alignment		0.4	0.4	0.4	0.4		1.6
xxi)	Box up of bearings, air baffles, generator		0.8	0.8	0.8	0.8		3.2
xxii)	Pre commissioning checks		0.3	0.3	0.3	0.3		1.2
								30
3	Exc sys with AVR, Ex trans, acc etc	**2**	0.5	0.5	0.5	0.5		2
4	13.8 kV bus duct isolated type, terminal cubicles etc	**6**	1.5	1.5	1.5	1.5		6
5	53MVA 13.8KV/420KV stepup transformer I phase with associated eqmt	**6**	1.5	1.5	1.5	1.5		6
6	220V/48V DC system, battery banks, chargers, racks, electrolyte, main & sub dist boards	**1**	0.2	0.2	0.2	0.2	0.2	1
7	Control & Monitoring sys incl computers, VDU's, printers, optic fibre cable(incl Alarm & annunc.,sync panels, instruments, relays, automatic energy metering system etc	**2**	0.5	0.5	0.5	0.5		2
8	Protection system for gen and transformers with wiring & cubicles	**1.6**	0.4	0.4	0.4	0.4		1.6
9	Power, control & instrumentation cabling, cable trays, support structures,	**2.4**	0.6	0.6	0.6	0.6		2.4
10	11 kV Switchgear with all accessories	**1.2**	0.3	0.3	0.3	0.3		1.2
11	Unit stn service, aux, other transf with 415 V switchgear	**2**	0.5	0.5	0.5	0.5		2
12	Oil handling system	**0.8**	0.2	0.2	0.2	0.2		0.8
13	CW system fully independent open circuit for each unit & double loop cooling sys for each gen transf, clean water for shaft seal, HVAR,piping etc	**2**	0.5	0.5	0.5	0.5		2

BILLING BREAK UP FOR SUB CONTRACTOR FOR PARBATI ST III ETC TENDER

SL no.	ACTIVITY		UNIT NO.				COM-MON	TOTAL
			I	II	III	IV		
14	Drainage water pumps and piping etc for PH	1					1	1
15	Dewatering system pumps and piping etc	1					1	1
16	HP & LP comp air system with compressors, accessories, piping etc	1	0.2	0.2	0.2	0.2	0.2	1
17	Painting of equipment	1.2	0.3	0.3	0.3	0.3		1.2
18	Spining and bearing run of unit	1	0.25	0.25	0.25	0.25		1
19	Synchronising including commissioning tests prior to synchronising	2	0.5	0.5	0.5	0.5		2
20	Load throw off tests and unit inspection	0.8	0.2	0.2	0.2	0.2		0.8
21	Efficiency and type test on one unit including preparatory works	1					1	1
	TOTAL	92						92
22	As per clause No. 58.3	3						3
23	On completion of trial run and handing over the units to NHPC OR 3 months after the contractor has discharged his responsibilities as per contract, whichever is earlier.	2.5						2.5
24	2.5% of the contract value shall be payable on completion of all pending works, which includes settlement of all outstanding issues, reconciliation of material wherever required, area cleaning and handing over surplus materials and spares to NHPC/ BHEL and submission of final bill.	2.5						2.5
	TOTAL	100						100

ANNEXURE I

PARBATI III (4 X 130 MW)

FRANCIS TURBINE

PACKAGE WEIGHTS & DIMENSIONS

S.NO.	DESCRIPTION	NO. OF PACKAGES	PACKAGE DIMENSIONS (EACH)			PACKAGE WT	WEIGHT PER UNIT	TOTAL WEIGHT FOR 4 UNITS	SUM
			L	W	H	(T)	(T)	(T)	(T)
			(m)	(m)	(m)				
A)	**TURBINE (each)**								
1.0	Runner	1.0	3.5	3.5	1.5		18.5	74.0	
2.0	Shaft	1.0	3.5	1.6	1.6		20.0	80.0	
3.0	Head Cover(single piece)	1.0	4.5	4.5	1.7		40.0	160.0	
4.0	Bottom Ring(two halves)	2.0	4.4	4.4	1.5		30.0	120.0	
5.0	Regulating Ring	1.0	3.0	3.0	0.5		7.0	28.0	
6.0	Guide Vanes (20 nos)	1.0	1.5	3.0	1.0		6.0	24.0	
7.0	**Draft Tube Cone**								
	Upper Cone	1.0	3.0	3.0	1.0		3.7	14.8	
	Middle Cone	1.0	3.0	3.0	2.0		7.4	29.6	
	Lower Cone	1.0	3.5	3.5	0.5		1.1	4.4	
8.0	Draft Tube Liner(in six pieces)	6.0	-	-	-		18.0	72.0	
9.0	Stay Ring	2.0	3.0	3.0	1.5		18.0	72.0	
10.0	Spiral Casing (in 11 segments)	-	-	-	-		58.0	232.0	
11.0	Inlet pipe	1.0	-	-	-		12.5	50.0	
12.0	**Pit Liner**								
	Lower pit Liner(in two segments)	2.0	5.0	5.0	4.0		9.5	38.0	
	Upper pit Liner(in two segments)	2.0	5.5	5.5	4.0		10.5	42.0	
13.0	Guide Bearing	1.0	1.20	1.20	0.70		3.0	12.0	
14.0	Other misc. assemblies & Components	.------In suitable no. of transportable segment boxes.------					50.0	200.0	
B)	**MAIN INLET VALVE (each)**								
1.0	MIV assembly (main)	1.0	3.8	3.8	3.0		100.0	400.0	
	Remaining parts of MIV	1.0	-	-	-		26.0	104.0	
1.0	Counter weight	1.0					50.0	200.0	
2.0	MIV servomotor	2.0	1.0	1.0	3.0		7.0	28.0	
3.0	Other Misc. assemblies & components	.------In suitable no. of transportable segments boxes.-----					38.0	152.0	
C)	**AUXILIARIES (one set for complete power house)**								
1.0	Cooling Water Pump Motor Set	4.0					2.0	2.0	

2.0	Cooling Water Duplex Strainers	2.0					1.0	1.0	
3.0	H.P. Compressor motor set	2.0					2.0	2.0	
4.0	L.P. Compressor motor set	2.0					2.0	2.0	
5.0	Dewatering Pump motor set	4.0					2.0	2.0	
6.0	Drainage Pump motor set	20.0					10.0	10.0	
7.0	H.P. Air Receiver	1.0					1.0	1.0	
8.0	L.P. Air Receiver	1.0					1.0	1.0	
9.0	Misc. piping, valves, fittings for C-1 to C-11	L.S					250.0	250.0	
D)	**SPARES (one set for complete power house)**							0.0	
1.0	Runner	1.0	3.5	3.5	1.5		22.0	22.0	
	One set for turbine, MIV & auxiliaries	.-----In suitable no. of transportable segments/boxes.------					30.0	30.0	
	SUB TOTAL WEIGHT							2459.8	2459.8
HYDROGENERATOR CONSIGNMENTS(TENTATIVE)									
-	**PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	NAME OF COMPONENT	CASE PER M/C	DIMENSION			PACKAGE WT	TOTAL CASES (FOR 4 M/C)	TOTAL WEIGHT FOR 4 UNITS	
			L	W	H				
			(m)	(m)	(m)	(T)		(T)	
1.0	Wound Stator Sector	3.0	7.3	3.8	3.2	68.0	12.0	816.0	
2.0	Poles	18.0	4.4	1.1	0.7	4.4	72.0	316.8	
3.0	Rim Punching	44.0	2.0	1.1	0.5	2.6	176.0	457.6	
4.0	Top Shaft	1.0	3.0	1.5	1.8	13.0	4.0	52.0	
5.0	Bottom Shaft	1.0	3.2	1.5	1.8	16.5	4.0	66.0	
6.0	Thrush Collar	1.0	2.2	2.2	1.4	12.0	4.0	48.0	
7.0	Spider	1.0	3.7	3.7	2.2	19.5	4.0	78.0	
8.0	Top Bracket Housing	1.0	3.8	3.8	1.8	25.0	4.0	100.0	
9.0	Top Bracket Arm	6.0	2.1	0.7	1.8	2.5	24.0	60.0	
10.0	Bottom Bracket Housing	1.0	3.8	3.8	1.0	9.0	4.0	36.0	
11.0	Bottom Bracket Arms	6.0	1.0	0.6	0.8	1.0	24.0	24.0	
12.0	Air Coolers	6.0	2.8	2.4	0.7	1.5	24.0	36.0	
13.0	Plug in Type Oil Coolers for upper Bearing	6.0	1.2	1.0	1.0	0.8	24.0	19.2	
14.0	Plug in Type Oil Coolers for Lower Bearing	6.0	1.0	0.9	0.7	0.5	24.0	12.0	
	MISC PACKAGES			1.5	1.2		0.0	0.0	
15.0	Large Packages	12.0	3.0	1.5	1.2	1.0	48.0	48.0	
16.0	Medium Packages	22.0	2.0	1.0	1.0	7.5	88.0	660.0	
17.0	Small Packages	32.0	1.2	0.8	0.8	0.5	128.0	64.0	
	SUB TOTAL WEIGHT							**2893.6**	**2893.6**
HSE (Electrical)									

-	**TENTATIVE PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	DESCRIPTION	NO. OF PACKAGES	PACKAGE DIMENSIONS (EACH)			WT.OF EACH PACKAGE	TOTAL WT. OF PACKAGE		
			W	D	H	(T)	(T)		
			(m)	(m)	(m)				
1.0	**DC SYSTEM**								
	220V DC SYSTEM								
	Battery 1500 AH	60.0	1.0	1.0	2.5	1.5	90.0		
	Charger	2.0	3	1.0	3.0	2	4.0		
	DCDB	2.0	3.5	1.0	2.5	1	2.0		
	48V DC System						0.0		
	Battery 250 AH	***1.0***	1.5	1.0	1.5	1	***1.0***		
	Charger	2.0	1.2	1.0	1.2	1	2.0		
	DCDB	1.0	2	1.0	2.5	1	1.0		
	SUB TOTAL WEIGHT						**100.0**		**100.0**
SCHEDULE OF PANELS FOR STATIC EXCITATION SYSTEM									
-	**PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	SCOPE OF SUPPLY	NO. OF PANELS PER SET	NO. OF SETS	DIMENSION, MM			WIGHT OF EACH SET(KGS)	TOTAL WT.(KGS)	
				W	D	H			
1.0	Regulation Panel with AVR	1.0	4.0	1500.0	1250.0	2320.0	1000.0	4000.0	
2.0	Thyristor converter Panel	2	4.0	680	1250	2800	700.0	2800.0	
3.0	Field flashing Panel	1	4.0	1100	1250	2320	1000.0	4000.0	
4.0	Field Breaker Panel	1	4.0	1100	1250	2320	1000.0	4000.0	
5.0	Excitation Transformer with enclosure	1	4.0	2000	1500	2500	7000.0	28000.0	
	SUB TOTAL WEIGHT							**42800.0**	**42.8**
MAJOR ITEMS OF GOVERNING GROUP									
-	**PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	DESCRIPTION	NO. OF PACKAGES	PACKAGE DIMENSIONS (EACH)			WT.OF EACH PACKAGE	TOTAL WT. OF PACKAGE	TOTAL WT. OF PACKAGE	
			(mm)	(mm)	(mm)	(Kg)	(kg)	(T)	

1.0	**HYDRO MECHANICAL CABINET (HMC)**	4.0	3000(H)	1600(W)	1500(D)	1700.0	6800.0	6.8	
2.0	**MICROPROCESSOR BASED DIGITAL GOVERNOR (EHGC)**	4.0	2520(H)	1200(W)	1000(D)	900.0	3600.0	3.6	
3.0	**OIL SUMP TANK FOR GOV. (1.6 M. Cu)**	4.0	2012(L)	1412(W)	1850(H)	1850.0	7400.0	7.4	
4.0	**OIL PRESSURE RECEIVER FOR GOV. (1.6 M. Cu)**	4.0	1400(phi)	3000(H)		1825.0	7300.0	7.3	
5.0	**OIL SUMP TANK FOR MIV. (10 M. Cu)**	4.0	5480(L)	2480(W)	3000(H)	10500.0	42000.0	42.0	
6.0	**OIL PRESSURE RECEIVER FOR MIV. (12.6 M. Cu)**	4.0	2500(phi)	5800(H)		15000.0	60000.0	60.0	
7.0	**HYDRAULIC CONTROL PANEL FOR MIV.**	4.0	2450(H)	1020(W)	820(D)	350.0	1400.0	1.4	
8.0	**TROLLY MOUNTED OIL STORAGE TANK CAPACITY - 3 KL**	1.0	5000(L)	2000(W)	3000(H)	5000.0	5000.0	5.0	
9.0	**TROLLY MOUNTED OIL STORAGE TANK CAPACITY - 25 KL**	1.0	8000(L)	3000(W)	5000(H)	30000.0	30000.0	30.0	
	SUB TOTAL WEIGHT							**163.5**	**163.5**
CABLES									
-	**TENTATIVE LENGTH IN M**	-							
S NO.	DESCRIPTION				LENGTH	Unit Weight (kg/Km)	Weight(kg)		
A	**11 KV, 1 CORE, 300 MMSQ, XLPE**	….							
B	**600/ 1100V, PVC Insulated Cables**								
1.0	1 Core 300 MM SQ CU								
2.0	1 Core 630 MM SQ								
3.0	1 Core 400 MM SQ								
4.0	1 Core 240 MM SQ								
5.0	1 Core 185 MM SQ								
6.0	1 Core 120 MM SQ								
7.0	1 Core 1000 MM SQ								
8.0	2/4 Core 6 MM SQ (CU)								
9.0	4 Core 10 MM SQ								
10.0	3.5 Core 35 MM SQ								
11.0	4 Core 16 SQ MM								
12.0	3.5 Core 25 SQ MM								
13.0	3.5 Core X 50 SQ MM								
14.0	3.5 Core X 120 SQ MM								
15.0	1 Core X 500 SQ MM								
16.0	2 Core X 25 SQ MM								

17.0	1 Core X 4 SQ MM								
18.0	2 Core X 4 SQ MM								
19.0	4 Core X 4 SQ MM								
20.0	1 Core X 50 SQ MM								
B	**2.5 MM SQ Control Cable - PVC**								
1.0	2 Core								
2.0	4 Core								
3.0	7 Core								
4.0	12 Core								
C	**0.5 MM SQ Twisted Pair Instrumentation Cable**								
1.0	2 Pair								
2.0	4 Pair								
3.0	8 Pair								
4.0	16 Pair								
D	**Telephone Cable**								
1.0	2 p, 5p, 10p & 20p								
E	**Cables for PAS**								
1.0	Signal Cable								
2.0	Power Cable								
	SUB TOTAL WEIGHT								**400.0**
SCHEDULE OF PANEL/DESK FOR CONTROL & MONITORING SYSTEM									
S.NO.	DESCRIPTION	NO. OF SETS	NO. OF PANELS/ SUITES/ DESKS PER SET	Size of each panel/suite/desk					
				W	D	H			
				mm	mm	mm			
1.0	**LOCAL CONTROL BOARDS**								
1.1	**Unit Control Board (UCB)**								
1.1.1	Control & Monitoring Panel	4.0	1 suite	(750+750+750+750)	800.0	2350.0			
1.1.2	Temp. msmt. Panel on floor EL.974.00	4.0	1.0	950.0	800.0	2320.0			
1.1.3	Ins. Panel on floor EL.974.00	4.0	1.0	950.0	800.0	2320.0			
1.1.4	Gauge Panel on EL.974.00	4.0	1.0	1000.0	800.0	2320.0			
1.1.5	Remote Panel on floor EL. 968.50	4.0	1.0	750.0	800.0	2320.0			
1.1.6	Remote Panel on floor EL. 963.70	4.0	1.0	750.0	800.0	2320.0			
1.2	**Local Control Board(LCB) for Common, Station Service & Dam Monitoring**								
1.2.1	Control & Monitoring Panel	1.0	1suite	(750+750+7	800.0	2320.0			

				50)					
1.2.2	Remote Panel	1.0	1.0	750.0	800.0	2320.0			
1.3	**Local Control Board(LCB) for Electrical Power Supply Service Board**								
1.3.1	Control, Monitoring Panel	1.0	1suite	(750+750+750)	800.0	2320.0			
1.4	**Local Control Board(LCB) for 420 KV GIS**								
1.4.1	Control, Monitoring Panel	1.0	1suite	(750+750+750)	800.0	2320.0			
2.0	**Computerized system in Central Control Room**								
2.1	Operator Stations	1set	1 desk	3600.0	800.0	1100.0			
2.2	Simulator Station	1set	1 desk	1800.0	800.0	1100.0			
2.3	Engineer's Station(Desk top)	1set	1 desk	900.0	800.0	1100.0			
2.4	Engineer's Station(Lap top)	2set	1 table	900.0	800.0	1100.0			
2.5	maxLINC PC	1set	1set	900.0	800.0	1100.0			
2.6	maxSTORIAN PC	2sets	1set	900.0	800.0	1100.0			
2.7	Tables for Plant Computers Servers & Printers	10 nos.	1.0	900.0	800.0	1100.0			
2.8	Printers	1set	2 tables	2000.0	750.0	1000.0			
3.0	**Large Screen Display Unit**	**1.0**	**1.0**	**3000.0**	**2000.0**	**1000.0**			
4.0	**Network Interface Panel**	**1.0**	**1panel**	**750.0**	**750.0**	**2250.0**			
5.0	**Global Positioning System**	**1.0**	**1panel if required**						
6.0	**Dam RTU**	**1.0**	**1panel**	**1000.0**	**800.0**	**2320.0**			
6.1	UPS fro Dam RTU	1.0	Later	Later					
7.0	**Hardwire Emergence/control panel for units**	**4.0**	**1panel**	**1000.0**	**800.0**	**2320.0**			
8.0	**Hardwire Emergence/control panel for station**	**1.0**	**1panel**	**1000.0**	**800.0**	**2320.0**			
	SUB TOTAL WEIGHT								**110.0**
TRANSFORMER									
-	**PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	DESCRIPTION	QTY. PER TRNASFORMER	TOTAL QTY.	DIMENSION, MM			WIGHT PER PACKAGE	TOTAL WT.	
				L	B	H	KG	(T)	
1.0	TRANFORMER	1.0	12.0	3750.0	3200.0	3700.0	67000.0	804.0	
2.0	HV BUSHING	1.0	12.0	3500.0	800.0	800.0	450.0	5.4	

3.0	NEUTRAL BUSHING	1.0	12.0	2000.0	500.0	500.0	200.0	2.4	
4.0	LV BISHING	1.0	12.0	1500.0	600.0	900.0	200.0	2.4	
5.0	M. BOX	1.0	12.0	1000.0	800.0	1500.0	600.0	7.2	
6.0	COSERVATOR	1.0	12.0	3000.0	1200.0	1200.0	800.0	9.6	
7.0	PIPE WORK	2.0	24.0	4000.0	600.0	600.0	650.0	15.6	
8.0	TRANSFORMER OIL	98.0	1176.0	Std. Drum of size 210 L			200.0	235.2	
9.0	LV TURRET	1.0	12.0	1500.0	700.0	700.0	500.0	6.0	
10.0	OFWF COOLER	2.0	24.0	3500.0	800.0	800.0	1500.0	36.0	
11.0	MISC./Instruments etc.	1.0	12.0	4000.0	2000.0	2000.0	2000.0	24.0	
	SUB TOTAL WEIGHT							**1147.8**	**1147.8**
		MISCELLANEOUS							
-	**PACKAGE WEIGHTS & DIMENSIONS**	-							
S.NO.	DESCRIPTION	NO. OF QTY.	PACKAGE DIMENSIONS (EACH)			UNIT WEIGHT	TOTAL WT.		
			(mm)	(mm)	(mm)	T	T		
1.0	**BUS DUCT, LAVT, NGC including steel structures**	4.0				75.0	300.0		
2.0	11 KV switch gear, UAT 4 no.						180.0		
3.0	GAS INSULATED SWITCH GEAR	1.0					150.0		
4.0	Oil handling System	1.0					50.0		
5.0	Cable trays & accessories						200.0		
	SUB TOTAL WEIGHT						**880.0**		**880.0**
								TOTAL=	**8197.5**

ANNEXURE - II

SCOPE OF WORK

Scope of work mainly consists of pre-erection assembly, erection, testing (including hydraulic, NDT, electrical, stage & final HV including dry out etc of relevant equipments at various stages during erection), pre-commissioning and commissioning including trial run, handing over to customer NHPC of the following equipments for four units of 4X130 MW PARABATI HEP-III head (Rated net head of 334.30 meters) 333.33 RPM clockwise vertical Francis type Hydro Turbines (with having salient poles with close air circuit), vertical shaft type Hydro Generators with partially wound stators in three sectors each and rim type Rotors, connected to single phase 53 MVA,13.8/400 KV Generator Transformers through isolated phase13.8 KV, 700 Amps. Bus Ducts.

1. Each Turbine comprising mainly of
   - Embedded parts namely Draft Tube liner supplied in 6 segments, Draft Tube Cones (upper middle & lower) all in single piece each, primary embedded piping etc.
   - Foundation parts namely. Stay ring in 2 sections with Spiral Casing in eleven segments, Inlet pipe, secondary embedded piping, Upper & Lower Pit liners etc. The Spiral casing weld joints shall be Ultrasonically / Radiographically tested as per drawing. Complete spiral after welding with stay ring is to be pressure tested at site.

   - Set of Guide Apparatus & Servomotors, Guide Bearing, Turbine Shaft sealing, Runner, Turbine Shaft, Bottom Ring ,Head cover, Fixed & Rotating Labyrinths (upper & lower), Discharge ring, Centralised grease lubrication system, complete with associated instrumentation, Cabling works and other standard assemblies etc,
     -Set of chequered plates, handrail etc. along with associated equipment.

2. A Electro hydraulic Governors comprising of Hydro Mechanical Cabinet, Micro processor based MaxDNA controller, Electro Magnetic Transducer and Hydraulic amplifier, Gate opening limiter, Feed back shaft, Lever transmission, Feed back gear, Main slide valve, Contact device of gate limiter, Control and measuring instruments, Double oil filter & Emergency closing valve, Over speed protection device, Emergency closing solenoid valve, Rotary cam switch bank, Head race/ Tail race level measuring equipment, Discharge measuring system, Oil pumping unit etc along with its piping and associated accessories.

3. Each Main Inlet Spherical Valve (MIV) dia 2300 comprising mainly of
   - Body & Door (fabricated type), Maintenance seal, main seal, Out let pipe with dismantling joint, Inlet pipe, Air valve, Bypass valve each in one no. and two Levers and Servo motors, Set of control gears, sundry items and stairs, ladders, Plate forms etc.
   - a set of Hydraulic Pressure testing equipments for testing at site.
   - Centralized Grease Lubrication System, Oil Pressure Unit etc. along with its piping and associated accessories.

4. Each Generator comprising mainly of

- Partially Wound Stator in three sectors with balance winding to be done at site, Air Coolers, anti-condensation Pit heaters and Control Panels,
- Rim type Rotor assembled around the Spider having 18 no. Poles, Thrust collar, Tabular shaft, Slip rings, Brush gear etc.
- Cutting of molded air guides while maintaining proper gaps with Rotor fans to suit the assembly at site.
- Thrust bearing upper, lower and Upper Guide Bearings, plug in type Oil Coolers,
- Brake & Jack system, HS lubrication system, Carbon dust collection system for slip rings, Brake dust collection system consisting of extraction unit, hoppers, hoses etc
- Upper and Lower Brackets, Upper and Lower Air Baffles, Generator covering segments, Turbine pit cover segments etc.
- Cooling water system with starter panels, water flow, pressure, temperature monitoring and necessary regulating/ check valves etc.
- Water mist fire extinguishing system,
- Various indicating & measuring instruments and devices like Temperature Recorders Over speed, on line Vibration monitoring, Rotor temperature indicator, Partial discharge monitoring, SSG, Moisture detectors in oil, Shaft current monitor, Air gap monitoring system etc,
- Various foundation plates, foundation bolts, barrel access door, lighting arrangement for barrel, dome and turbine pit areas, various instruments/ control devices etc,
- Blue matching of bearing pads with shafts and components of thrust bearing thrust bolt, thrust block etc. with corresponding parts shall be carried out along with associated equipment.

5. Static Excitation systems and AVRs consisting of Excitation Transformers, AVRs, Rectifier system, Power supply units, AC/DC Field flashing equipments including Transformers, Field circuit breakers, Dynamic breaking equipment, Digital control and Metering equipment, JB's and its wiring etc along with associated equipment.

6. Isolated Phase 13.8 KV Bus Ducts mainly comprising of 4 sets each of main Bus Duct, Delta Bus Duct, Tap off Bus Duct for UAT, LAVT, Excitation Transformer & NG cubicle, one set of tap off bus duct for SST, 4 sets each of LAVT, VT, NG cubicles, galvanized steel structures, etc along with various rubber bellows, seal off bushings, CTs, VTs and other associated equipment. Field tests during erection/ commissioning current carrying capacity, voltage withstand test etc.

7. Generator Transformers single phase, 53 MVA, 13.8 KV/ 420 KV along with set of Valves, Piping, Hangers, Hardware, CW system, a set of Rails and other associated equipment. Apart from routine tests on all 13 Transformers including Oil filling, Drying, Charging etc. The temperature rise test and Dielectric type test shall be conducted on one unit. The connection on HV side to the 420 KV overhead lines shall be done by other contractor and not in the scope of this work. Transformers unloaded by Material handling contractor from trailer in Service Bay area and positioned on the foundation under the scope of this contract either by dragging or with the gantry crane (if foreseen). All further piping etc shall be under the scope of this contract.

8. One set of each 220 V DC & 48 V DC, Two sets of Battery chargers systems for Power House comprising of lead acid battery banks, electrolyte, portable distilled water plant,

2 float cum boost chargers for each of the battery sets, racks, main and sub distribution boards, protection and controls, UPS 2 no. along with associated equipment and its entire cabling works.

9. Control & Monitoring system comprising of Local control boards are provided for each of the following; Unit control board for each units 1-4, LCB for common, station service and Dam monitoring, LCB for Electrical power supply service board & for 420 KV GIS. Computerised Control equipments in Central Control Room with different electronic equipments, Process Control Networks & Power house LAN for Fiber optic network between Ethernet switches, control boards, various Computers, Printers etc., RTU at Dam & Connectivity to Parbati Stage-II. MMI, mosaic mimic board, control master clock system, CAD station, UPS system, optic fiber cable including Central Alarm & Annunciation Panels one each in central Control room and Switchyard control room, Synchronizing Panels, Automatic energy metering system with panel in central Control room and Switchyard, Instruments, Relays, Power and Control cables for all above equipments along with associated equipment.

10. Protection system for Generators and Transformers comprising of various Relay Panels.

11. Power and Control cables complete with cable terminals, accessories, trays/ support structures, cabling/-wiring, proper dressing and clamping of cables on trays for Turbine, generator & controls alongwith associated equipment, covered in BHEL scope of supply. some of the type of cables are mentioned below:

- HT Cables 11 KV cabling for connecting 11 KV switchgear in Power house to Station Auxiliary Transformer, 13.8 KV for Tap off Transformer, 1000KVA DG Sets, Pole structure in Pot Head Yard and Main Access Tunnel for regional and future use supply.
- LT power cables,
- Low level instrumentation cables,
- Control cables of different sizes (Single and multi core),
- Cable trays of standard widths 150, 300, 450 600 mm
- Cable/wiring conduits i.e. PVC and/or metallic of different sizes generally upto 75 mm.

12. 11 KV indoors metal clad vacuum Switchgear and Unit Tap Off Transformers comprising mainly one no. 17 panel switch board , set of Earthing trucks and different type of Modules / Pannels along with other associated equipment.

13. 415 V Switchgear & Station Auxiliary Transformer system comprising
- 4 sets of Unit auxiliary boards,
- 1 set for Station aux board 1-2-3-4
- 1 set for Electrical testing lab board
- 1 set for miss. Service board
- 1 set for HP and LP Compressor board.
- 1 set for Illumination board.
- Sets of Pot Yard cum DG board etc

- Power sockets & isolating switches etc along with associated equipment for powerhouse. Each board shall be in 3 poles 415 V and different value of current MCCB S.

14. Cooling Water System: The station shall have a combined cooling water and partial dewatering arrangement utilizing the same pump to meet the cooling water and partial dewatering requirement. Other auxiliaries like compressor along with piping, valve, pressure reducer, strainer element/candle, and multimedia pressure filter tank for cooling water system. The set shall consist of following:
    - Four set of CWS for Turbine, Generator & Transformer
    - One set for HVAC, Shaft seal CW circuit, Erection & maintenance tools, Instruments and Control devices etc.

15. The Power House Drainage/ Dewatering sump shall have four continuous duty submersible pumps each which will discharge water into one common header and finally into Tail Race above Maximum flood level . All the pump-motor sets shall be suitable for operation on 415V,3Phase 50Hz. The system shall be complete with adequate numbers of isolating valves non-return valves, fitting supports and instrumentation.

16. HP and LP Compressed Air System: One set of HP & LP Compressed air system comprising mainly of two no. A. C. motors in each system driven air compressor one for main and other stand by ,for supplying air for automatic starting/stopping of motor and very low pressure alarm shall be provided. HP compressor for pressured air to Governing Oil System of Turbine & MIV. It will also cater the air requirement of Generator Breaking System, and Turbine maintenance Seal air etc. at reduced pressure in addition to LP Compressed air supply. Necessary accessories like Air Filters, Air Dyers Piping, fittings, pipe support, adequate numbers of isolating valves, non- returns valves, safety valves, pressure gauges etc. shall be provided.

17. Oil Handling System: Consists of the following :
    - Lubrication Oil Purifying system Plant capacity 1200 LPH & 3 KL Storage Tank.
    - Degassing and Dehydration Chambers, Vacuum Pumping System, Discharge Pump, Isolation valves, Control panels, pipe line and Valves etc. and associated equipments.

GENERAL

- Erection of primary embedded, secondary embedded and surface/ exposed air, oil, water or any other pipelines for all above systems including cleaning, clamping, flushing, hydraulic testing as per drawing requirements and standard practices etc. The ends of the pipe lines shall be kept covered during concreting and/or other civil works.

- Finish painting of equipment as per drawing requirements. Painting may also be required on embedded / foundation parts prior to concreting etc.

- Some of the main tests apart from the routine tests during erection, pre commissioning and commissioning shall include HV, SCC, OCC, load rejection tests up to 110 %, emergency stop tests, over speed tests, Turbine & Generator output tests, Vibration measurement & balancing, etc. on all units and Field efficiency test and Type test on one unit. Inspection of the units shall be carried out after load throw off tests and re-tightening of wedges, fasteners etc if required shall be carried out.

- Earthing / grounding of all electrical equipments with the near by risers coming from bottom earth mat shall be done as per relevant standards and proper quality. Contractor shall pay special attention in this aspect to meet the requirements of BIS.

- Any other works required to be carried out which have not been explicitly mentioned above but are essentially required to be carried out to complete the individual assemblies and the unit/ units as a whole including pre commissioning and commissioning.

- Special welding electrodes for main assemblies like Draft tube, Spiral casing, Inlet pipe etc. and general purpose welding rods shall be arranged by contractor at his own cost.

- Insulating materials for stator winding shall be provided by BHEL.

- First filling of oil with 10% extra for Turbine and Generator bearings, OPU system, and Transformers shall be supplied by BHEL. Any undue wastage of oil due to mis-handling, poor quality of piping and/or other works resulting into leakages or spillages shall have to be arranged by contractor at his cost or recoverable from him.

- In order to save time of assembly/erection of Spiral Casing, the welding shall be carried out by MIG process as far as possible. Two shift or preferably three shift working with deployment of sufficient number of certified welders, fitters etc. shall be adopted to ensure completion of Stay Ring and Spiral Casing assembly in maximum of three months period.

- Since the subsequent units shall have to be erected/ commissioned with a gap of 1 months from the previous unit and there is a provision for assembly of two rotors in Service Bay at a time, the contractor shall have to complete the rotor (Which is rim type with 18 poles) assembly in around 3 months by working round the clock in this area. Moreover, two-shift working shall have to be adopted by the contractor to meet the erection schedule.

- In view of the tight erection schedule, limited area in Service bay and rotor assembly being in critical path, whatever pre-erection preparatory works can be carried out in BHEL store area shall have to be planned accordingly. In particular, the cleaning, de-burring, de-greasing and segregation of Rim punching by weight shall definitely be planned and carried out in store area located within about 10 KM from Power House.

NDT:

Stay ring, spiral casing, MIV, inlet pipe of spiral casing, inlet pipe of MIV etc. welding to be tested Radiographically, Ultrasonically, Magnetic Particle Inspection as per drawing

requirement. Other welding joints shall be tested by DP Test or as stated in subassembly / assembly drawing.

Exclusions:

All civil works.

Covers for trenches

BRIEF DESCRIPTION OF TURBINE

Embedded parts: The embedded parts comprise mainly of, Draft tube liner lining, draft tube and embedded pipelines in primary concreting.

The Draft tube liner weighing approximately 18 tones having inlet diameter of 2909 mm with exit cross section of 5747 x 2352 mm and shall be fabricated at site from structural steel plates in 6 pieces.

Draft tube cone will be supplied in three parts each in single piece with following dimensional details:

Part description	Inlet dia (mm)	Outlet dia (mm)	Weight in(kg)	Thickness (mm)	Height (mm)
Upper Cone	2516	2650	3700	32	903
Middle Cone	2650	2886	7400	32	1700
Lower Cone	2886	2909	1100	32	230

Upper and middle parts will be bolted together while middle and lower parts will be bolted and seal welded.

Foundation parts: The foundation parts comprise mainly Stay ring, Spiral casing, Inlet pipe, Turbine pit liner, foundation ring and embedded pipes in secondary concreting.

The stay ring with over all diameter 5480 mm, throat height of 600 mm and weighing approx 28 tones is supplied in 2 halves to be bolted together with studs and finally seal welded. Centerline of the stay ring is at EL 961.0 meters. Same sets of holes are used for fixing of cylindrical plug during hydraulic testing of spiral casing, which are to be plugged by welding after hydraulic testing.

The Spiral casing approx. 58 Tons in weight with inlet dimension of 2324 mm is supplied in 11 segment rolled out of plates having max. thickness of 61mms and minimum thickness of 30mm, which are to be finally matched, assembled, and welded at site with the stay ring.

Two closing members have been provided with erection allowance to be matched at site. Edge preparation in few sections may have to be done at site. The weld quality shall have to be ultrasonic tested.

The assembled Spiral casing shall be hydraulically tested at site for which the test pump shall be supplied by BHEL. Suitable test gauge shall be arranged by the contractor. The central test plug bolted type is in single piece and bolted to stay ring. The conical plug on spiral inlet end fabricated out of 45 mm plate is also in single piece welded type and shall be welded at site for hydraulic testing of spiral and then cut after testing.

Inlet Pipe

The inlet pipe shall be fabricated from steel plates having thickness of 61 mm with a flange on one end connected to MIV dismantling joint and other end shall be welded to spiral casing The inlet pipe shall be provided with .a manhole and cover. The overall dimension of inlet pipe will be approximately 2323 mm ID, 2319 length and 12.5 tonnes weight.

Turbine pit liner:

Turbine pit liner will be supplied as lower pit liner & upper pit liner each in two segments with following dimension.

Descriptions	Innerdia (mm)	Height(mm)	Thickness (mm)	Weight (Tons)
Lower pit liner	4800	3562	8	9.5
Upper pit liner	5300	3700	8	10.5

Embedded pipe lines in first stage & second stage concreting of various piping for all 4 units have been provided. Necessary cutting in pit liner etc wherever required for the embedded pipelines, hydraulic testing of pipelines before concreting, pickling etc shall have to be done at site. Pipes up to approx 50mm / 65 mm diameter shall in general have to be bent at site.

Guide apparatus 20 guide vanes of 450 kg are located at PCD of 3776 mm. Regulating ring is located out side the guide vane PCD. Top cover weighing 40 ton single piece and bottom ring weighing 30 tones are in two segments. Two servomotors are mounted on base plates to be installed / leveled at site.

Runner & shaft assembly

The Francis type runner assembly with OD 3372 mm and height 1170mm is in single piece weighting about 18.5 tones. The runner cone is in one parts. The stoppers / plugs of runner cone shall be welded at site after tightening of the bolts.

The turbine shaft 3662 mm long and dia 790mm is flanged type at both ends with guide bearing journal of diameter 1100 mm. This is bolted to runner bolts and to generator shaft. Bolts are elongation tightened by thermal tightening to required elongation. The bolts & bushes are to be assembled with anti friction grease to be arranged by the erection contractor.

Turbine guide bearing

Self pumping lubrication type guide bearing with 8 segments has been foreseen. Semi circular coolers are mounted inside the guide bearing housing. Guide
Bearing shall be submerged self oil lubricating, pivoted pad type with external/internal coolers. The bearing shall be situated above the shaft gland as close to the turbine runner as possible.

Main Inlet Valve:
2300 mm diameter spherical valve with SS sealing arrangement has been provided on the main inlet valve before the turbine. The main body is fabricated / machined and is bolted together in two halves. It has service seal (Main seal) on D/S side and SS Maintenance seal on U/S side. Levers, Servomotors by pass valve, Air release valve. The valve door is also fabricated / machined which will be bolted together with trunnion on both sides. The complete assembly is to be pressure tested at site before installation.
Inlet Pipe with tapper piece of MIV:

The inlet pipe 32mm is in one piece of diameter 2300 mm. This shall be welded on upstream side to penstock at site. It shall be subjected to `100% ultrasonically / radiographically tested at site as per drawing.

Outlet pipe with dismantling joint

The outlet is in one piece dia 2300 mm. Dismantling Joint (SS) is provided to facilitate dismantling of the spherical value.

Turbine sealing

3-layer rubber segment type sealing has been provided which is assembled on a bracket to be mounted on the top cover. Inflated type maintenance seal has also been provided. The carbon ring segment shall be sealing against the rotating sleeve to be fixed on the turbine shaft flange.

Other standard assembles

Various assembles like feedback system, top cover drain pumps, oil pumping system, oil air receives, oil leakage unit as generally provided in any hydro unit are all foreseen which shall be erected at site.

Feedback mechanism

It comprises of a mechanism to transmit the guide apparatus movement signal to the hydro mechanical cabinet (HMC) of governor. This is achieved through a wire rope with necessary brackets and versatile rollers connected from regulating ring to master switch and in turn to HMC.

Installation of metering instruments

Pressure and temperature measuring instruments are installed on this metering panel to measure the pressures of different points like penstock, spiral casing, draft tube, sealing air & water pressures, servomotor closing & opening pressures etc. The pipelines shall be hydraulically tested to required pressures and picking to be done before assy.

Monorail assy.

2 tone capacity monorail assembly has been provided in the turbine pit to handle various components of guide apparatus and guide bearing etc.

Platform in turbine pit

Chequered plate platform has been foreseen for easy movement in the pit. Plates are fixed over the angle frame with M8/ M12 screws for which matching holes are to be done at site.

Oil, water, air pipelines

In general pipelines are to be assembled / fabricated strictly as per requirement of drawing, however for smaller pipes of 65NB and lesser dia pipe routing can be changed to suit condition at site and bending of pipes to be done at site. For longer dia pipes mitre / gusset bends are to be fabricated as per the routing shown in the drawing and as required to be modified at site.

Pipelines after erection shall be tested at required pressures as per drawing requirement. Pipes shall be cleaned by acid picking and flushed, properly clamped, painted at site.

BRIEF DESCRIPTION OF GENERATOR

GENERAL:
The generator is of vertical shaft type semi umbrella having salient poles construction with closed air circuit ventilation and suitable for coupling to a Francis turbine. Static excitation system is provided for energizing the field winding of rotor. This supply is fed through slip rings located above the generator rotor on an extension shaft.

The generator thrust bearing and a guide bearing is positioned below the rotor in lower bracket and a guide bearing above the rotor in upper bracket. The bearings are of self-lubricating type and immersed in oil bath in which plug-in type oil coolers are provided. Thrust bearing is provided with high-pressure oil injection (HS Lubrication) system. Air operated brakes are mounted on lower bracket arms. These are also used for lifting the rotor for maintenance purposes. For trapping and subsequent evacuation of the brake dust generated during braking operation, brake dust collection equipment has also been provided. Space heaters are provided inside the barrel for removed of humidity during non-operation of generator.

Air coolers are directly mounted on the outer steel casing of stator. Water Sprinkler type fire extinguishing system is located inside the generator. For monitoring the air gap in between generator stator-rotor & vibrations on the bearings of the machine, an on-line (continuous) monitoring system has been provided.

A partial discharge analyzer has been provided to monitor the condition of the stator winding. Creep running of the machine is detected though a creep detector.

GENERAL DESCRIPTION OF VARIOUS ASSEMBLIES.

WOUND STATOR: The partially wound stator has been dispatched to site in 3 segments. The assembly of the winding bars at the joints (App 120 no.) of the stator segments is carried out at site at the time of erection of the machine. For lifting/ handling of each complete assembled stator weighing app 200 tones from service bay to the generator pit, supplied beam to be used NDE for lifting the wound stator. The complete stator is to be HV tested at site.

GENERATOR SHAFT & THRUST-CUM-GUIDE BEARING COLLAR: The shaft is having integral thrust-cum-guide bearing collar. The bottom surface of the collar is polished in fine limits to act as runner surface.

Generator upper shaft having integral guide bearing jurnal – 6.5 tonne

SPIDER: Rotor spider is a fabricated structure having central hub and 9 arms integral. The segmental type brake track is mounted on the spider.

ROTOR RIM: The rotor rim, which is assembled around rotor spider at site, is built up from sheet steel laminations. The laminations are pressed between steel end plates during assembly and clamped by means of tight fitted studs. The rim segments do not have equal weight due to variation in thickness. Therefore, all the laminations are required to be degreased, cleaned, de-burring if any, segregated in groups of equal thickness by weight measurement and accordingly assembled. The rim is secured tangentially to the rectangular bars of the spider with sets of 8 part keys having a master key, so as to allow the rim to float freely during operation. As such, no hot wedging shall be required to be carried out. Broaching of the rim shall have to be done at site as is usual in rim type rotors.

POLES WITH FIELD WINDINGS: There are 18 poles each having 4 no. ‘T’ shaped tails to engage with corresponding ‘T’ shaped slots in rotor rim. Damper connections have also been foreseen. Weight is 5 tonnes each.

SLIP RINGS & BRUSH GEAR: The slip rings are mounted on the upper tubular shaft during erection. The brush-gear collector shall be mounted on the brush gear casing on top bracket.

CARBON DUST COLLECTION SYSTEM: Necessary arrangement is provided to prevent mixing of carbon dust with closed air ventilation system of generator. A small centrifugal fan is provided on extension shaft under the slip rings assembly. The carbon dust is collected in the cleanable filters mounted on the brush gear casing.

BEARINGS:

THRUST BEARING: Thrust bearing is positioned below the rotor in lower bracket. Thrust bearing is of pivoted segmental pad type consisting of a set of 12 nos. babbited segmental pads. TB frame has been split in two halves having flanged ends that have been doweled together and joined with a no. of fasteners. This has been done to facilitate insertion of generator shaft through it. The main shaft and thrust bearing assembly pit has been provided in the service bay for carrying out this assembly and a device has been provided for shifting this composite assembly from service bay to the pit. The assembly stools have been provided for carrying out this assembly. The bearing is of self-lubricating type and immersed in oil bath in which plug-in type of oil coolers are provided.

GUIDE BEARINGS: Two nos. segmental pad type of guide bearings are provided for generator; one positioned below the rotor along with thrust bearing housed in lower bracket having 12 nos. pads and second above the rotor housed in upperbracket having 12 nos. pads. The guide bearings are of pivoted pad type consisting of a row of white metal pads.

HYDROSTATIC LUBRICATION SYSTEM: A high-pressure oil system is provided for the thrust bearing in order to create a positive oil film over the pads at low speeds. The components consist of a positive displacement pump with its motor, filters, valves etc. mounted on a steel base.

VENTILATION:
The generator has closed circuit system of ventilation. 6 nos. of air coolers have been fixed to the outer periphery of the stator frame.

UPPER BRACKET:
The upper bracket consists of a fabricated steel structure having a central part and 6 nos. radial arms. The arms have been detached and are to be bolted. It supports the weights of the stationary parts of brush gear, upper air baffles, generator covers, mechanical over speed device, creep detector, speed signaling generator (S.S.G) etc.

LOWER BRACKET:
The lower bracket consists of a fabricated steel structure having a central part and 6nos. radial arms. The arms have been detached and are to be bolted and finally welded to the central part at site. The lower guide bearing and thrust bearing is housed in it along with oil coolers. Brake-cum-jack units are also mounted on the bracket for rotor braking.

BRACKING AND JACKING SYSTEM: has been provided for the braking by air pressure of the unit during stopping and jacking whenever required during maintenance time by oil pressure .

Brake dust collection equipment: The brake dust collection equipment consists of two extraction units for each hydro generator, hoppers around brake assembly for trapping the brake dust and flexible hoses for connecting hoppers to extraction unit.

COOLING WATER SYSTEM:
Cooling water pipe lines along with pressure gauge and flow monitoring instruments are provided to supply cooling water to air coolers and oil coolers.

MAJOR INSTRUMENTS & DEVICES:

- Mechanical over speed device and creep detector
- On line condition monitoring system for vibration & air gap.
- On line partial discharge monitoring system.
- Speed signaling generator

ANNEXURE-III

LIST OF T&P BEING PROVIDED BY BHEL FOR USE OF CONTRACTOR FREE OF HIRE CHARGES ON SHARING BASIS

S.NO.	EQUIPMENT	CAPACITY	QTY
1.	HYDRA CRANE	14/20 T	01
2.	TYRE MOUNTED CRANE	55 T	01

NOTE:

1. THE ABOVE MENTIONED SUITABLE CAPACITY CRANE WITHOUT SLINGS & LIFTING TACKLES WILL BE PROVIDED BY BHEL ON SHARING BASIS. THE OPERATION AND MAINTENANCE OF CRANE SHALL BE THE RESPONSIBILITY OF CONTRACTOR. THE FUEL SHALL BE ALSO GIVEN BY CONTRACTOR. ALL OTHER TERMS & CONDITIONS SHALL BE AS PER TENDER CLAUSE NO. 37.

2. EOT CRANES IN THE POWER HOUSE WILL BE ERECTED / COMMISSIONED BY ANOTHER AGENCY OF CUSTOMER AND MAY BECOME OPERATIONAL ANY TIME DURING THE PERIOD OF SUBJECT WORK. THESE EOT CRANES WILL ALSO BE PROVIDED BY BHEL FREE OF HIRE CHARGES & ON SHARING BASIS FOR SUBJECT WORK WITH EXCLUSIONS AS ADVISED. THE MAJOR MAINTENANCE OF EOT CRANE WILL BE CARRIED OUT BY AHPCL. ROUTINE MAINTENANCE SHALL BE TAKEN CARE BY THE CONTRACTOR UNDER THIS SCOPE OF WORK. HOWEVER, CONTRACTOR WILL NOT BE ENTITLED FOR ANY COMPENSATION DUE TO NON-AVAILABILITY OF EOT CRANE.

Annexure -IV

TENTATIVE LIST OF TOOLS & PLANTS FOR ERECTION (TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST)

S.NO.	ITEM	MINIMUM QTY.(Nos.)	REMARKS
1	Mobile crane 15T	NIL	
2	Fork Lift-3 T	NIL	
3	Trailor 40T/ 50 T	NIL	
4	Truck 8/ 10T	1 (as & when required)	
5	Slings (10, 16, 25, 32, 40, 50 mm)	As per requirement	
6	Pulling & Lifting machines 5T	2 no	
7	Chain Pulley blocks(1T,2T, 5T, 10T,15T)	2each	
8	D-Shackles & Eye Bolt	Assorted upto 50T	
9	Hydraulic Jacks (5,10, 20, 50,100 Tons)	4 each	
10	Wire Ropes	As per requirement	
11	Manila Ropes	As per requirement	
12	Turn buckles & chain shackles	Assorted	
13	Set of Carpenter tools	1 set	
14	Crow Bar (0.5, 1.0, 1.5 meter)	2 each	
15	Set of preservatives	As per requirement	
16	Torque Spanners / Wrenches	As per requirement	
17	All general purpose T&P	As per requirement	

Note:

1) The above list specifies only major T & P (may not be complete) to be deployed by the contractor. All additional/ other tools and plants required for timely and satisfactory completion of works/ testing etc. shall also be deployed by the contractor with in the finally accepted rates/ prices.

2) Other terms and conditions regarding above shall be as per the special condition of the contract clause no. 37 of section III A (Tools & Plants, IMTEs)

Annexure V

INDICATIVE LIST OF TOOLS AND PLANTS FOR ERECTION TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST

S.NO.	ITEM/ DESCRIPTION	QTY.(Nos.)	REMARKS
1	Double end spanners upto 60mm	2 No. each	
2	Ring spanners upto 60mm	2 No. each	
3	Hammer 500 gm, 1 Kg, 2Kg, 4 Kg,8 Kg	2 No. each	
4	Nylon/ Wooden Hammer	As required	
5	Box spanner set upto 60 mm	1 No. each	
6	Set of Slogging spanner upto 60 mm	1 No. each	
7	Torque Wrenches upto 2000 NM	1 set	
8	Impact Wrench (Pneumatic) upto 2400 NM		
9	Chiesel 14mm, 22mm	1 No. each	
10	Hacksaw 400 mm with blades	2 nos	
11	Electrician Tool Kit	As required	
12	Soldering iron (35/ 125 Watts)	As required	
13	Plier 1", 1 1/2"	1No. Each	
14	Screw driver set	1No. Each	
15	Letter punch A-Z (10mm)	1 set	
16	Number punch 0-9 (10mm)	1 set	
17	Turn Buckle (2 T, 5 T)	4 each	
18	Mechanical Jacks (5, 10, 20, 35 T)	4 each	
19	Gas cutting set (Acetyline Cylinder, Oxygen Cylinder cutting set with hose & regulator.	As required	
20	Brazing torch set (With oxygen, acetylene cylinder)	As required	
21	Compressed air spray painting Unit	1 No.	
22	Air hose	As required	
23	Aluminium ladder 4 M legnth	2 nos	
24	Welding generator (300/ 600 A) with cable & holder	As required	
25	Air Arc Gouging Arrangement	As required	
26	Electrode Oven/Baking unit	4 nos	
27	Wire Brush	As required	

28	Flat/ round/ triangular/ square/ needle file (assorted)	1 set As required	
29	Oil stone / oil can	As required	
30	Allen key set (MM/ BA/ Inch size - assorted)	1 set each	
31	Crow bar (1.5M, 2.1M)	2 Each	
32	Scissor	2 nos	
33	Leather gloves / Rubber glouses/Cotton gloves	As required	
34	Goggles green	As required	
35	Mobile power boards	6 nos.	
36	Set of carpentar tools	1 set	
37	Plumb-with line dori	1 no.	
38	MIG/ TIG Welding machine with accessories	As required	
39	Angle grinder (AG7, AG9) machine	4 nos each	
40	Sander (HS7)	4 nos	
41	Straight grinder (GQ4, GQ 6)	4 nos	
42	Pneumatic straight grinders(use upto 100 mm dia)	4 nos	
43	Pneumatic Angle grinders(use upto 100 mm dia)		
44	Flexible shaft grinder (FF2)	3 nos	
45	Portable pneumatic drill machine (upto 40 mm)	1 set	
46	Portable electric dril machine (upto 40 mm)	1 set	
47	Fire fighting equipment for A,B,C class of fires	Adequate Qty	
48	Hydraulic test pump (100 Kg/cm2)with pressure gauge	1 no	
49	Pipe bending machine for pipe upto 50 mm	1 set	
50	Bench Vice	2 nos	
51	Pipe Vice	2 nos	
52	Scrapper (Flat/ triangular/ half round)	2 each	
53	First Aid Box with medicine	2 sets	
54	Centre punch	4 nos	
55	Hole Punch (assorted size)	2 nos each size	
56	Portable drilling Machine (concrete upto 40 mm)	As required	
57	Air Compressor	As required	

58	DG set (CONSTRUCTION POWER TO BE ARRANGED BY CONTRACTOR)	as required to meet the power requirements	
59	WOODEN /CONCRETE SLEEPERS	AS PER REQMT	
60	WINCHES, D SHACKLES ETC	AS PER REQMT	
61	COMPUTERS WITH PERIPHERALS AND LATEST SOFTWARE	2 NOS (1 LAP TOP MINIMUM)	
62	VACUUM CLEANER INDUSTRIAL	2 NOS	
Note:			
1) The aqbove list specifies only major T & P (may not be complete in items or numbers) to be deployed by the contractor. All additional/ other tools and plants required for timely and satisfactory completion of works/ testing etc. shall also be deployed by the contractor with in the finally accepted rates/ prices.			
2) Other terms and conditions regarding above shall be as per the special condition of the contract clause no. 37 of section III A (Tools & Plants, IMTEs)			
3) The T&P marked BHEL in the remarks column shall be arrange by BHEL			

Annexure VI

LIST OF T&P AND IMTE FOR TRANSFORMER ERECTION/ COMMISSIONING TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST

S.NO.	ITEM/ DESCRIPTION	QTY.(Nos.)	REMARKS
1	High vacuum filter machcine of suitable capacity	1	
2	Vacuum pump for evacuation of transformer tank.	1	
3	Hydraulic Jacks 10 Tons	5	
4	Wooden sleepers	AS PER REQMT	
5	Tarpauline for covering (3M x 6M)	4	
6	Hand tools (spanners, screwdrivers, hammers etc)	AS PER REQMT	
7	Slings, ropes, manila rope, D-shackes, spanners (upto 36 mm size) & other fitter / electrician hand tools.)	2 sets	
8	Pully 3/5 tonnes	2 each	
9	Chain Pulley blocks(3T, 5T)	2 each	
10	Welding machine set.	1 set	
11	Gas cutting set with gas & cutting set.	1 set	
12	Winch 10 Tons capacity	1 no.	
13	Multimeter	1 set	
14	Meggar Hand operated 500V / 1000V	1 set	
15	Meggar Motorised 2500v / 5000v	1 set	
16	Transformer turn ratio meter	1 set	
17	single phase variac 0-260 V, 8 Amps.	1 set	
18	Oil BDV Test Kit 0-100 KV DC	1 set	
19	Tong tster 0-30-60 Amps.	1 set	
Note:			

1) The above list specifies only major T & P (may not be complete) to be deployed by the contractor. All additional/ other tools and plants required for timely and satisfactory completion of works/ testing etc. shall also be deployed by the contractor with in the finally accepted rates/ prices.

2) Other terms and conditions regarding above shall be as per the special condition of the contract clause no. 37 of section III A (Tools & Plants, IMTEs)

3) The T&P, IMTEs marked BHEL in the remarks column shall be arranged by BHEL

Annexure VII

INDICATIVE LIST OF IMTE`s (ELECTRICAL) TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST			
S.NO.	**ITEM**	**QTY.(Nos.)**	REMARKS
1	Analog multimeter voltage AC/DC 2.5-2500Vcurrent AC /DC-100Ma to 10A, Resistance upto 200 Mohm	As per requirement	
2	Digital Multimeter	As per requirement	
3	Meggar hand operated 500V / 1000V 200 Mohms	As per requirement	
4	Meggar motorized 2500V / 500V 2500 00 Mohms	As per requirement	
5	Phase sequence indicator 110-450V	As per requirement	
6	Frequency meter 0-115-230-440 0-300-600A	As per requirement	
7	Tong tester	As per requirement	
8	Single phase variac 0-220 V, 8/15A	As per requirement	
9	Three phase variac 0-415, 8/15A	As per requirement	
10	Milli volt meter 600-60 mv D.C	As per requirement	
11	Rheostat 0-250 ohms 2A, 0-8 Ohms 15A, 0-8 Ohms 15A, 0-26 Ohms 5A, 0-165 ohms 2 Amps	As per requirement	
12	Hand tachometer(Digital) 0-15000 r.pm	As per requirement	
13	Function Generator - Input/ output 220V AC/ 30 V DC, 20 VA	As per requirement	
14	A.C. Voltometer 0-75-150-300-600V	As per requirement	
15	D.C. Voltmeter 0-75-150-700-600	As per requirement	
16	A.C. Ammeter 0-5-10 Amps.	As per requirement	
17	D.C. Ammeter 0-1-2.5-5 Amp.	As per requirement	
18	Dual channel, double beam Oscilloscope 20 M HZ	As per requirement	
19	secondary injection Kit 0 to 5 Amp	As per requirement	
20	Digital micro Ohm meter	As per requirement	
21	A.C. H.V..Test Kit 0-40 KV, 400 KVA	As per requirement	
22	Vibration Measurement equipment	As per requirement	

23	Dead weight Testser for calibration of pressure gauge.	As per requirement	
24	Wheatstonebridge.	As per requirement	
25	Kelvin's double bridge	As per requirement	
26	Partial discharge monitoring	As per requirement	
27	U.V. Recorder	As per requirement	
28	C.T.'s 50/100/200/500 by 5A	As per requirement	
29	P.T's 3.3/6.6/11/13.8by 110 V	As per requirement	
30	D.C. Shunt 2000A / 10 Mv		BHEL
31	Stop watch		
32	Precision Thermometer		
33	Sound level meter 150 db.		BHEL
34	Temperature measurement system with RTD .		BHEL
35	Precision tools (IMT) TENTATIVE QUANTITY 1. 0.02 accuracy block level-2 nos 2. Dumpy level with accessories- 1 no 3. Inside micrometer – as per requirement 4. Outside micrometer-0-25, 25/50, 50-75, 75-100, 100-150 5. Vernier callippers150, 300 – 2 each 6. Telescopic gauge- 2 sets 7. Slip gauge- 1 set 8. Feeler gauges- as per requirement 9. Dial gauge with magnetic stand- 12 nos		
Note:			
1) The above list specifies only major IMTE – Electrical (may not be complete) to be deployed by the contractor. All additional/ other IMTEs required for timely and satisfactory completion of works/ testing etc. shall also be deployed by the contractor with in the finally accepted rates/ prices.			

ANNEXURE-VIII

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, wage structure, Industrial climate and total 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.

Tenderers Name and Address

Place: (Signature of the Tenderer with stamp)

Date:

ANNEXURE-IX

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	M/s……..

ANNEXURE-X

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 Cost to BHEL".
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 - XI

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.: **Erection, testing, commissioning & trial operation of Francis type turbines, generators, transformers, switchgear and bus duct, excitation system, C & I etc of 4x130 MW PARBATI STAGE III HEP of NHPC LTD (NHPC) at BEHALI KULLU DISTRICT, HIMACHAL PRADESH.**

TENDER NO. BHEL:NR(SCT): PARBATI III:HTG:594

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited Parbati 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 of the bidder)