TENDER SPECIFICATION

BHEL:PS:SR:SAS:SCT: GK1115-078:T-01:10-11

FOR

HANDLING AT SITE STORES / STORAGE YARD, TRANSPORTATION OF MATERIAL TO SITE, ERECTION, TESTING & COMMISSIONING OF UNIT 4 & 5 OF 30MW PUMP MOTORS AND AUXILIARIES INCLUDING FINAL PAINTING.

At

REGUMANGADDA, KALWAKURTHY LIFT IRRIGATION SCHEME – STAGE - I
NEAR KOLLAPUR, MAHABOOBNAGAR DISTRICT
(for M/s.PATEL ENGINEERING LTD, HYDERABAD)
ANDHRA PRADESH

PART – I Technical Bid

BOOK NO: 1

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

SUB. CONTRACTING

CONTRACT AGREEMENT

AGREEMENT NO:	BHEL/PSSR/SAS/SCT/ GK1115-078/T-01/10-11
PROJECT	KALWAKURTHY STAGE – I - LIFT IRRIGATION SCHEME – 5X30MW PUMP MOTORS.
DESCRIPTION OF WORK	HANDLING AT SITE STORES / STORAGE YARD, TRANSPORTING MATERIAL TO SITE, ERECTION, TESTING & COMMISSIONING OF UNITS 4 & 5 OF 30MW PUMP MOTORS AND AUXILIARIES INCLUDING FINAL PAINTING AT KALWAKURTHY LIFT IRRIGATION SCHEME, NEAR KOLLAPUR, MAHABOOBNAGAR DISTRICT, A.P.
DOCUMENT CONTROL NO.	

COPY DISTRIBUTION

		REMARKS

This Agreement contains

1. General Condition of Contract – No. of Pages = 49
2. Tender Specification – No. of Pages = 82
3. Other Connected Papers – No. of Pages = 4

*** THIS COPY IS AUTHORISED FOR USE**

DATE OF ISSUE HEAD/SCT

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector, Southern Region,

Service After Sales - Ek Tara Building,

39, Sarojini Devi Road, Secunderabad 500 003, A.P

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

TENDER SPECIFICATION NO. BHEL:PS:SR:SAS:SCT: GK1115-078:T-01:10-11

Messrs Dated:

Dear Sir,

SUB: Handling at site stores / storage yard, Transportation of material to site, Erection, Testing & Commissioning of Units 4 & 5 of 30MW Pump Motors and auxiliaries including final painting at Kalwakurthy Lift Irrigation Scheme, Near Kollapur, Mahaboobnagar District, A.P.

Please find enclosed one set of non-transferable tender documents Containing-80 pages along with general conditions of contract Booklet and for the above work.

You are requested to go through the tender documents, GCC Booklet and offer your most competitive rate and submit the tender documents duly filled in as per procedure indicated in the tender specification along with requisite EMD of Rs.1,50,000/-(Rupees One Lakh and Fifty Thousands only) either in the form of Bank Guarantee, or by Demand Draft. Bids with Deviations from the tender conditions will be rejected.

A SEPARATE LETTER SHALL BE FURNISHED INDICATING THAT THERE ARE NO DEVIATIONS FROM THE TENDER CONDITIONS (As in Page 3)

The completed quotations shall reach the office of the undersigned on or before 15.00 Hrs on Dt. . The technical bids, will be opened on the same day at 15.30hrs. We shall separately intimate the date for opening the price bids only to those parties who were technically Qualified. You are requested to depute your authorized representative at the time of opening.

ANY REVISION OF RATES / PRICES WHAT SO EVER AFTER THE TIME AND DATE MENTIONED IN TENDER SPECIFICATION FOR SUBMISSION OF COMPLETED QUOTATIONS SHALL NOT BE ENTERTAINED UNLESS CALLED FOR SPECIFICALLY BY BHEL.

Kindly acknowledge the receipt of the tender documents and confirm your participation.

In case you are not participating in this you may return the document immediately.

Kindly note that BHEL reserves the right to reject any or all tenders without assigning any reason.

Thanking you,

Yours faithfully,
For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

SR. DY, GENERAL MANAGER/CONTRACTS

Date:

Encl: One set of Tender documents along with GCC Booklet.

BHARAT HEAVY ELECTRICALS LIMITED
(A government of India undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

SPECIAL INSTRUCTIONS TO BIDDERS

The Bidder must submit their bids as requested in sealed cover prominently superscribed the Tender Specification number, due date and time of submission as mentioned in the TENDER NOTICE.

The following information shall be furnished by the Bidder along with their offer (Technical Bid cover)

01 Details of Previous experience during the last five years indicating contract value, duration completion period and present engagement as per G.C.C.

02 Organisation structure of the Company as per GCC.

03 Financial status of the firm enclosing balance sheet and profit and loss account for the past 3 years and certificate from the Company Banker as per G.C.C.

04 Turnover of the Company in last 3 financial years in construction works only.

05 Latest Income Tax clearance certificate.

06 BIO DATA of key personnel presently in the Rolls of the company and proposed site organization for carrying out the work including deployment of Engineers and Supervisors.

07 Declaration sheets as per Appendix of Tender Specification.

08 Checklist and Schedule of General particulars as per Appendix in GCC.

09 T & P owned/deployment details as per G.C.C.

10 Technical manpower deployment details as per G.C.C.

11 Other relevant details as per GCC and checklist.

12 These terms and conditions will be read and construed along with General Conditions of contract and incase of any conflict or inconsistency between the General conditions and the Terms and Conditions of the tender specification, the provisions contained in the Terms and conditions (NIT, Rate Schedule, Common Conditions, Special Conditions including appendices) shall prevail.

13 **THE BIDDERS ARE REQUESTED TO FURNISH THE DOCUMENTS LIKE COPIES OF LOI'S, WORK ORDER'S ETC PERTAINING TO THE EXPERIENCE INDICATED IN QUALIFYING REQUIREMENTS, AS GIVEN BELOW.**

14 **QUALIFICATION REQUIREMENT**

Technical QR:

a). The bidders should have executed at least one Unit of 18 MW or above Hydro TG and Auxiliaries in a Hydel Power Project in the last seven years.

Financial QR:

a. The bidders should have a minimum average financial turn over of Rs.40 Lakhs per year in the preceding three years ending 2008-2009.

b The bidder should have earned profit in any one of the last 3 financial years ending 31.03.09

c Financial status of the firm enclosing balance sheet and profit and loss account for the past 3 years and certificate from the Company Banker.

Notwithstanding the above, BHEL reserves the right to reject any Tender or all the Tenders for reasons whatsoever beyond our control and the decision of BHEL final.

LD / Penalty shall be leviable as per the applicable clauses of GCC.

15 A DECLARATION SHEET INDICATING THAT THERE IS NO DEVIATION IN TENDER DOCUMENTS (AS IN PAGE 3) TENDERS MAY FURTHER NOTE THAT THIS DECLARATION IS A PREREQUISITTE FOR BHEL TO CONSIDER THEIR BIDS. BIDS SUBMITTED WITHOUT "NO DEVIATION DECLARATION WILL BE REJECTED BY BHEL.

16 SAFTY PLAN

Bidder may further note that the submission of safety plan is prerequisite for BHEL to consider their bids.

BHARAT HEAVY ELECTRICALS LIMITED

(A government of India undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

PROCEDURE FOR SUBMISSION OF SEALED BIDS

The Tenderers must submit their bids as required in two parts in separate sealed covers prominently superscribed as Part-I "Technical Bid and Part-II "Price Bid and also indicating on each of the covers the tender specification number and time as mentioned in the Tender Notice.

Part-I (Technical Bid) Cover-I

Excepting Rate Schedule, all other schedules, data sheets and details called for in the specification shall be enclosed, in part I Technical Bid only.

Part II (Price Bid) Cover II

All indications of price shall be given in this part II Price Bid.

Tenderers are requested to quote their rates, only in the price bid (part II) provided by BHEL. Quoting of rates in any other form / formats will not be entertained.

These two separate cover I & II (Part I and Part II) shall together be enclosed in a third envelope (Cover III) along with requisite EMD as indicated and this sealed cover shall be superscribed and submitted to Senior Deputy General Manager/ Contracts at the above mentioned address before the due date as indicated. The Tenders will be intimated separately in case any clarifications are required.

NOTE:

Tenderers are issued with 2 Nos. of Technical Bids, 2 Nos. of Price Bids and 2 Nos. of GCC booklet, out of which one set of each document shall be retained by them for their reference. Balance one set shall be submitted along with their offer as per procedure indicated above.

EMD amount for this Tender is Rs. 1,50,000 /- (Rupees one lakh and fifty thousand Only). This EMD amount shall be submitted in the form demand draft only drawn in favour M/s.Bharat Heavy Electricals Limited, Service After Sales, Secunderabad.

EMD amount in the form of Bank Guarantee / fixed deposit receipt or in any other form will not be Accepted.

Any revision of rates / prices what so ever after the time and date mentioned in tender specification for submission of completed quotations shall not be entertained unless called for specifically by BHEL.

DEPUTY GENERAL MANAGER/CONTRACTS.

TENDER SPECIFICATION BHEL:PS:SR:SAS:SCT: GK1115-078:T-01:10-11

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Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

TENDER NOTICE

Sealed Tenders are invited from reputed contractors with sufficient previous experience in the under mentioned similar nature of work.

Tender Specification No. BHEL:PS:SR:SAS:SCT: GK1115-078:T-01:10-11

Description	EMD
Handling at site stores / storage yard, Transportation of material to site, Erection, Testing & Commissioning of Unit 4 & 5 of 30 MW Pump Motors and auxiliaries including final painting at Kalwakurthy Lift Irrigation Scheme, Near Kollapur, Mahaboobnagar District, A.P. Approximate Weight: 1000MTfor Erection & Commissioning of 2 Units.	Rs.1,50,000/-

Cost of Tender Documents (Including all Taxes)	:	Rs.1,700/-
Sale Starts on	:	23.12.2010
Sale close on	:	10.01.2011
Due date and Time for Submission	:	10.01.2010 At 2.00 PM
Date and time for opening Of Technical Bids	:	10.01.2010 At 4.00 PM

a). The bidder should have executed at least one Unit of 18MW or above Hydro TG and Auxiliaries in a Hydel Power Project in the last seven years.
b). The bidders should have a minimum average financial turn over of Rs.40Lakhs per year in the preceding three years ending 2007-2008.
c). Notwithstanding the above, BHEL reserves the right to reject any Tender or all the Tenders for reasons whatsoever beyond our control and the decision of BHEL is final.

LD / Penalty shall be leviable as per the applicable clauses of GCC.

Interested parties can get the Tender documents from the office of the Senior Deputy General Manager/ Contracts on all working days by remitting the cost of tender documents by A/C Payee Demand Draft drawn in favour of M/s Bharat Heavy Electricals Limited, Secunderabad 500 003. Money order, Cheques and Postal Orders will not be accepted.

The Bharat Heavy Electricals Limited takes no responsibility for any delay, loss or non-receipt of tender documents sent by post and also reserves the right to reject any or all the tenders without assigning any reason thereof. TENDERS NOT ACCOMPANIED BY THE PRESCRIBED EARNEST MONEY DEPOSIT ARE LIABLE TO BE SUMMARILY REJECTED.

NOTE:
BHEL reserves the right to adopt the process of Reverse Auction (on line bidding) among the bidders who are found to be qualified on the basis of Technical bid. Refer the **Appendix - VII** of section VII for procedure for reverse Auction in the special conditions of contract. No extension of time on this account will be entertained for bid submission.

Please visit our web site at **"www, bhel.com"** for Corrigendum, if any, issued after publication of this Tender Notice.

Downloaded Tender documents should be submitted along with demand draft for the requisite amount towards the cost of tender documents

SR. DEPUTY GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION: BHEL:PS:SCT: GK1115-078:T-01:10-11

CERTIFICATE FOR NO DEVIATION

I, OF M/S.

hereby certify that there is no deviation from the Tender conditions either technical or commercial and I am agreeing to all the terms and conditions mentioned in the Tender

Specification.

OFFER OF CONTRACTOR

The Deputy General Manager/Contracts
Bharat Heavy Electricals Limited,
Power Sector – Southern Region, SAS
39, Sarojini Devi Road, Secunderabad – 500 003.

Sir,

I/We hereby offer to carry out the wok detailed in Tender Specification No.BHEL:PS:SCT:GK1115-078:T-01:10-11 issued by Bharat Heavy Electricals Limited, Power Sector : Southern Region, in accordance with the terms and conditions thereof.

I/We have carefully perused the following documents connected with the above work and agreed to abide by the same.

1. Instructions to Tenderer
2. General Conditions of Contract
3. Special conditions of Contract
4. Other Section, Appendices and Schedules

I/We have deposited/forwarded herewith the Earnest Money Deposit/the Bank Guarantee in the format prescribed and as stipulated towards the Earnest Money Deposit a sum of Rs. (Rupees only) vide BHEL'S Cash Receipt No. Dt. which shall be refunded should our offer not be accepted. Should our offer be accepted. I/We Security Deposit for the work as provided or in the Tender Specification within the stipulated time as may be indicated by BHEL, Power Sector, Services After Sales, Southern Region, Secunderabad – 500 003.

I/We further agree to execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

DATE: CONTRACTOR:

PLACE: ADDRESS:

Witness with their address

Signature Name Address

PROJECT INFORMATION

PROJECT	:	Kalwakurthy Lift Irrigation Scheme, Stage -I (5x30MW) Pump Motors-Unit 4&5,
CUSTOMER	:	M/s.Patel Engineering Ltd., PLO NO 76 H.NO 8-2-293/82/A/76 Road No.9A, JUBILEE HILLS Hills, Hyderabad. 500 033 Phone : 040 – 44604999, Fax : 040 - 44604800 E-Mail : pateleng_hyd@yahoo.com
LOCATION OF PROJECT	:	Approx.200 Km from Hyderabad, Approx.120km from Mahboobnagar, Approx. 10 Km Kollapur Mandal, A.P.

Other particulars

1.	Rainfall	:
2.	Highest Temperature	:50 deg c

SECTION – III

COMMON CONDITIONS OF CONTRACT (E&C)

3.1 SCOPE OF CONTRACT

3.1.1 The Intent of this specification is to provide erection and commissioning services for execution of projects according to most modern and proven techniques and codes. The omission of specific reference to any method and equipment of 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 project or portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.

3.1.2 The contractor shall carry out the work in accordance with Instructions/ drawings/specification/standard practices supplied by BHEL from time to time.

3.1.3 Provision of all types of labour, Supervisors, Engineers watch and ward as required tools and tackles as required, consumables as required under various clauses of tender specification for handling transportation, erection, testing and commissioning. Tenderer is liable to arrange all necessary T & P except those being supplied by BHEL for use.

3.1.4 Proper out-turn as per BHEL plan and commitment.

3.1.5 Completion of work in time as per monthly erection plan which will be worked out to adhere to project completion schedule.

3.1.6 Good quality and accurate workmanship for proper performance of equipment. BHEL Site Engineer shall be the deciding authority with reference to quality requirement.

3.1.7 Preservation of all components at all stages of per-assembly / erection/testing as per clause 3.15.

3.2 FACILITIES TO BE PROVIDED BY BHEL:

3.2.1 Open space for building of temporary office shed and contractor's stores shed(s) will be provided free of cost. Contractor has to approach M/s.Patel Engineering Ltd., for allotment of open space for building labour colony near site. Contractor has to build his labour colony at his cost. The whole area around labour colony shall be properly fenced by the contractor at his cost for their safety.

3.2.2 WATER:

For construction purpose water will be provided at one single point free of charge, as provided by Customer to BHEL. For labour colony water has to be arranged by the contractor at his cost.

3.2.3 ELECTRICITY:

3.2.3.1 For construction purpose electricity will be provided at one single point as provided by customer to BHEL, on chargeable basis as per the tariff applicable during the construction period.

3.2.3.2 It shall be the responsibility of the contractor to install 250kva DG set for usage during power supply interruption and prolonged shutdown of power. The Diesel requirement for the above purpose has to be met by the contractor.

3.2.3.3 For contractor's office/stores shed electricity will be provided at one single point on Chargeable basis.

3.2.3.4 BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage/frequency or interruptions in power supply.

3.2.4 CONSUMABLES:

Such of those consumables as indicated as "Consumables provided by BHEL" shall alone be provided to the contractor by BHEL free of charge. Other consumables, required are to be arranged by the contractor at his cost.

3.2.5 TOOLS, TACKLES AND CONSUMABLES

The contractor shall arrange all T & P's including cranes/tractors, trailers, trucks, etc. at his own cost. BHEL will not provide any T & P for This contract. The contractor at his cost shall arrange Diesel, Petrol and other consumables required for the tools and plants, equipments etc. Preventive and routine maintenance of T & Ps are to be arranged by the contractor at his cost.

3.2.6 RESPONSIBILITIES OF THE CONTRACTOR

1. Contractor shall be responsible for examining all the shipment and notify BHEL Engineer immediately if any damage, shortage, discrepancy etc., for the purpose of engineers' information. The contractor shall submit a report every week detailing in this regard.
2. For timely completion of the job, the contractor may have to work in one or more shifts. He will not be eligible for any extra charges on this account.

3.2.7 WORK SAFETY REGULATIONS

1. The contractor shall ensure the safety of all the workmen, materials, and equipment either belonging to him or to others working at site.
2. The contractor will notify the Engineer of his intention to bring on to site any equipment or any container, with liquid or gaseous Fuel or other substances which may create hazard. The Engineer shall have the right to prescribe the conditions under which the equipments or container may be

handled and used during the performance of the work and the contractor shall strictly adhere to such instructions. The Engineer shall have the right to inspect any construction plant and to forbid its use, if in his opinion, it is unsafe. No claim due to such prohibition shall be entertained by BHEL.

3. Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the contractor shall be responsible for safe keeping.

3.2.8 INSURANCE

The contractor shall take suitable insurance policies to cover his workers under Workmen's Compensation Act to cover risks of his staff/Engineers through group personnel accident insurance policy, to cover risks of his tools tackles and equipments and a suitable insurance policy to cover damage to property or personnel or third parties.

3.2.9 FACILITIES TO BE PROVIDED BY BHEL

Open space for contractor's office and stores will be made available by BHEL Electricity and water will be provided at one point and further distribution shall be arranged by the contractor.

3.2.10 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

i. The contractor shall be responsible to provide all necessary facilities like residential accommodation, transport, distribution of water and power, medical insurance etc. as required under the various labour laws and other statutory rules and regulations as applicable at site for their staff, labour.

ii. The contractor will make his own arrangement for his communication needs at his site office.

iii. Contractor shall deploy labour at site strictly in accordance with the guidelines approved by our customer.

iv. Crane of 10T capacity and Hydra shall be arranged by the contractor for material handling.

v. For movement of cranes, tractor, trailers, if sleeper/plates are required, the same shall be arranged by contractor at his own cost.

Crane of capacity beyond 30T if required to be arranged in specific cases by contractor.

3.3 FACILITIES TO BE PROVIDED AND DEVELOPED BY THE TENDERER AT HIS COST

3.3.1 It shall be the responsibility of the contractor to construct his own office shed stores shed, labour tenements with all facilities like electricity, water, supply, sanitary arrangements in the area allotted to him for the purpose.

3.3.2 Distribution of water for construction purpose and as well as drinking purpose from the single point provided by BHEL to various work-fronts shall be contractor's responsibility and at his cost.

3.3.3 Any duty deposit involved in getting the Electricity shall be borne by the bidder. As regards contractors office shed also all such expenditure shall be borne by the contractor.

3.3.4 Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cable and cable laying including supply of all materials like cables, switch boards, pipes etc. observing the safety rules laid down by electrical authority of the State/BHEL/ there customer with the appropriate statutory requirements shall be the responsibility of the tenderer/contractor.

3.3.5 Necessary meters for recording consumption of water and power for cost calculation purpose and maintenance of the same during execution period shall be contractor's responsibility.

3.3.6 As there are bound to be interruptions in regular power supply cut/load shedding in any construction site due to inherent power shortage in State on this account, suitable extension of time if found necessary only shall be given and Contractor is not entitled for any compensation. It shall be the responsibility of the tenderer/contractor to provide, maintain the complete installation on the roadside of the supply with due regard to safety requirements at site.

3.3.7 Adequate lighting facilities such as flood lamps, low volt hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc., at his cost.

3.3.8 For the purpose of planning contractor shall furnish along with tender the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

3.3.9 On completion of work all the temporary buildings, structures, pipelines, cables etc., shall be dismantled and leveled 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 BHEL will undertake such work and the cost of the same will be recovered from Contractor including overhead charges. The decision of BHEL Engineer in this regard is final.

3.3.10 Depending up on the nature of work and availability of facilities locally, contractor may have to arrange for a temporary workshop for facilitating uninterrupted progress of work.

3.3.11 The contractor has to arrange the required materials like Angles/GI sheets / Tarpaulins etc. For temporary coverings of materials / Equipments like stator / Rotor etc also during dry out and H.V test activities, within quoted value.

3.4 GASES

3.4.1 All required gases like Oxygen/acetylene/LPG/argon/Nitrogen required for construction purpose shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store

sufficient quantity of those gases. Non-availability of gases cannot be considered as reasons for not attaining the required progress of erection.

3.4.2 In case of improper arrangement of above gases, BHEL reserves the right to procure the same from any source and for issues made, recover the cost from the contractor's bill at the market value plus BHEL departmental charges. Postponement of recoveries is not permissible.

3.4.3 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

3.4.4 Monthly gas consumption reports are to be furnished by the Tenderer to BHEL for statistical purposes, every month.

3.5 ELECTRODES

3.5.1 All required electrodes are to be arranged by the contractor at his cost including gouging electrodes.

3.5.2 All the required electrodes, as above are to be approved by BHEL. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc. However the required TIG welding and S.S electrodes if supplied by BHEL manufacturing units, the same will be provided free of charges.

3.5.3 Necessary Welding Electrodes for spiral casing, DT etc alone will be supplied by BHEL

3.5.4 Storage of electrodes shall be done by the contractor in an air conditioned/controlled humidity room as per requirement.

3.5.5 All electrodes shall be dried in the electrode drying oven to the temperature and period specified by the BHEL Engineer before they are used in erection work and each Welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by the contractor.

3.5.6 All filler wires and electrodes shall be preserved by the contractor carefully to prevent deterioration of their properties. Special care be taken to preserve alloy steel and other steel and other special electrodes/wires. Contractor shall exercise maximum care in using these electrodes/brazing rods / filler wires to minimize wastage by maintaining a record of all usages. An electrode register has to be maintained by the contractor for usage and the same shall be audited. All bits of electrodes after usage have to be returned and are accountable.

3.5.7 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL. Postponement of such recovery is not permissible.

3.5.8 BHEL reserves the right to reject the use of any electrodes at any stage if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

3.5.9 The contractor shall account for all welding electrodes issued to him by BHEL. Required quantity as arrived at by calculation and standards will only be supplied. It shall be the contractors responsibility to account consumption of electrodes by maintaining records for consumption for each joint of weld. Additional requirement beyond standard quantity will be recovered with departmental charges unless and otherwise accounted for.

3.6 TOOL & TACKLES

3.6.1 BHEL will not provide any Tool and Plants for this job. All Tools and Plants are to be arranged by the contractor at his cost. However BHEL will provide the tools and plants indicated in (Appendix IV for "T & P provided by BHEL" in the Tender Specification) free of hire charges as received from manufacturing units. It may be noted that distribution of these equipment will be done by BHEL Engineers and the decision of the Engineer shall be final in this regard.

3.6.1.1 The Contractor shall be responsible for the safe and proper use of the above equipments issued to him. Day-to-day maintenance and operation of the equipment shall be the contractor's responsibility and shall be as per instructions/standard practice of BHEL Engineer. Any consumable/lubricants required for operation and application of the same shall be done by the contractor with his skilled labour at his cost.

3.6.2 Any loss/damage to any or part of the above equipment shall be to contractor's account and the expenditures on these account will be recovered from contractor's bills in case contractor fails to make good the loss.

3.6.3 Necessary electrical/water/air connection required for operation of any of the above equipment shall be to Contractor's account.

3.6.4 Regular utilization report of the above equipment shall be furnished by contractor for cost analysis purpose.

3.6.5 The contractor shall return the T & P issued to him by BHEL in good working condition as and when so desired by BHEL (Completion or reduction in work load) for diversion for their work. If such return is delayed by contractor due to his fault without written consent of BHEL, hire charges as applicable according to BHEL policy will be levied from such time it was requisitioned by BHEL to the time of actual return and the amount so decided and arrived at will be recovered from the contractor's bill.

3.6.6 Excepting those indicated as BHEL manufacturing unit supply, all the other T & P and instruments required for proper and safe handling,

transportation, erection, testing and commissioning shall be arranged by the contractor and the quoted rates shall deem to include the same.

3.6.7 In the event of failure of contractor to bring necessary and sufficient T & P, BHEL may arrange for the same at risk and cost of contractor including transportation of the same from any of BHEL's other site and hire charges as applicable shall be deducted from the bidder's bill. Decision of BHEL in this regard is final.

3.6.8 All the T & P arranged by contractor including electrical connections wherein required shall be reliable/proven/tested and necessary test certificates, as per statutory rules of the Stat/Central Government in force from time to time.

3.6.9 Contractor shall have at all times experienced operators and technicians/foremen for routine and breakdown maintenance of the equipment. Any delay in rectification of defects will warrant to BHEL rectifying the defect and charging the cost to the contractor.

3.6.10 If at any time it is noticed that contractor is not using any of the T & P or equipment properly according to the instructions of BHEL, BHEL will have the right to withdraw any and all such equipment and any cost due to this shall be contractor's account.

3.6.11 The T&P would be issued only at stores and it shall be responsibility of contractor to take the delivery from stores, transport the same to site and return the same at store in goods conditions after use.

3.6.12 All the T & P, Lifting tackles including wire ropes, slings shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use.

3.7 CRANES

3.7.1 BHEL will provide 1 number EOT crane free of charge. The required experienced operator is to be arranged by the contractor at their cost. The contractor has to carry out the routine/regular maintenance of the EOT crane up to completion of erection of all units. The contractor has take note of this aspect and quote accordingly.

3.7.2 The availability of crane is likely to be hampered from time to time due to routine preventive maintenance of breakdown maintenance. contractor has to make alternative arrangements or plan/modify/alter his activities to suit the above conditions and the contractor will not be liable for any compensation or extension of time due to this non-availability, for maintaining the schedule.

If for any reason EOT crane is not available for the erection of embedded parts and foundation parts. The contractor has to arrange suitable capacity of mobile crane with fuel and operator for erection of embedded & foundation parts. (DT and spiral casing etc)

3.7.3 It shall be the responsibility of the contractor to arrange for all other lifting equipment/plant and machineries other tools and tackles required for

satisfactory completion of work. The contractor shall indicate the list of T& P the proposes to use in the work along with his offer.

3.7.4 For the movement of cranes & trailors etc. (during material handling) it may become necessary to lay sleeper bed for obtaining safe approach for usage of equipment. It shall be the contractor's responsibility to lay necessary sleepers. Necessary sleepers shall be arranged by the contractor at his cost.

3.8 SUPERVISORY STAFF AND WORKMEN

3.8.1 The Contractor shall deploy experienced Engineers, Supervisors all the skilled workmen like High Pressure Welders (gas, TIG and arc) Carbon, alloy steel welders, Gas cutters, electricians, Riggers, Sarongs, Erectors, Carpenters, fitters etc. in addition to other skilled, semi-skilled and unskilled workmen required for all the work of handling and transportation from site storage to erection site, transportation, erection, testing and commissioning contemplated under this specification. Only fully trained and competent men with previous experience of job shall be employed.. They shall hold valid certificates wherever necessary.

3.8.2 BHEL reserves the right to decide on the suitability of the workers and other personnel who will be employed by the contractor, BHEL reserves right to insist on removal of any employee of the contractor at any time, if they find them unsuitable and the contractor shall forthwith remove him.

3.8.3 The supervisory staff employed by the contractor shall ensure proper out-turn of work and discipline on the part of labour put on the job by the contractor and in general see that the works are carried out in safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL's client.

3.8.4 The Tender shall also furnish DAILY & MONTHLY report showing the number employees engaged in various categories of work and a progress report of work as required by BHEL Engineer.

3.8.5 The work shall be executed under the usual condition existing in major power plant construction and in conjunction with numerous other operations at site. The bidder and his personnel shall co-operate with other personnel contractor coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

3.8.6 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in stipulated time. Accuracy of work, good workmanship 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 he drawings/instructions given by BHEL Engineers from time to time.

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

3.8.8 It is the responsibility of the bidder to carryout the work for achieving the target set by BHEL by working for 12 hours a day including holidays during erection and 24 hours continuously in shift during commissioning and testing period. The contractor's quoted rate shall include all these contingencies.

3.8.9 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 wires, 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 good by other workmen or by other means and deduct to expenses (of which BHEL's decision is final) from any money due to the contractor.

3.9 CIIVIL WORKS

3.9.1 Foundations of all equipments and plants and necessary civil works shall be provided by customer. The dimensions of the foundation and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further top elevation of foundations shall be checked with respect to bench mark etc. All minor adjustments up to 25 mm of foundation level, dressing, chipping of foundation surface enlarging the pockets in foundations and grouting of equipments etc, as may be required for the erection of equipment/plants shall be carried out by the Contractor. All the materials like cement and cleaning special consumable shall also be arranged by the contractor at his cost. Special cement like PAGAL, CONBEXTRA-GP2 and SHRINKOMP etc or its equivalent grade cement for grouting of turbine, generator shall also be arranged by contractor and the quoted price should include the same. The contractor should also arrange required nos. of mixing machines and vibrators at their cost.

3.9.2 The contractor shall ensure perfect matching of packer plates with foundation by dressing the foundation and between the packer plates and the base plate of structural column/equipment to the satisfaction of BHEL Engineer. Machining/matching of packer shall be carried out by the Contractor at his own cost.

3.10 SCOPE OF MATERIAL HANDLING

3.10.1 The contractor shall transport all the materials from Customer / BHEL stores, to erection site. The materials shall be loaded at Customer / BHEL stores in the contractor's vehicle, for transporting to erection site.

For loading the materials at stores suitable mobile crane with operator, the required vehicle, like tractor / trailors, trucks etc. for transporting the same shall be arranged by the contractor at their cost. For unloading the materials at site, EOT Crane will be provided free of charge as provided by customer to BHEL, wherever possible.

3.10.2 While BHEL will endeavour to store/stack/identify materials properly in their open/closed storage yard/shed it shall be contractor's responsibility to assist BHEL in identifying material well in time for erection, taking delivery of the same in time following the procedure indicated by BHEL and transport the

material safely to pre-assembly yard/erection site in time according to programme.

3.10.3 Contractor shall properly store / stack / stock all the materials, transported by them, in a place identified by customer, at erection site.

3.10.4 It shall be contractor's responsibility for shifting the materials from storage place to preassembly yard / to the place of erection etc. and the rate quoted shall include all these incidental works.

3.10.5 The contractor shall identify necessary supervisor/labour for the above work in sufficient quality as may be needed by BHEL for areas covering their scope.

3.10.5 All equipment so used by contractor shall be of proven quality and safe in operation as approved by the statutory authorities as per the law in force.

3.10.6 All T&P used by contractor for this work shall be proven quality and safe in operation as approved by the statutory authorities as per the law in force.

3.10.7 Any loss/damage to materials issued to contractor shall be made good by him or BHEL, will arrange for replacement at cost recovery basis and decision of BHEL, shall be final. Any loss/damage must be intimated to TG in-charge of BHEL in writing within 24 hours of the occurrence.

3.10.8 All the surplus damaged, unused materials, package materials / containers/special transporting frames, gunny bags etc. supplied by BHEL shall be returned to the BHEL Stores by the contractor immediately.

3.10.9 The contractor shall take delivery of the components and equipment and special consumable from the storage area after getting the approval of the BHEL Engineer on standard indent from to be specified by BHEL. At periodic/interval of work, complete and detailed account of the equipment so erected and electrodes used shall be submitted to the BHEL Engineer.

3.11 OTHER RESPONSIBILITIES OF THE CONTRACTOR

3.11.1. BHEL Engineers shall make out a plan for erection and the contractor shall arrange for a labour force and tools and plants and consumables to suit the above plan and execute the work accordingly.

3.11.2. The contractor shall have total responsibility for all equipment and materials in his custody, stores, loose, semi-assembled, assembled or erected by him at site.

3.11.3. The contractor shall make suitable security arrangement including employment of security personnel to ensure the protection of all materials/equipments and works from theft, fire pilferage and any other damage and loss.

3.11.4. The contractor shall ensure that the packing materials and protection devices used for the various equipment during transit and storage are

removed before these equipments are installed. All empty packing boxes are to be returned to BHEL / Customer, stores.

3.11.5. All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc, shall be used for unloading and or/ handling of the equipments without the specific written permission of the Engineer. The equipments from the storage yard shall be moved to the actual site of erection/location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage for such equipments at site.

3.11.6. The work covered under this scope of work is of highly sophisticated mature requiring best quality, proven workmanship engineering and construction management. It should also ensure successful and timely commercial operation of equipment installed. The contractor must have adequate quantity of precision tools, construction aids in possession Contractor must also have adequate trained, qualified and experienced supervisory staff and skilled personnel.

3.11.7. All the necessary certificates and licenses required to carry out this scope of works are to be arranged by the contractor then and there at no extra cost.

3.11.8. The Contractor shall take all reasonable care to protect the materials and work till such time the erected equipment has been taken over by BHEL/their client. Necessary suitable temporary fencing and lighting shall be provided by the contractor as a safety measure against accident and damage of property of BHEL. Suitable caution notices shall be display where access to any part may be deemed to be unsafe and hazardous.

3.11.9 The contractor shall be responsible for taking all safety precautions during the construction and leaving the site safe at all items. When the work is temporarily suspended he shall be protect all construction materials, equipments and facilities from causing damage to existing property interfering with the operation of the station when it goes into service. The contractor shall comply with all applicable provisions of the safety regulations clean-up programme and other precautionary measures which the BHEL has in effect at the site.

3.11.10 The contractor shall be responsible for good house-keeping neat stacking and arrangement of materials on the floors. The contractor shall also be responsible for periodic regressing, reconservation of comments like bearings and machined surface etc.

3.11.11 Contractor shall provide at his cost watch and staff round the clock for the safety of the equipment under erection/in his stores at site.

3.11.12 All lifting tackles including wire ropes, slings, shackles etc, used by the contractor shall be got approved by BHEL Engineer at site before they are actually put on the work. It will be he responsibility of the contractor to ensure safe lifting of the equipment taking due precautions to avoid any accidents and damage to other equipments and personnel. All piping shall be adequately supported and protected to prevent damage during handling and erection.

3.11.13 The contractor shall take delivery of equipment as received and handed over him at site and make arrangements for verification of equipment maintain records and keep safe custody watch and ward of equipment after it has been received at site till these are fully erected, tested and commissioned and taken over by BHEL's client. The stolen/lost damaged goods shall have to be made good by the contractor at his own cost Contractor should assist in claming from the insurance to minimize his liability for the above.

3.11.14 The contractor shall carry out scrapping wherever required and matching of all the matching parts. The chipping of concrete surface to achieve the true contact as per specification between packets and concrete is also covered in this scope of work. While on job care is essential to avoid too much of chipping and lowering of level.

3.11.15 All hangers, supports and anchors (Including concreting or welding)shall be installed as per drawing to obtain safe reliable and complete pipe installation as per instructions of BHEL Engineers.

3.12 DRAWINGS AND DOCUMENTS

3.12.1 The detailed drawing specification available with BHEL Engineers will form part of this tender specification. These documents will be made available to the contractor during execution of work at site.

3.12.2 One set of 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's personnel shall take care of these documents given to them.

3.12.3 The data furnished in various appendices and the drawings enclosed with this Tender Specifications are only for the guidance purpose and describes the equipment to be installed tested and commissioned under this specifications. However, the changes in the design and in the quantity may be expected to occur as is usual in any such large scales of work.

3.12.4 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.

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

3.13 SITE CLEANLINESS AND SAFETY REQUIREMENTS

3.13.1 Contractor shall strictly follow all safety requirements/conditions as per clause 2.15.0 and its subclauses of General Conditions of contract booklet enclosed with this tender.

3.13.2 Non-conformity of safety rules and safety appliances will be viewed seriously and the BHEL has right to impose fines on the contractors as under BHEL Engineers decision is final and binding in this regard.

SL. NO.	Safety	Fine (Rs.)
01	Not wearing safety helmet	50/-
02	Not wearing safety belt	100/-
03	Grinding without goggles	50/-
04	Not using 24 V supply for internal work	500/-
05	Electrical plugs not used for hand machines	100/-
06	Not slinging properly	200/-
07	Using damaged sling	200/-
08	Lifting cylinder without cage	500/-
09	Not using proper welding cable with lot of joints and not insulated properly	200/-
10	Not removing small scrap from platforms	200/-
11	Gas cutting without taking proper precaution or not using sheet below gas cutting	200/-
12	Not maintaining elec. winches which are being operated dangerously	500/-
13	Improper earthing of electrical T & Rs	500/-

3.13.3 Contractor shall necessarily fill up the safety plan format available in general conditions of contract booklet enclosed with this tender and submit along with their offer.

3.14 PROGRESS OF WORK

During the course of erection if the progress is found unsatisfactory or if the target dates fixed from time to time for every milestone are to be advanced or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians etc. employed are not sufficient, BHEL will induct required additional workmen to improve the progress or take over a part of the job and get it done on risk and cost of the contractor and recover from Contractor's bill, all charges incurred on this account including all expenses together with BHEL overheads.

3.14.2 The progress reports shall indicate the progress achieved against planned with reasons indicating delays if any and shall give remedial action which the contractor intends to take to make good the slippage or lost time so that

further works can proceed as per the original programme and the slippage do not accumulate and affect the overall programme.

3.14.3 The contractor shall submit daily, weekly and monthly progress reports manpower reports, material reports, consumables report and other reports considered necessary by the BHEL Engineer.

3.14.4 The manpower reports shall clearly indicate the manpower deployed category wise daily specifying also the activities in which they are engaged. The periodicity of the reports will be decided by BHEL Engineer at site.

3.14.5 The contractor shall arrange for weekly progress review meeting with the "Engineers" at site during which actual progress during the week vis-à-vis scheduled programme shall be discussed for action to be taken for achieving targets. The programme for subsequent work shall also be presented by contractor for discussion. The contractor shall constantly update/revise his work programme to meet the overall requirements and suit the material availability.

3.14.6 The contractor shall submit detailed advance monthly plan and the same has to forwarded by the first week of each month of decision and finalization by 15th of the month which shall be basic document to be followed for the next month erection plan.

3.15 PRESERVATION OF COMPONENTS

3.15.1 It shall be the responsibility of the contractor to apply touch up painting on all equipment before erection. All paint and thinner shall be provided by BHEL and it shall be contractor's responsibility to arrange for required labour, brush etc. for carrying out touch up painting. The quoted value shall be inclusive of above work.

3.15.2 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.

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

3.15.4 Due to atmospheric conditions erected materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required consumables for this purpose like paint, thinner, rust converter compound (Ruskill or Ferropro) or any other equivalent shall be arranged by BHEL,. However, the contractor should arrange other consumable like wire brushes, emery papers, cotton waste cloth etc. at their cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint and rust preventive compound.

3.15.5 The contractor has to take necessary arrangements/precautionary methods to protect the equipments during heavy monsoon rainy days.

SPECIFIC REQUIREMENTS FOR ISO 9001-2000

3.16.0 IMPORTANT NOTE

Contractors shall ensure that all their Staff/Employees are exposed to periodical training programmes conducted by qualified agencies/personnel on ISO 9002 Standards.

Contractors shall ensure that the Quality is maintained in all the works connected with this contract at all stages of the requirement of BHEL.

Contractor shall ensure that all Inspection, Measuring and Testing equipments that are used, whether owned by the contractors or used on loan, are calibrated by the authorised agencies and the valid calibration certificate will be available with them for verification by BHEL A list of such instruments possessed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

Contractors shall arrange for the inspection of the works at various stages as required by BHEL, Immediate corrective action shall be taken by the contractors for the non-conformances if any, observed and pointed out by BHEL.

3.17.0 INSPECTION/QUALITY ASSURANCE/QUALITY CONTROL STATUTORY INSPECTION (AS APPLICABLE)

Various Inspection/quality control/quality assurance procedures/methods at various stages of erection and commissioning will be as per BHEL /Customer quality control procedures / codes / and other statutory provisions and as per BHEL Engineer's instructions.

Preparation of quality assurance log sheets an protocols with customer's Engineers. welding logs and other quality control and quality assurance documentation as per BHEL Engineer's instructions, is within the scope of work /specification.

The protocols between contractor and customer/BHEL shall be made prior to installation for correctness of foundations, materials, procedures, at each stage of Installation, generally as per the requirement of Customer/BHEL. This is necessary to ensure elimination of errors or keeping them within tolerable limits and to avoid accumulation and multiplication of errors.

A Daily log Book should be maintained by every supervisor/Engineer of Contractor on the job Duplicate (One for BHEL and one for Contractor) for detailing and incorporating Alignment/clearance/centering/Levelling Readings and Inspection details.

Record of radiography containing details like serial number of weld joints date of radiography repairs if any reshots etc. shall also be maintained as per BHEL Engineer's instructions.

High Pressure welding details like number of joints, Welder's Name, Date of welding, Details of Repair, Heat Treatment, etc. will be documented in welding Logs as per BHEL Engineer's Instructions.

Heat Treatment details of Hp Welds indicating minimum temperature recorded, heating rate, cooling rate, soaking time, etc., shall also be recorded and documented by Contractor as per BHEL Engineer's Instructions. High pressure Welder's Performance Record shall be furnished every month. The performance Report of Welders shall indicate the percentage of Repair for each welder.

All the Electrical/Technical Measuring and Testing Instruments/Gauges, Feeler Gauges, Height Gauges, Dial Gauges, Micrometers, Levels, Spirit Levels, Surface Plates, Straight Edges, Vernier Calipers and all measuring instruments shall be provided by the contractor for checking Levellings, instruments shall be provided by the contractor for checking Levelling, Alignment, centering etc. of Erected Equipments at various stages.

The Instruments/Gauges/Tools etc. provided should be of Brand. Quality and Accuracy specified by BHEL Engineer and should have necessary calibration and other certificate as per the Requirements of BHEL Engineer.

In the course of erection it may be necessary to recheck or counter check or finally check the work with instruments recently calibrated recalibrated or of inspection grade gauge/tools or special measuring instruments such as instruments whenever necessary will be provided by BHEL on specific authorization by BHEL Engineer.

The instrument mentioned above shall be drawn by the Contractor from BHEL stores on the specific authorization and use the same on the specific job for the purpose of inspection / rechecking / counter checking / finally checking of the work and shall be returned to BHEL stores immediately on completion of the inspection.

Vibration indicators / vibration recorders / vibration analyzers will be provider by BHEL for checking and analyzing vibration levels of rotating equipments with necessary operators. Contractors shall provide necessary labour for carrying out such tests.

Total Quality is the Watch Ward of the work and standards; Procedures laid down by BHEL. We shall follow all the Instructions as per BHEL Drawings and Quality / Standards. Contractor shall provide for the services of quality Assurance Engineer.

The Welders performance will be reviewed from time to time as per the BHEL Standards and any welder not performing to the Standards set by BHEL / Consultant shall be engaged on the work.

All the welders including the HP Welders shall carry identity cards as per the proforma prescribed by BHEL only Welders duly authorized by BHEL / Consultant shall be engaged on the work.

Contractor shall ensure speedy alignment and welding of all Equipment erected by him after placement. Also all alignments, Welding, NDT Tests required for stage Inspection shall be completed as per Quality Assurance Procedures.

All the Quality Assurance procedures have to be completed with before effecting column erection, structural work, Hydraulic Test, Trail Run of Equipment, Pre-Commissioning and Post Commissioning and any other tests required to be conducted for completing erection and commissioning.

STAGE INSPECTION BY FES / QA ENGINEERS

Apart from Day-to-Day Inspection by BHEL Engineers Stationed at site and also by Customer's Engineers. Stage inspection and Equipment under Erection and Commissioning at various stages of Erection and commissioning by TEAMS of Engineers from Field Engineering Services of BHEL's manufacturing units and Quality Assurance Teams from Field Quality Assurance Unit/Factory Quality Assurance and Commissioning Engineers Contractor shall arrange all labour, Tools and Tackles, etc. for such stage inspections free of cost.

Any modifications suggested by FES and QA Engineers Team shall be carried out. Claims of Contractor, if any shall be dealt as applicable.

Any minor rectifications or minor repairs of defective work found out during stage Inspection shall be rectified free of cost, by the contractor.

SECTION VI

SPECIAL CONDITIONS (E&C)

6.1 SCOPE OF WORK

a. Taking delivery of parts in BHEL stores, transportation to site of work, unloading at service Bay in proper manner in the place as identified by BHEL.

b. Assembly, erection, pre-commissioning, testing and commissioning of the following Equipments for Units – 4 &5.

   i. Vertical Shaft Single Stage Pumps with Francis type runner complete with associate equipments.

   ii. 30 MW vertical shaft AC Motor, 0.95 PF leading, 11000 volts, 50 Hz with all auxiliaries and connected equipments.

c Erection of auxiliary equipments required for operation of Generating units. The detailed scope has been described in Appendix.

6.2 PROVIDING WORKMEN AND SUPERVISORY PERSONNEL

6.2.1 The contractor shall provide skilled, semi skilled and unskilled workers including qualified high pressure welders, winders, brazers, gas cutters, riggers, qualified electricians, gas cutters, riggers, grinders, qualified electricians, helpers etc., for all the work covered under this specification. Only fully trained and competent men with previous experience on the job shall be employed. they should hold valid certificate wherever necessary . BHEL reserves the right to decide on suitability of the workers and other personnel who will be employed by the contractor. BHEL also reserves the right to insist on removal of any employee of the contractor at any time if found unsuitable and the contractor shall forthwith remove such employee. In the event of increase or decrease in the category of workers, supervisors, the contractor should take prior approval of BHEL engineer. only qualified welders are to be arranged for the generator works as described by BHEL.

The stator is supplied in three parts. The have to be assembled at site and the winding of balance portion at the joints is to be done at site
The contractor shall provide adequate qualified winders to carry out stator winding who will be tested by BHEL. They shall also carry out taping works and ultrasonic testing of winding. Ultrasonic test kit shall be arranged by the contractor at his cost.
The rotor rim is to be build at site. For this purpose necessary electronic weighing machine is to be arranged by the contractor to maintain rotor balance during build up

6.2.2. The contractor has to provide supervising engineer experienced in the various classes of works included in the contract. Contractor also has to provide one Computer Operator with two unskilled personnel exclusively for M/s.BHEL for day to day office work.

6.2.3 The Contractor shall provide sufficient no. of consumables like tin sheets, asbestos cloths, fire resistant tarpaulin etc, as required by BHEL within the quoted rates, in addition to T& P, instruments and manpower to be supplied by him. Special tools and tackles and consumables required for winding, brazing works are to be arranged by the contractor at his cost.

6.2.4 All protective coverings during dry out of generator using G.I. Sheets, steel are to be arranged by the contractor at his cost.

6.2.5 Contractor has to provide all necessary support steel going into embedments during erection of piping draft tube spiral casing etc.

6.2.6 Contractor has to provide 1 number computers with printer and accessories exclusively for BHEL office work with operators. Necessary maintenance of P.C and Printer along with stationary shall be arranged by the contractor.

6.3.0 ENGINEER TO DECIDE METHOD, ASSEMBLY AND PRIORTY

BHEL engineer will decide the method of assembly and priorities and the contractor shall carryout the works only as per the engineers directions.

The assembly, erection testing and commissioning of the Generating units and auxiliaries should be strictly carried out as per the guide lines and tolerances indicated in the respective manufactures/suppliers and corporation drawings. Materials should be handled exactly as per the erection procedure stipulated by the various suppliers. The contractor has to carryout erection of all the equipments and associated auxiliaries supplied by the manufacturing units as per the contract and to the entire satisfaction of BHEL/PEL authorities.

6.3.1 The work shall have to be carried out in a neat and aesthetic manner following all the required quality procedures. All care shall be taken to follow systematic stage inspection duly filling all relevant log sheets. Only on obtaining clearance from BHEL / Customer contractor can proceed with further application works. Work shall be executed by proper planning drawn in consultation with BHEL Engineer.

6.3.2 The works hall conform to dimensions and tolerance given in various drawings and quality manual provided by BHEL. 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 at their cost failing which the job will be carried out by BHEL's at the risk and cost of the contractor including BHEL's overhead charges @ 30%.

6.3.3 The contractor shall arrange required materials at their cost for erection of temporary platforms like scaffolding materials, clamps etc., for carrying out erection of equipments, welding and N.D.T Test.

6.3.4 Cleaning, revisioning, servicing of any equipment during erection and commissioning stages will be arranged by the contractor if required. However Gaskets / packing for replacement will be provided by BHEL.

In case of any class of work for which there is no specification detailed in the contract, but necessary for satisfactory completion of plant equipment shall be carried out in accordance with the instructions and requirements of BHEL engineer at site.

6.3.5 All works such as cleaning, leveling, aligning, trial assembly dismantling of certain equipment, components for checking and cleaning, surface preparation, as per general Engineering practice and as per BHEL Engineer's instructions at site, cutting, grinding, straightening, chamfering, filing, machining, chipping, drilling, reaming, scrapping, lapping, shaping, fitting up etc. as any be applicable in such erection works are treated as incidental to the erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work.

6.3.6 Certain extra lengths of portions/ parts of various site fabricated ducts/parts bellows/piping etc. are provided as erection allowance and they shall have to be cut to suit site conditions and layout or certain length of portions/parts of ducts/bellows/piping etc. may have to be added to suit site conditions and layouts. No. extra charges will be admitted for such works.

6.3.7 The contractor shall carry out all necessary checks such as accuracy of level. Center lines, bolt positions, hanger parts, anchor / foundations bolt hole / pit positions etc sufficiently in advance to ensure correctness of installation of all equipments covered in the scope of work.

6.3.8 Aligning, matching and welding of piping to the terminal points forming part of the scope of work/specification. Also, where the piping connection to the terminal points involve flanged joints, mounting and welding of flanges on piping, matching of flanges, fixing of gaskets, bolting and tightening as per BHEL Engineer's instructions is also in the scope of work.

6.3.9 In case of piping connected to equipment, matching of flanges for achieving the parallelism and alignment at equipment end by suitably resorting t6o heat correction or other method as instructed by BHEL engineer is within scope of work.

6.3.10 Certain adjustment in length may be necessary while erecting piping etc. The contractor should remove the extra lengths / add extra lengths to suit the final layout after preparing edges afresh and adopting specified erection procedure at no extra cost.

6.3.11 Minor adjustments like opening or closing of the fabricated bends of pipes by process of heat correction or any other method approved by BHEL Engineer to suit the lay out, with specified procedure, are in the scope of work.

6.3.12 Contractor shall use only bolted clamps for achieving alignment of piping, where welded 'L' shaped stoppers and wedges are to be used for aligning piping and equipment, the same shall be subject to approval by BHEL Engineer. Contractor shall after completing welding, remove by gas cutting the bridges, toppers etc. and not by hammers. Any burrs left on the

equipments and piping after welding shall be ground off or any scar or cavity made good by welding and grinding.

6.3.13 All weld joints on equipments and piping shall be ground or filed on completion of welding as per instructions of BHEL Engineer so as to achieve smooth surface devoid of ripples, undulations etc.

6.3.14 All piping have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air.

6.3.15 Pipelines shall be cleaned off welding slags and burrs by hand files, wire brushes and flexible grinders wherever required and using cloth.
Flame cutting of piping and parts of equipment shall be strictly done as per BHEL Engineer's instructions and in his presence only.

6.3.16 All drains / vents / relief / escape / piping to various tanks / sewage / drain channel / sump / atmosphere etc. from the stubs on the piping and equipments erected by the contractor is completely covered in the scope of work.

6.3.17 If during erection, the contractor may have to works simultaneously on both the units and may have to increase his workmen to improve the progress of work, the contractor shall suitably increase his resources and contractor should be able to compress the various schedules / events suitably or as directed by BHEL Engineer / customer at no extra cots.

6.3.18 The Stator segments will be kept at site in temporary sheds. It is the responsibility of the contractor to dismantle the above sheds, after removal of stator segments to erection site for erection and all the dismantled materials to be returned by BHEL stores. The above indicated works are to be carried out within quoted value.

6.4.0 RESPONSIBILITY OF CONTRACTOR

6.5.1 The contractor shall take necessary measures to see that all the machined surface are greased/preserving oil applied and covered. The contractor shall protect the finished work from weather, damage and defacement.

6.5.2 The pre-heating if necessary by gases for welding shall be done by the contractor in accordance with the relevant regulations and standards of equipment suppliers practice and to the satisfaction of BHEL/PEL engineer.

6.6.0 WELDING INSTRUCTIONS

6.6.1 WELDING

Erection of hydro turbine parts specified in the scope of work involve good quality of welding with pre-heating followed by radiography wherever required. Dye-penetrant and other test will have to be conducted by the contractor wherever necessary. The contractor's personnel engaged should have adequate knowledge on the above works.

It may be necessary to prepare weldneck or prepare the edge for welding to suit site conditions which shall be done by the contractor at no extra cost. All

fittings like 'T' pieces, weld neck flanges, reducers etc., shall be suitably matched / re-edged prepared with pipe for welding.

RE-WELDING

Any rewelding before, during and after hydraulic and any other test should be carried out without any extra cost.

6.6.2 WELDERS

The welders should have valid welding certificates involved in first class welding. They should also have certificate for all precision welding. In case the welders do no have the valid certificates or their period or certification as expired, they should undergo valid tests. The BHEL reserves the right to reject any welder without assigning any reason and in such case the contractor shall replace the welder immediately to the satisfaction of the customer engineer. The contractor at his cost shall arrange sufficient no. of "X" Ray quality welders for welding of spiral casing in the round the clock operation.

CONTRACTOR SHOULD DEPLOY H.P WELDERS, HAVING VALID IBR CERTIFICATE AND CAPABLE OF DOING TIG WELDING

6.6.3 STOPPING OF UNSATISFACTORY WELDING

BHEL is entitled to stop ay welder from the work if his work is unsatisfactory for any technical reason or there is high percentage of rejection of joint welded by him, which in the opinion of the engineer will adversely affect the quality of welding, though the welder has earlier passed the tests prescribed by the corporation. The welders having passed the qualification test, does not relieve the contractor from the contractual obligation for the quality of welder performance.

6.6.4 MAINTAINING RECORDS FOR THE WELDS

The contractor shall maintain records in the form as prescribed by the engineer 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, pre-heat temperature radiographic results, rejection if any, percentage of rejection etc, and submit copies of the same to engineer at site. interpretation of engineer regarding acceptability or otherwise of welder shall be final. All welding joint shall be subject to acceptance by the engineer.

6.6.5 RADIOGRAPHY WORK/ULTRASONIC TEST OF WELD JOINTS

The radiography of the welds will have to the arranged by the contractor by providing suitable isotope cameras, radiography experts etc. They personnel handling isotopes should be fully certified by BARC Mumbai and valid certificates shall be produced to the engineer for verification and also photocopies of the certificates shall be given to the engineer for his records. The length of welds to be radiographed will be decided by the engineer at site. However, in case of any rewelding work, the radiography of the particular

portion will have to be done by the contractor without any additional cost. The contractor shall plan the welding in such a way to give sufficient time to radiography to take radiography of welds intermittently when the welding is in progress. All necessary precautions such as barricading the area, posting to prevent unauthorized entry into the area where radiography is being doing will be the responsibility of the contractor. Radiography, shall be taken only during the night hours. The contractor shall arrange for suitable capacity isotope camaras in order to ensure minimum exposure time during radiography testing of weld joints.
ULTRASONIC TESTS AS SPECICIFIED IN DRAWINGS OR DOCUMENTS IS TO BE CARRIED OUT BY THE CONTRACTOR. NECESSARY CALIBRATION CERTIFICATES OF THE EQUIPMENT USED AND THE QUALIFICATION CERTIFICATES OF THE PERSON CARRYING OUT UT SHALL BE FURNISHED BY THE CONTRACTOR

The quantum of radiography / UT for this scope of work are to be noted from the drawings.

6.7.0 FILLING OF SPIRAL AND HYDRAULIC PRESSURE TEST

6.7.1 For filling up spiral casing for the purpose of conducting hydraulic test, the contractor will have to arrange temporary pipe line for arranging filling of water from river or any other source nearby available as per instructions of BHEL. The contractor should do all the works and conduct hydraulic pressure test as per the instructions and to the fullest satisfaction of the engineer. If the hydraulic testing is repeated for any reason it should be done without any extra cost. Transport and fitting of dummies, test pieces are to be done by the contractor at no extra cost.

6.7.2 After spiral casing testing removal of conical plugs cutting of “V” groves, welding of inlet pipes with penstock pipes for radiography should be done by the contractor at no extra cost.

6.8.0 HANDING OVER OF SPIRAL FOR CONCRETING

Internal and external supports should be provided to the spiral casing and grouting holes to be provided before handling over the spiral casing for concreting. Removal/plugging after concreting shall be done by the contractor at no extra cost. Felt lining have to be provided at the upper half portion of the spiral casing. All the materials required for felt lining will be supplied by BHEL and the contractor shall arrange for the same as per the instruction of the Engineer.

6.9.0 QUALITY AND TOLERANCE

The contractor’s supervisory staff shall execute the work in the most substantial and workmen like manner in the stipulated time. Quality, accuracy, tolerance, alignment runout and aesthetic finish of work are essential part of this contract. The contractor shall be responsible to ensure that all the work conforms to the dimensions and tolerance and other values indicated in the various drawings and relevant standards as indicated by customer engineers.

6.10.0 INCIDENTAL WORKS

All the works such as cleaning, checking, leveling assembling, temporary erection for alignment, dismantling of certain equipments for checking and cleaning, face preparation, fabrication of plate/sheets, fabrication of temporary enclosures to assembles/equipments and temporary platform etc, as per direction of BHEL/PEL, tubes and pipes as per general engineering practice at site, cutting gouging, grinding, straightening, filling, chipping, minor civil works such as chipping and plastering for fixing of clamps, bolts etc, for laying of pipes and cable trays as may be applicable in such erection work as incidental to the erection and necessary to complete, the work satisfactorily shall be carried out by the contractor at no extra cost.

6.11.0 RECEIVING AND CLEANING OF EQUIPMENTS:

All the equipments/parts shall be checked as and when received and cleaned, rust etc., removed and kept in a safe manner by the contractor. Any discrepancy in the quantity of material should be intimated to BHEL engineer the same day.

6.12.0 ASSEMBLY OF PIPES

Pipes shall be cut and welded/threaded to suit the site condition. Pressure test of pipes, collers etc, shall be conducted wherever necessary as indicated in the drawing. Assembly of pipes includes with flanges, gaskets, packages including all the valves on the route of pipe.

6.13.0 RETURN OF SURPLUS ITEMS

All the surplus, damaged, unused materials, package materials/containers etc, supplied by customer through BHEL shall be returned to customer. The loading and unloading of theses items at PEL stores should be done by the contractor at no extra cost.

6.14.0 OTHER WORKS

6.14.1 Dewatering of pits at work site wherever necessary will have to be carried out by the contractor, using his own pumps, pipes etc at no extra cost. Contractor should be geared up with required capacity of dewatering pumps at the time of mobilization.

6.14.2 Laying of Rail tracks may have to be done if required upto Generator Transformer, locations within the quoted value.

6.14.3 The contractor has to fix the instruments and electrical fittings, which is coming within barrel assembly along with cables up to junction box at no extra cost.

6.15. HYDRAULIC TESTING AND OTHER TESTS

6.12.1 The contractor shall carry out the required tests on the equipments and pipelines and rectify all the defects. Contractor may have to replace old / damaged Gaskets / packing etc for equipments during hydraulic test etc

which will include dismantling and assembly of equipments and same shall be carried out as per requirement.

6.12.2 Contractor shall lay out all necessary temporary piping, install pumps, valves, pressure gauges, electric cables and switches etc required for the hydraulic test and other test. After the test is over, all the temporary piping, pumps etc will be removed and returned to BHEL stores.

6.12.3 Hydraulic testing of piping, individual systems and equipment either under hydrostatic pressure or under static water head or both as per BHEL Engineer's instruction is in the scope of work. Test pumps required for hydraulic testing will be provided as supplied by manufacturing units.

6.12.4 All the above tests should be repeated till the equipments satisfy the requirements / obligations of BHEL to their customer. All repairs during testing due to failures attributable to erection shall be made good by the contractor. However, no extra payment will be considered for repeating the tests on account of defects, attributable to contractor.

6.12.5 Hydraulic pressure test at 150% of the maximum dynamic head including water hammer experienced under works conditions prescribed by the manufacturer, shall be conducted by the contractor on the assembled and welded distributor to check and rectify any defects.

6.12.6 Hydraulic pressure test, leakage tests and operation tests wherever applicable shall also be performed on other components such as the turbine components, pressure tanks, governor sump-tank, pumps, motors, grease equipments etc.

6.12.7 The contractor shall perform all the site tests during site assembly and erection of the turbine prior to commissioning.

TEST SCHEDULE

6.15.0 SITE TESTS

The following tests shall be carried at site.

6.15.1 DURING ERECTION

1. Inspection of welding of housing.
2. Testing of MIV and Hydraulic Pressure testing of distribution pipe before concreting.
3. Measurement of closing and opening time of inlet valve, by stroking in dry conditions.
4. Operational checks of inlet valve.
5. Inspection of welding of draft tube liner
6. Inspection of welding of spiral casing & outlet pipe.
7. Pressure testing of spiral casing and outlet pipe
8. Measurement of clearance between shaft and guide bearing and runner and top cover.
9. Measurement of guide vane gaps.

10. Relation between servomotor stroke and guide vane opening.

11. Check of shaft alignment.

12. Running test of bearing.

6.15.2 After the pump and associated equipment have been installed and before placing the units in service the following acceptance tests shall be carried out.

1. Over-speed test
2. Load rejection test
3. Emergency stop test
4. Continuous operation test
5. Pump starting test
6. Pump stopping test
7. Continuous operation test
8. Pump input test
9. Pump discharge test

6.15.3 Pump Weighted Average efficiency test – as per IEC

FIELD TESTING

1.	Specification of prototype	
	Type of Turbine	Vertical Francis Pump
	Rated output (Unit) No x MW	5 x 30
2.	STANDARDS / CODES TO BE FOLLOWED	AS PER RELEVANT IEC – 41, and agreed test procedure

SCOPE OF TESTING

1. Measurement of Specific Hydraulic Energy:

   The head measurement will be done directly, by taking tappings on the penstock.

2. Output Setting:

   Output would be measured using 3 wait meter method. CTs and PTs available in the power station will be used.

3. Efficiency Measurement

   Thermodynamic method as per IEC41 will be used to measure efficiency of hydro turbine.

TYPE OF TESTS

The following type tests on the first completely assembled generator and associated auxiliaries shall be carried out.

1. Temperature rise test
2. Excess current tests
3. Efficiency tests (by summation of losses method)
4. Bearing currents

Note: The bearings above the rotor shall be insulated. Healthiness of the bearing insulation shall be checked measuring the voltage across the rotor.

6. Determination of characteristics
   a. Direct axis transient reactances at rated current and voltage.
   b. Direct axis open circuit and short circuit subtransient reactances
   c. Direct axis and quadrature axis subtransient reatanc
   d. Direct axis and quadrature axis saturated and unsaturated reactances.
   e. Negative sequence reactance
   f. Rated current zero power factor lagging saturation curves
   g. No load and short circuit saturation curves

   h). Waveform oscillograph
   i). Moment of inertia of rotating parts (WR^2) by retardat method
   j). Short circuit ratio

LOAD TEST ON TURBINE SHALL BE DONE:

The turbine shall be given runaway speed test for a period of note more than 10 minutes to demonstrate their ability to withstand successfully the mechanical stress and hydraulic performance incident to maximum runaway test is complete, the main parts of the turbine shall be disassembled to check any damage due to stress resulting from the runaway speed test. The disassembly and re-assembly work will be done by the contractor and price quoted shall include this work also.

6.15.3 HIGH VOLTAGE TEST:

a. The H.V. test on generator stator & Rotor shall be conducted as per instruction of BHEL/PEL Engineers. It is responsibility of the contractor to arrange required H.V. test kit for the above test at their cost BHEL will not provide any H.V. test kit for this test. Contractor to make a note of this aspect and quote accordingly.

b. The wound stator segments prior to start of balance winding work at site shall first to be tested for healthiness to ensure no defect of the segments. For this purpose, an additional stage high voltage test shall be carried out for the above segments and the requirement of IR, PI & HV test shall be as indicated below.

For 11 KV machines

1.	Minimum IR value	-	2000 mega-ohm with 2 kv megger
2.	Minimum PI value	-	2.0
3.	H.V. test values	-	(For each stator segment)

Shop tested machines	Others
20 KV 50 Hz Ac (Rms) for 1 min. to earth	24 kv 50 Hz Ac (Rms) for 1 min. to earth.

6.16.0 SCOPE OF WORK OF FINAL PAINTING

6.16.1 The scope of work shall also include application of final painting as required and specified for the components of Generating units and Associated equipments. Paints and thinner shall be supplied by BHEL free of cost.

6.16.2 All other consumables required for painting like painting brushes, wire brush, cleaning consumables etc shall be arranged by the contractor at his cost Application of paints as per the colour code, Customer/BHEL requirement and specification.

6.16.3 All exposed metal parts of the equipments, wherever applicable after thoroughly cleaning all dust, rust, scales, grease, oil and other foreign materials by wire brushing, scrapping after the approval of BHEL/Customer and for Painting, Painting shall be carried out as per instructions of BHEL/Customer official.

6.16.4 The actual colour to be applied shall be intimated to the contractor before starting of actual painting work. The quoted rate shall include final painting also. The scope of painting includes application of colour bands, lettering the names of the systems, equipments tag nos of valves, marking the directions of flow and other datas required by Customer/BHEL within the quoted rates at the appropriate place as identified by BHEL/Customer.

6.17.0 TIME SCHEDULE

6.17.1 The contractor has to mobilize site in all respects within two weeks from the date of issue of telegraphic telex Letter of Intent.

6.17.2 The contractor shall complete the works as detailed in the Tender specification within 13 months from the date of start of work for first unit, with a phase shift of 2 months for other Unit.

However the contractor has to be provide required manpower assistance for a period of two months for each unit towards acceptance / trial operation for all units. The fields efficiency test also to be carried out in one unit, as per directive of BHEL / Customer Engineer.

Turbine activities are linked up with civil works. Hence there is likely to be a time gap, since considerable concreting activity is involved. These gap shall not construed as ideal period. During the period of concerting several works in other areas should be tackled by the contractor with proper planning in consultation with BHEL.

6.17.3 For the above purpose, the erection work shall be commenced as may be stipulated in the letter of intent and shall deemed to have been completed in all respects only when the unit is operated successfully under full load conditions. The decision of BHEL in this regard shall be final and binding of the contractor. During the total period of contract, the contractor has to carryout the activities in a phased manner as required by BHEL Engineer and as per the programme of events/targets fixed by BHEL/Customer.

6.17.4 During the total period of contract, the contractor has to carryout the activities in a phased manner as required by BHEL engineers and as per the programme of events / targets by BHEL / Customer.

6.17.5 During the tenure of contract, if BHEL is not satisfied with the progress of work, BHEL have the right to withdraw any portion of work / balance work and get the same done either directly employing their own men or through other agency at your risk and cost. You shall not be entitled for any compensation whatsoever in this regard.

6.18.0 EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK

6.18.1 a. BHEL may consider payment for extra works on man day basis for such of those works which require major revamping/ rework/ rectification /modification which is totally unusual to normal erection or commissioning work, which are not due to contractor's faulty erection.

b. The decision of BHEL is this regard shall be final and binding on the contractor. The contractor may submit his work claim bills (specifically agreed by BHEL Engineer) along with the labour sheet duly certified by BHEL Engineer at site. But BHEL also got the option to get those work done through other agencies if they so desire.

6.18.2 All the extra work, if any, carried out should be done by a separate gang which should be identified prior to start of work for certification, of man hours. Daily labour sheets should be maintained and should be signed by contractor's representative and BHEL Engineer. Signing of the labour sheets does not necessarily mean the acceptance of extra works. Only those works which are identified as not usual to normal erection and certified so by the Project Manager and accepted by designers/supplier or competent authority only will be considered for payment.

6.18.3 The decision of BHEL in this regard shall be final and binding on the contractor.

6.18.4 The following man hour rates will be applicable modification/rectification work.

Average single manhour rate including overtime if any, supervision, use of tools and tackle and other site expenses and incidentals, including consumables for carrying out any rework/revamping as may arise during the course of erection.

Rs. 40 /-
Per manhour

Average single man hour rate including overtime if any, supervision, use of expenses and incidentals excluding consumables for carrying out any rework / revamping as may arise during the course of erection.

Rs. 25 /-
Per manhour

6.18.5 EXTRA WORK DOES NOT INCLUDE

6.18.5.1 Nominal dressing of foundations, holes, bases nut and bolts, incase of abnormal conditions, this can be mutually discussed before starting of such work.

6.18.5.2 Extra works are broadly defined as below:

Design changes which will be intimated to the contractor after the start of erection and same refers to dismantling of erected components rectifications of components wrongly manufactured at work, any other works which do not fall in the scope of this contract.

6.18.6 The decision of BHEL in this regard shall be final and binding on the contractor.

6.18.7 FIRM/PVC: FIRM

6.19 OVER RUN CHARGE:

6.19.1 In case due to reasons not attributable to the contractor the work gets delayed and completion time gets extended beyond fifteen (15) months from the date of commencement of work, the contractor shall not be entitled for any overrun compensation (ORC) for a period of first Three (3) months after the expiry of fifteen (15) months. In case of ORC arise the same will be Rs.25,000/-(Rupees Twenty five thousand only) per month for extension to the completion period beyond 18 (15 + 3 months) as stated above duly taking in to account the balance work at the end of that period.

6.19.2 The exact period of overrun will have to be ascertained before the commencement of grace period.

6.19.3 During the period of over run targets will be fixed on month to month basis, which have to be adhered. Incase of any shortfall due to the reasons attributable to the contractor, ORC amount will be proportionately reduced.

6.19.4 The payment of over run charges for extended stay for reasons not attributable to contractor will be subject to achieving the monthly programme of works as mutually agreed upon during the extended stay.

6.20. PAYMENT FOR WORK COMPLETED

6.21.1 The tenderer shall quote his rates as required therein for each of the categories as per the rate-schedule appended.

6.21.2 The measurement will be taken as per Clause 2.6 of General conditions of contract and certified by the BHEL Engineer for the actual work.

6.21.3 Subject to any deduction which BHEL may be authorized to make under the contractor, shall on the certificates of BHEL Engineer at site, be entitled to payments as explained hereunder.

6.21.4 For erection, testing and commissioning of Generating units and auxiliaries as described I Rate schedule, intermediate payment shall be made as follows on the basis of percentage of total average of each unit (1/2 of lumpsum rate) Contract value of work. These percentages are only for the purpose of terms of payment and should not be construed as price for individual items.

FOR THE PRUPOSE OF RUNNING BILL PAYMENTS, LUMPSUM VALUE FOR EACH UNIT WILL BE half (1/2) OF THE TOTAL LUMPSUM AMOUNT QUOTED.

6.21.5 For erection, testing and commissioning of Generating units and auxiliaries as described in Rate Schedule, intermediate payments shall be made as follows on the basis of percentage of total contract value of work. (These percentages are only for the purpose of terms of payment and should not be construed as price for individual items).

Sl.No.	Completion of Stage Activities	Percentage
	A-PUMPS	
1.	DT Liner assembly, Welding and anchoring	2%
2.	Assembly, welding and anchoring of DT Cone	1%
3.	Assembly, welding of first stage Embedded Pipes and parts	1%

4.	Speed ring assembly in service bay, positioning, centering and leveling in Turbine pit	1%
5.	Spiral segments trail assembly in service bay and partial welding and bracing (excluding inlet section between spiral and penstock)	2%
6.	Matching & sequential welding of spiral segments to speed ring/stay ring (complete welding)	2%
7.	X-Ray/UT testing of all spiral joints and required repairs	1%
8.	Filling of spiral, hydraulic testing of spiral casing	2%
9.	Final leveling and centering of speed ring and spiral casing assembly, other connected works and handling over spiral for concerting.	1%
10.	Assembly of foundation ring assembly, of DT cone to foundation ring/stay ring. Welding of make up piece.	1%
11.	Erection of pit liner, welding and completion of second stage embedded pipes.	1%
12.	Blue matching of guide bearing pads.	1%
13.	Trial assembly, final assembly of runner and shaft, lowering of assy in to pit, centering and leveling and releasing shaft for Generator works.	2%
14.	Assembly of guide apparatus completed with guide vanes, bush housings, regulating ring, links, levers, GV Servo motors, final adjustment of guide apparatus and com etc dowelling including base plates.	2%
15.	Inlet section assembly between spiral and penstock.	1%
16.	Inlet section section welding(including penstock joint)	1%
17.	Make up pices between penstock and inlet pipe welding and X-ray/UT.	1%

18.	Erection of Hydro mechanical cabinet, pressure pumping set, pressure vessel etc.	1%
19.	Fabrication and final welding and final assembly of oil pipelines.	2%
20.	Fabrication and final welding and final assembly of cooling water pipelines.	2%
21.	Erectiom of draft tube drainage valve and spiral drainage Erection of electro hydraulic governing system.	1%
22.	Assembly of turbine shaft gland sealing assembly.	1%
23.	Erection of pipes in turbine pit like GB cooling, Ejector piping, TCD piping etc.	2%
24.	Erection of flow meter and piping level gauges and metering for synchronous condenser operation.	1%
25.	Discharge valve assembly & Aux. and testing.	4%
26.	Regrouting of D T Knee and spiral hallow patches.	1%
27.	Boxing up operation of Turbine.	2%
28.	Assembly of out let pipe.	1%
	Total for Pump	**41%**

MOTORS

1.	Embedments in Generator barrel	1%
2.	Erection of lower bracket pedestals, stator pedestals.	1%
3.	Lower bracket erection, centering, leveling Brake jack pipes assembly and brake jack panel erection.	2%
4.	Generator stator quadrants assy as full ring, in service bay. Pressure testing of stator air coolers and trail assembly on to stator and remove, stator dia measurement.	2%
5.	Stator winding including joint barsetc complete brazing ultrasonic testing and taping.	2%

6.	Stator instruments assembly and wiring.	1%
7.	Stator dry out and H.V. test	2%
8.	Rotor rim punching, cleaning, dressing, Deburring and batching as per weight of punching	2%
9.	Rotor rim assembly, checking diameter and height and other fastening	3%
10.	Rotor pole assembly, rotor radius measurement magnetic axis measurement, dry out of poles, checking I.R. values.	2%
11.	Rotor pole to pole connections, D.C. leads assembly-Rotor fan assembly.	1%
12.	Rotor dry out H.V. test, Rotor poles impedance test for inter turn shorts	2%
13	Thrust bearing assembly H.S. Lubrication assy lowering of generator shaft on the thrust bearing.	1%
14	Lifting, lowering, leveling and centering of generator stator in the pit	2%
15	Lifting of Rotor, lowering on to Generator shaft and coupling to shaft complete	1%
16	Rotor pit seal assembly, Erection of space heaters, trial assembly of top and bottom air guides and removal.	1%
17	Stator air coolers assembly, cooling water system inside generator barrel smoke detectors, D.T.T. assy etc. pressure testing of cooling pipes after welding.	1%
18.	Lifting, Assembly, leveling centering of Top bracket and bearing housing assembly generator floor plates assembly.	1%
19.	Rotor levelling, Generator alignment, Combined unit alignment compete alongwith slip ring & unit axis alignment and unit centring.	2%
20.	Thrust bearing & top bearing cooling water pipe lines assembly-Instrumentation and wiring, vapour seal and piping assembly.	1%

21.	Unit centralization setting of bearing clearances and bolting up of bearings.	1%
22.	Generator barrel lighting, brush gear casing lighting brush gear and slip ring assembly speed sensor assembly,CO2 System.	1%
	Total for Motor	**33%**

C.COMMON EQUIPMENTS

1	Compressed Air System	3%
2	Water depression system	3 %
	Total for Common Equipments	**6%**

D. UNIT COMMISSIONING

1	Pre-commissioning Tests	5%
2	Commissioning Tests	5%
	Completion of all works including application of painting, submission of Protocols / FQA log sheets and on submission of final bill.	5%
	Balance 5% after gurantee period of 12 months.The guarantee period starts after 6 months from date of first syncronisation.	5%
	Total for Unit commissioning	**20%**

A.	PUMPS:	41%
B.	MOTORS:	33%
C.	COMMON EQUIPMENT	6%
D.	UNIT COMMNG	20%

6.21.5.1FIELD QUALITY ASSURANCE FORMATS: It is the responsibility of the Contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary check as per the log sheet and obtaining the signature of BHEL and PEL in token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets.

6.21.6 The balance amount of 5%will be paid after the guarantee period of 12 months is over separately, for each unit. The guarantee period shall commence from the time of handing over of each set to customer or 6 months from the date of first synchronization of each set whichever is earlier. However, the above 5% payment can be released against submission of a matching bank guarantee from a Nationalised / Scheduled Bank in the prescribed proforma of BHEL valid for on year.

6.21.7 No levy or payment or charge made or imposed shall be impeached by reasons
for any clerical error or demanded or charged.

6.21.8 BHEL, at discretion, may further split up the above percentage and effect payment to suit the site conditions, cash flow requirements, according to the progress of the work.

6.22.0 TAXES

Not withstanding the fact that this is only an erection service contract not involving any transfer of materials whatsoever and not attracting any sales tax liability, being labour oriented job work, for the purpose of Sales Tax the contractor has to maintain the complete data relating to the expenditure incurred towards wages etc. in respect of the materials like consumables, spares etc., interalia indicating the name of the supplier, address and ST Registration No. and ST paid and should furnish to BHEL at the year end.

The contractor has to register under local Sales Tax-Law and get assessed. The contractor has to give a certificate each year that the returns and submitted regularly and the turnover on this contract is included in his sales tax return.

The sales tax registration number and certificate is to be furnished at site soon after the award of contract. The ST registration number is required to be given to BHEL site office immediately after the award of contract. The final bill amount would be paid only after assessment orders covering this turnover are produced. The ST deduction at source will be made from running bills, unless necessary exemption is produced.

6.23.0 IMPORTANT CONDITIONS FOR PAYMENT

It may be noted that the first running bill will be released only on production of the following.

i ST Regn.No.

ii PF Regn.No.

iii labour Licence No.

iv. workmen Insurance Policy No.

6.24.0 PROVIDENT FUND &MINIMUM WAGES

Your are required to extent the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due Implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of this letter of intent. Incase you are exempted from such remittance an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provision of said Act, if recoveries therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payment due to you.

The contractor shall ensure the payment of minimum labour wages to the workmen under him as per the rules applicable from time to time in the state.

The final bill amount would be released only on production of clearance certificate from PF/ESI and labour authorities as applicable.

SPECIFIC REQUIREMENTS FOR ISO 9001

IMPORTANT NOTE

Contractors shall ensure that all their staff / employees are exposed to periodical training programmes conducted qualified agencies/ personnel on ISO 9001 Standards.

Contractors shall ensure that the quality is maintained in all the works connected with this contractor at all stages of the requirement of BHEL.

Contractor shall ensure that all Inspection, Measuring and Testing equipment that are used, whether owned by the contractor or used on loan, are calibrated by the authorized agencies and the valid calibration certificate will be available with time for verfication by BHEL. A list of such instruments possessed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

Contractors shall arrange for the inspection of the works at various stages as required by BHEL. Immediate corrective action shall be taken by the contractors for the non-conformances if any ,observed and pointed out by BHEL.

HSE SPECIFIC REQUIREMENT

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING HEALTH RELATED POINTS:

01. Sub- Contractor to identify nearest hospital for Health check up of his staff and workers and intimate BHEL site office & PSSR HQ.

02. To arrange for occupational health check up / screening of contractor's staff and workers engaged in sub contracting activities. In this, category of workmen such as welders, gas cutters, grinders, radiographers, crane operators are to be given exclusive attention in respect of health screening.

03. Sub- Contractor to arrange an ambulance vehicle or emergency vehicle on a continuous basis to meet any emergency situation arising at site work in which his staff and workers are engaged.

04. To provide appropriate facilities for prompt first aid treatment of injuries and illness at work. One first Aider for each subcontractor to be provided. First Aider should undergo training of first aid.

05. To provide filtered drinking water at selected place in a clean container.

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING **SAFETY** RELATED POINTS:

01. Personnel protective equipment (PPES): Required number of following PPES (Confirming to relevant is Standards) to be made available to workmen at site and ensured that they are used.

- Helmet
- Safety goggles
- Welding face shields
- Safety belts for working at heights
- Safety shoes
- Ear plugs
- Rubber gloves and mats for low tension (I.T) electrical works.
- Gum boots & aprons
- Other items as required by BHEL site.

02. Sub contractor to liase with nearest fire station and inform contact telephone number and contact person to meet any emergency.

03. To provide appropriate fire fighting equipment at designated work place and to provide fire fighting training to selected person in his group of workmen to meet emergencies.

04. To provide adequate number of 24 V power supply points to work in a constrained and enclosed space.

05. All power tapping points / switch boards/ power & control cabling should fulfill required electrical safety aspects as per relevant is standard.

06. ELCH's (Earth leak circuit breakers) at all electrical distribution points to be provided.

07. Red and white caution tape of proper width (1.5 to 2 inch) to be used for cordoning unsafe area such as open trench, excavated area etc.,

08. to provide sub-contractors company logo or clothing to all staff and workers and identification including identity cards with photographs approved by BHEL.

09. High pressure and structural welders to be identified with colour clothing and to display copy of welders certificate with photographs of welder at the work place. The also should be in possession of valid welding procedure.

10. to display safe handling procedure for all chemicals such as lube oil, grease, sealing compound, kerosene, diesel etc. At stores & respective work place.

11. Contractor should authorize a person at site to stop work if there is a unsafe work noticed as per his knowledge.

12. Fitness for use of erected scaffolding to certified by the contractors approved scaffolder and the certificate should be displayed on the scaffolding itself. If the scaffolding is unsafe, the same will not be used. The certificate to be updated daily. The scaffolding to be made as per the relevant is standard.

13. For making platform on the scaffolding, proper thickness and size of the plank of required quality wood to be used. The safe working load of the platform to be displayed on the scaffolding itself. Proper use of plat form to be explained to the user.

14. All plant equipment should have inspection report before put into use.

15. All T&Ps should be of reputed brand and having quality certificates.

16. all IMTEs should have valid calibration certificate from recommended institution / testing lab and these should be in place.

17. All lifting tackle and plant equipment should have safe working load certificate.

18. The right worker should be deployed for right job and the resume of site Incharge, supervisors, and key workers to be submitted before commencement of work.

19. Sub-contractor should submit inspection / testing matrix of all T&Ps and to be approved by BHEL.

20. Sub-contractor to display safety slogan, safety board, caution boards wherever required in consultation with BHEL.

21. Sub-contractor to provide gas detectors of reputed make at desired locations.

22. Sub- contractor to conduct emergency mock drills, one drill per 6 month and submit report to BHEL.

23. Safe handling and storing of all equipment with adequate space to be ensured.

24. Sub contractor to deploy safety supervisor till the completion of the project.

25. Sub contractor to comply the safety reporting procedure of BHEL as practiced at present and also additional requirements that may arise out of future improvements in the safety management system. This includes computation of safety indices such as frequency rate, severity rate & incident rate.

26. Sub contractor to identify probable emergency situations such as electric shocks to workmen, caving in of shored earth, fall from height, collapse of scaffolding fire etc., and should have clear action plan to overcome them. Sub contractor to take required guidance from BHEL in this regard.

27. Sub contractor to identify hazardous activities which he may carryout and should train his workmen in those activities with the relevant operation control procedures. Sub contractor to take required guidance from BHEL in this regard.

28. Safe work permit system to be followed while working in confined space / near electric systems.

SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING **ENVIRONMENT** RELATED POINTS

1. HOUSE KEEPING : Sub contractor to carry out daily house keeping of work areas / stores through a check list prepared in consultation with BHEL.

2. Sub contractor shall adopt pollution prevention / reduce / control approach in all his site activities. This shall include:

    a. Transporting of oil / chemicals from stores to site safely without causing spillage. In case of any spillage, the area shall be cleaned and the remanant spilled oil disposed off to a safe place, identified for such disposal.

    b. To use required containers / cans / safety gadgets / appliances for transporting and for usage of oil / chemicals at site.

3. Sub contractor shall arrange for segregation / collection of scraps and dispose off to the identified place meant for scrap collection.

4. Sub contractor to adopt good erection practices / procedures with the objective of reduction of waste generation / rework.

OTHER HSE REQUIREMENTS TO BE COMPLIED BY SUB CONTRACTOR

1. Sub contractor to clearly understand and accept the HCE policy of PSSR with a commitment to comply the requirements of the policy.

2. Sub contractors to arrange for daily meeting of their supervisors and work force before they disperse for their daily planned activities where in the relevant health, safety and environment aspects of the job and use of PPES are explained.

3. Sub contractor to conduct monthly HSE meeting (internal) and submit the report to BHEL.

4. HSE slogans to be displayed in a proper board - hoarding at designated places in consultation with BHEL.

5. Sub contractor to submit a structured programme for training & occupational Health Screening of their work force at site after the Award of LOI.

SECTION – VII

APPENDIX – I

DETAILS OF ITEMS TO BE ERECTED

S.No.	PGMA	DESCRIPTION
1.0		EMBEDDED PARTS (PG-201)
1.1		D.T.CONE
1.2		D.T. Liner
1.3		D.T. Drain Value
1.4		Pipes & embedment in first stage
1.5		Tubes & embedments for field efficiency test
1.6		Steel Tube for field efficiency test
2.0		FOUNDATION PARTS (PF 202)
2.1		Stay ring
2.2		Spiral casing
2.3		Outlet pipe
2.4		Felt lining for spiral casing
2.5		Spiral outlet pipe
2.6		Foundation ring
2.7		Pit liner
2.8		Pipes embedments in 2^{nd} stage
3.0		GUIDE APPARATUS (PG 203)
3.1		Regulating Ring Top cover Guide Vanes Pivot Ring Regulating Mechanism items
3.2		G.V. servomotor (with stopper)
3.3		G.V. Servomotor (without stopper)

3.4	Shear pin
4.0	ARRANGEMENT OF IMPELLER (PG207)
5.0	ARRANGEMENT OF SHAFT (PG 206)
6.0	MAJOR ASSEMBLIES OF SHAFT
6.1	Guide Bearing (includes cooler) Turbine Guide bearing pads
6.2	Shaft sealing
7.0	PUMP CONTROLLER EQUIPMENT
7.1	Hydraulic cover speed device
7.2	Toothed wheel and magnetic pickup
7.3	Feed back mechanism
8.0	MAJOR ASSEMBLIES (PG 210)
8.1	Discharge Valve & Servomotors assembly
8.2	Platform & Failing in pump pit
8.3	Details of flowmeter equipment & piping
8.4	Pump discharge measuring equipment Water & Air pipes in pump pit
12.5	Top cover drain pump
12.6	Ejector system
12.7	Piping
12.8	Misc items FPR piping system
12.9	Micro Filter

OIL PIPE LINE SYSTEM

12.10	Discharge valve piping & OPU
12.11	Rating plate
13.	Drainage & Dewatering system (KPG211) D & D Pumps
14	(PG 220 & 221)

14.1	Pressure Receiver
14.2	Sump Tank
15.0	Auxiliary / System (PG 229)
15.2	Compressed Air Pipes
15.3	Air receivers (HP & LP System)
15.4	Air Receivers for Water Deprassion - 6.3 cum.
15.5	Air Compressors
15.6	Mics. Items for piping Water Depression System
15.7	Valves & Misc. Valve Items
15.8	Pipes for water depression syst.
15.9	Valves & Misc Items for cooling water system
15.10	Discharge valve & parts
15.11	Cooling water strainer
15.12	Pump motor set for cooling
15.13	Water system
15.14	Piping for cooling water system
15.15	Non return Values
16.0	Misc. Items (PG238 & 293)
16.1	Wound Stator (PG 251)
16.2	Foundation Item of stator
16.3	Air cooler
16.4	Air duct cover
16.5	Wound stator Segments (2 Nos)
16.6	Short Self Life Items for site
16.7	Coolers

16.8	Oil Coolers (4 * 16 FR)
16.9	Oil Coolers (2 * 12)
16.10	Air Coolers (5 * 22)
16.11	Rotor Assy. PG 252
17.0	Rotor Spider
17.1	Rotor Rim Items (Punching, End Plate, Stud, Nut etc.)
17.2	Fan Assembly
17.3	Slip ring assembly
17.4	Current carrying lead
17.5	Brake Track
17.6	Rotor assembly detail items
17.7	Pole Assembly (Pg-253)
17.8	Wound Pole Assy. - 14 Nos.
17.9	Pole Fixing Arrangement
17.10	Motor Shaft (PG-254)
18.0	Shaft Assembly – 1 No.
18.1	Trust Block
18.2	Tubular Shaft
18.3	Misc. Loose Items of Thrust Bearing
18.4	H.S. Lubrication System
18.5	Top Bracket Assembly
19.0	Upper Bracket Assembly with G.B. Support Ring etc. Top guide bearing pads
19.1	Misc. Loose items of top GD Bearing
19.2	Upper Air Guide & Baffle Assy
19.3	Radial Jack Installation
19.4	Brush Gear
19.5	D.C. Connection Lower Bracket (PG 257)
19.6	Lower Bracket Assy. with

	Bracking & Jacking
19.7	Lower Guide Bearing Pads
19.8	Misc. Items of Lower Gd. Brg
19.9	Lower air guide and baffle assy.
19.20	Turbine pit cover
19.21	Lower bracket foundation details
19.22	Brake control piping
20.0	Station Auxiliaries (PG 263)
20.1	Co2 Equipment
20.2	Oil Purifies
20.3	Other items (PG 263)
20.4	Completing Items of Genr.
20.5	Barrel Access Door Stairs & Hand Rails
20.6	Brush Gear Casting
20.7	Piping
20.8	Valves
20.9	Details Items (Gasket, Hardware Etc.)
20.10	Space Heaters
20.11	Brake Dust Collector
20.12	Details items like clip gasket etc.

Scope of Supply (Pumps)

five	-	Pumps
One	-	Runner
One	-	Shaft
One	-	Guide bearing
One	-	Shaft gland
One	-	Set of guide apparatus and servomotors consisting of following:
One	-	Top Cover
One	-	Pivot ring
One	-	Set of guide vanes and bearing housing

One - Set of guide vane regulating gear assembly

One - Set of guide vane servomotors

One - Set of foundation parts consisting of following:

One - Stay ring

One - Sprial casting

One - Inlet pipe

One - Foundation ring

One - Pit liner

One - Set of embedded parts consisting of following:

One - Draft tube cone

One - Draft tube bend liner

One - Set of chequer platings, stair case (if necessary) and hand rail for the turbine pit shall be supplied.

One - Set of pipes and valves

- Pipes and valves for dewatering of penstock/ spiral casing into draft tube.
- Pipes and valves for dewatering the draft tube.
- Pipes and valves for drainage of water from top cover
- Pipes and valves for shaft gland cooling water system
- Pipes and valves for turbine guide bearing cooling water system
- Pipes and valves for interconnecting oil pumping unit, pressure receiver and servomotors of guide apparatus.
- Pipes with tappings on spiral casing, top cover, and draft tube for connecting to the pressure/vacuum gauge.

One Set of Hydraulic Testing Equipment Consisting of Bulk that cover and cylinder with flanges for pressure testing of spiral at site shall be supplied. Pump-motor set, pressure gauge and hose pipe all also be supplied.

One Compressed Air System (for complete pump house)

One Set of cooling water System (for complete pump house)

One Set of Dewatering and Drainage System (for complete pumps house)

One - Dewatering System

One - Drainage System
Note : The dewatering and drainage pumps shall be installed in a common sump.

Four - Draft tube depression system

- For draft tube depression system, each set shall consist of :

- One level electrode box in the draft tube cone with a set of level electrodes.

- Compressed air system for depressing the water level in the draft tube consisting of servo operated valve, isolating valves and piping.

- Pipes, valves and servo operated valve for connecting spiral casing to lower reservoir.

- Set of solenoid operated valve, flow indicator, isolating valves and pipings for supplying cooling water to runner labyrinths.

Four - Sets of S.S.tubings and embedments for head measurement for field efficiency test.

SECTION-VII
APPENDIX – II

TECHNICAL PARTICULARS OF PUMP

1. Type	:	Pump
2.1 Rated Horse Power	:	34985 mhp (at GV opening 78%)
(at 100m head and 50Hz)		
2.2 Minimum Horse Power requirement at		
i). 100m head (at 51.5Hz)	:	38650 mhp (at GV opening 78%)
ii). 102.5m head (at 51.5Hz)	:	38525 mhp (at GV opening 78%)
iii). 76.0 m head (at 51.5Hz)	:	38080 mhp (at GV opening100%)

3. Discharge of each pump for above conditions		
i). 100m head (at 50Hz)	:	23.03 cumecs
ii). 100m head (at 51.5Hz)	:	25.37 cumecs
iii). 102.5m head (at 51.5 Hz)	:	24.70 cumecs
4. Pump Input		
a). Maximum input	:	38650 mhp
b). Rated head	:	100m
c). Guide vane opening	:	78%
d). Efficiency	:	87.5%
ii) Input and efficiency at rated head and full gate opening.		
a). Input	:	Same as above
b). Efficiency	:	

5. Efficiency in percentage at 100%, 80%, 60%, 30% and 110% load at.

i). At 100m head and 50Hz

Output (%)	:	100%, 80%, 60%, 30%,110%
Input (kw)	:	25714 ----------Not Applicable-------
Efficiency (%)	:	87.8----------Not Applicable----------
Discharge (m3/sec)	:	23.03----------Not Applicable------

ii). At 102.5 m head and 50Hz

Output (%)	:	100, 80, 60, 30,110
Input (kw)	:	255565 ----------Not Applicable------
Efficiency (%)	:	87.8----------Not Applicable----------
Discharge (m3/sec)	:	22.34----------Not Applicable------

iii). 76 m head

Output (%)	:	100, 80, 60, 30,110
Input (kw)	:	25840 ----------Not Applicable------
Efficiency (%)	:	84.8----------Not Applicable----------
Discharge (m3/sec)	:	29.8 ----------Not Applicable------

6. i) Guaranteed best efficiency:

a). At head of	:	102.5 m
b). At a discharge of	:	22.34 m3/s
c). At guide vane opening of	:	78%
ii). Efficiency curve for full range of output and head	:	Refer drg.no.309003

7. Speed

a) Rated	:	333.33 rpm
b) Maximum Run away speed under transient conditions (in opposite direction of rotation)	:	485 rpm
c) Specific (at 100 m and 333.33 rpm)	:	50.58 m3 / sec-m
d) Steady state runaway speed at design head	:	475 rpm

8. Rotation of the pump when viewed from motor side :
Anti Clockwise when looking from top of the motor.

9. a) Guaranteed minimum factor of safety under worst conditions based on the yield point of material :
Please refer to the table of next item(b)
b) Name and location of the part having the factor of safety in (a) above.

10. Guide Vane

i). Number of guide vanes	:	20
ii). Material of guide vane	:	Cast steel
10.1 Diameter of shaft	:	480 mm
10.2 Material and composition of shaft	:	Forged steel

10.3	Type of shaft coupling	:	Flanged rigid coupling
10.4	Weight of shaft	:	7000 kg (approx)
10.5	Length of shaft	:	3500 mm (approx)
10.6	Shaft seal	:	
	i) Material of seal / ring	:	Rubber
	ii) No. of seal rings	:	Two
	iii).Qty. of leakage (max)	:	Shall be furnished later
10.7	Wicket gate leakage	:	0.1 m3/sec
10.8	A) Impeller material and composition		
	i) Blade material and composition	:	Cast stainless steel (13% Cr – 4% Ni)
	ii) Boss material and composition	:	Not applicable
	b) Number of blades	:	6
	c) Method of attachment to shaft	:	by coupling bolts
	d) Weight of runner outlet dia of runner	:	8.5 tons 2009mm
	e) Inlet dia. Of runner	:	2760 mm
	f) Throat dia of runner	:	2009 mm
	g) Elevation of centre line of runner R.L.M.	:	225.00 M
	h) Velocity of water at runner exit of rated conditions	:	two, stainless steel

11. Guide Bearing Type

	a). Bearing area location	:	above shaft seal
	b) Composition of lubrication	:	White metal
	c) Method of lubrication	:	Self oil lubricated
	(if forced lubrication is adopted).		
	i). Number & Type of pump	:	Not applicable
	ii) Rating of motors	:	
	d). Amount of lubricant for one filling (one machine)	:	300 litres (approx)
	e) Lubricant used	:	ISO VG 68

10. DRAFT TUBE

	a). Type of draft tube	:	Elbow type
	b). Elevation of lowest point in draft tube	:	EL 218.540 m
	liner concrete EXIT	:	EL 223.129 m
	c). Distance from centre line of unit draft	:	60.5 m

	tube exit (concrete exit)	:	
	d) Weight of draft tube liner (+ cone)	:	15 tons
	e) Thickness of draft tube liners	:	8 mm
	f) Velocity of water (At rated discharge)		
	i). At draft tube exit	:	1.54m/sec
	ii). At draft tube liner exit	:	2.82 m/sec
	g). Material of the draft tube	:	Plate steel

Additional information

1.0	Cooling water system		
	a).No. and type of pumps	:	10, Centrifugal
	b) Capacity	:	2500 1 pm
	c) Head	:	40 m
	d) Motor rating	:	25 Kw
	e) No. and type of strainer	:	10, Motor operated self cleaning
2.0	Dewatering system		
	a).No. and type of pumps	:	2, Vertical turbine
	b) Capacity	:	5000 1 pm
	c) Head	:	35 m
	d) Motor rating	:	50 Kw
3.0	Drainage system		
	a).No. and type of pumps	:	2, Vertical turbine
	b) Capacity	:	2000 1 pm
	c) Head	:	35 m
	d) Motor rating	:	18.5 Kw
4.0	H.P Compressed air system		
	a).No. and type of compressors	:	2, Reciprocating
	b) Capacity (FAD)	:	1 m3/min
	c) Delivery pressure	:	35kg/cm2
	d) No. of Air receiver	:	1
	e) Capacity of receiver	:	0.8 m3

NOTE:

The date furnished above except the guaranteed parameters are preliminary worked out figures and subjected to minor changes during detail design stage.

TECHNICAL PARTICULARS OF MOTOR

1.	Type		Synchronous Motor
2.	Rating		
	a) KW		30000
	b) KVA		31579
	c) KVAR		9860
3.	Max. continuous rating (10% over load)		34737 KVA
4	Output with one cooler out of service and 10% of tubes of remaining coolers plugged in		31579 KVA
5.	Power factor		0.95
6.	Volrage (Normal) between phases		
	a).Maximum		12100 v
	b) Minimum		9900 V
7.	Frequency		50 Hz
8.	No. of phases		3
9.	Speed:		
	a) Normal		333.3 RPM
	b) Runaway		485 RPM
	c) Specific speed at rated head		Pump Data
10.	Efficiency (%) at 100%, 80%60% and 30% of output (the windage fiction loss by the integral parts of motor is included). (At rated conditions of voltage and frequency, copper losses calculated at 75 deg.C total losses subject to tolerance as per IS 4722).		
	a) 0.9 P.F	100 % Discharge	100 80 60 30
	b) Unity P.F	100% Discharge	97.90 97.74 97.37 95.61
			98.09 97.93 97.59 95.90
11.	Moment of inertia		: 610 T – M2 (min)
12.	Inertia constant		: 2.94
13.	Short circuit ration		: 1.0
14.	Line charging capacity		: NA
15.	Stator winding connection		: Star
16.	Direction of rotation		: CCW
17.	Insulation class (Both field and armature windings)		:
	Armature windings		: Class ‘F’

	Field windings	:	Class ‘F”
18.	**STATOR**		
	a). Number of sections	:	2
	b). Height of stator core	:	Cold rolled non grain oriented sheet steel.
	c). Outer diameter of stator core	:	5260 mm
	d). Height of stator core	:	800 mm
	e). Type of slots in stator core	:	OPEN
	f). Number of slots in stator core	:	243
	g). Number of conductor per coil	:	1
	h). Number of parallel paths in stator winding	:	1
	i). Type of stator winding	:	Roebel Bar Type
	j). total thickness of stator insulator (copper to iron in slots,		
	excluding liners)	:	
	i) Normal coil	:	3.5 mm Radial
	ii) Terminal coil	:	3.5 mm Radial
	k). total thickness of stator insulation	:	Not Applicable
	(between turns in slots)		Since Bar Type
	i) Normal coil	:	Winding
	ii) Terminal coil	:	
	l). Stator frame construction	:	Fabricated
	m). Width Air Gap	:	20.0 mm (min. air gap)
12.	**ROTOR**		
	a). Rotor diameter	:	4460 mm
	b). Type of pole fixing	;	‘T’ Head & Keys
	c) Number of poles	:	18
	d) Lowest factor of safety of any part of rotor, calculated		
	on yield stress when running at run away speed	:	1.5
	e) Part of rotor with lowest factor of safety	:	Rotor Rim
	f) Type of pole face damping windings	:	10 Nos 15 mm dia bars
	g) Air gap width	:	same as 21 (m)
20.	**Motor air coolers**		
	a). Type	:	CACW
	b). No. of coolers including one spare cooler	:	7
	c). Maximum safe pressure	:	7.0 Kg/cm ^{2}
	d) Water pressure required	:	3-4 Kg/ cm ^{2}
	e) Cooling water requirements:		

	i) Quality	:	3300 LPM
	ii) Water pressure	:	3-5 Kg/ cm^2
	iii) Temperature of cooled air	:	45^oC
	f). Continuous output of generator	:	30000 KW
21.	**Cooling**		
	a) Type		
	i) Rotor	:	closed ventilation with
	ii) Stator		rotor fans
22.	**Excitation system**		
	Type	:	Static Excitation Equipment
	a). Rating	:	197 KW
	b). Excitation power transformer	:	410 KVA, 11 KV / 195 V rating and voltage ratio.
	c). Direct current requirements Of excitation control system	:	1200 A at rated load.
	d). Range of voltage level setting	:	+/- 10%
	e) i) Sensitivity at which motor voltage is held	:	+/- 0.5% accuracy,
	ii) Ceiling voltage of excitation system	:	236 V
	f) Excitation system response time	:	<20m Sec.
	g) Regulator gain		Shall be provided during Execution stage.
	h) Regulator time constant		
	i) Feed back gain		
	j) Feed back time constant		
	k) Max.Min.limits of exciter voltage in per unit		
	l) Damping signal time constant		
	m) Damping signal time constant		
	n) Percentage transformer drop compensation	:	6% (Typical)
	o) Max. change in generation voltage when AVR is transferred from AUTO to Manual under all conditions of excitation.	:	Negligible
	p) Manual control range of excitation	:	80 – 110% / FN
	q) Thyristor type, rating and its temp. limitations	:	Gate controlled type Rating – During Execution. Temperature : 125 Deg.C Junction Temp. (Max)
	r) Cooling method of thyristors	:	Force cooled.
	s) Redundancy available in bridges	:	100% (Total 2 Bridges)

	t) Monitoring arrangement for the conductivity of thyristors.	:	Available
	u) Loss in static excitation system	:	Protection initiated for major excitation faults.
23.	**Voltage regulators**		
	a) Name of manufacturer	:	BHEL
	b) Type	:	DVR
	*c) Guaranteed sensitivity	:	+/- 0.5% Accuracy
	d). Min. time taken to respond at given sensitivity	:	<20m Sec.
	e) Range of voltage level setting	:	+/- 10%
	f) Range of adjustment of line drop compensation at full load.	:	16%
24.	**Nature of Insulation**		
	a) Stator conductors (in core)		
	i). To earth	:	Resin rich epoxy bonded glass cloth backed mica paper tape.
	ii). Between turns	:	Not Applicable
	Stator end windings	:	PGAM tape
	Stator laminations	:	Core plate varnish
	Rotor windings		
	i) To earth	:	Epoxy glass laminate
	ii) Between turns	:	Epoxy treated nomex paper
25.	**Thrust bearing**		
	a) Type of thrust bearing	:	Spring mattress type
	*b) Whether guarantee to operate successfully for 15 minutes at the run way speed of the turbine with the total load (yes/no)	:	Yes
	c) Diameter of bearing (ID/ OD)	:	700 mm / 1300 mm
	d) Bearing cooling water	:	
	i) Quantity	:	760 LPM
	ii) Pressure	:	3 – 5 kg/cm^2
	e) Location	:	Below the Rotor
26.	**Guide bearings**		
	a).Location	:	1 above & 1 below rotor
	b) Type	:	Pivoted Pad type
	c) Bearing Area	:	780cm^2 / 1170 cm^2

	d) Cooling water	:	
	i) Quantity	:	180 LPM
	ii) Pressure	:	3 – 5 kg / cm^2
27.	**Lubricating system (one machine)**		
	i) Quantity & type of oil in one filling		
	a) Thrust bearing system	:	4800 Liter
	b) Guide bearing system	:	1800 Liter
	ii) if forced oil lubrication is adopted		
	a) For guide bearing		
	i) Type of oil pumps		
	ii) H. P and speed for each motor	:	NA
	b) For thrust bearing		
	i) Type of oil pumps		
	ii) H.P and speed for each motor		

SECTION - VII

APPENDIX : III

KALWAKURTHY STAGE – I: 2 X 30 MW LIFT IRRIGATION SCHEME

WEIGHT DETAILS

SL. NO.	DESCRIPTION	WEIGHT DETAILS OF EQUIPMENT
01.	Pump	350 Tones approx for 2 Units
02.	Motor	370 Tones approx for 2 Units
03.	Controls / Aux etc.,	250 Tones approx for 2 Units
04.	Cables, Cable Tray, Cable Tray Supports etc.,	240 Tones approx for 2 Units
	Total:	**1210 Tones for 2 Units**

Note: The weight given is approx. for 2 units and is tentative. The detailed weight schedule will be given by BHEL after receipt of drawings at site.

Total Scope of work as per contract with customer by BHEL:

a) Receipt of materials / components at project / site storage, preservation, transportation to site from place of storage of materials / equipments for 5 x30MW lift Irrigation pump sets supplied by BHEL mainly constituting the following equipment / components / systems.

- **Vertical francis Pump & Accessories.**
- **Pump controller & OPU.**
- **Discharge Valve (Butterfly Valves)**
- **Motor & Accessories.**
- **Static excitation & DVR Excluding Excitation Transformers.**
- **11Kv Bus Duct including CT's, PTs.**
- **Protection system.**
- **Cooling water system.**
- **Drainage & Dewatering system**
- **HP compressed air system**
- **Dry type Cast Resin Excitation Transformer.**
- **Control & Monitoring Equipment.**
- **Static frequency converter.**
- **Workshop Equipments (Mechanical Workshop)**
- **Field efficiency**

b) supply of paints for the equipment being erected

c) Supply of Lubricants for initial fill only.

ANNEXURE

SECTION – VII

APPENDIX – IV

TOOLS AND TACKLES SUPPLIED ALONG WITH EQUIPMENTS

2.7 One – **SET OF ERECTION AND MAINTENANCE EQUIPMENT**

Following special tools and devices shall be supplied alongwith a tool box:

1. One set of single ended spanners/slogging spanners for tightening of bolts and nuts of size more than M36 (As per requirement of fasteners used in various assembling)

2. Slogging spanners / y spanners for tightening coupling bolts of runner and shaft.

3. Device for shear pin withdrawal.

4. Runner and shaft lifting device with sling & eye bolts.

5. Sling, D-shackles and collared eyebolts for lifting the different components of pump.

6. Necessary leveling bolts for draft tube and spiral casing / stay ring.

7. Turn buckles, anchor iron, holding down bolts, tie tods etc., required for leveling,

2.3 **TOOLS AND SPECIAL EQUIPMENTS** (Common for all motors)

- ONE SET STATOR lifting tackle
- ONE SET Shaft lifting trunion
- ONE SET Polo removing / replacing tackles
- ONE SET Pole key withdrawal tackle
- ONE SET Cure tightening equipment
- ONE SET Tightening equipment for shaft coupling between motor and pump.
- ONE SET Thrust pad withdrawal tackles\
- ONE SET Oil cooler withdrawal tackle
- ONE NO. Air cooler blanking plate
- ONE SET Spanners and small tools enclosed in a cabinet
- ONE SET Wire rope slings, shackles, eye bolts for lifting motor parts.

NOTE : The above T & P are sent along with components from manufacturing units for erection and maintenance purpose. These T & P are to be drawn from stores of PEL/ BHEL and returned back to the stores in good condition after use.

SECTION VII

APPENDIX VI

TENTATIVE LIST OF T & P THAT ARE TO BE NECESSARLY MADE AVAILABLE BY THE CONTRACTOR

1. 100-250-500 VOLTS HAND OPERATED MEGGER
2. 500-1000 VOLTS MOTOR OPERATED MEGGER
3. OVEN (ELECTRICAL)
4. OIL BATH
5. PRECISION SPIRIT LEVEL
6. STICK MICROMETER
7. PRECISION SQUARE BLOCK LEVEL
8. WELDING SENERATORS/TRANSFORMERS – SUITABLE FOR BOTH ARC/TIC WELDING
9. WIRE PROPES/PULLEY BLOCK
10. DIAL GAUGES WITH MAGNETIC BASE – MINIMUM 8 NUMBERS
11. MATERIAL HANDLING EQUIPMENTS
12. HAND TOOLS
13. ELECTRONIC WEIGHING MACHINE
14. GRINDING MACHINES
15. DRILLING MACHINES
16. OUTSIDE / INSIDE MICROMETER
17. PRECISION PARALLEL BLOCKS
18. FEELDER GAUGES
19. KNIFE EDGE
20. BORE DIAL GAUGE
21. TAPER GAUGE
22. DIAL GAUGE FIXTURE FOR CHECKING LOADING OF THRUST PADS

23. MEASURING TAPES
24. PLUMP BLOCKS VACCUM CLEANERS
25. VACCUM CLEANERS
26. PORTABLE BLOWER
27. SOLDERING IRON
28. ELECTRICAL HAND TOOLS SET
29. TAP SET / ALLEN KEY
30. TORQUE SPANNER
31. PERMANENT MAGNET
32. BALL PEN TEFLON NYLON HAMMERS
33. Hammers 16 pounds etc
34. STOP WATCH
35. HAND PUMP
36. FILE SETS
37. GAS CUTTING SETS
36. HAND REAMER
38. PIPE WISE / BENCH WISE
39. PIPE BENDING MACHINE
40. HAYDRAULIC MECHANICAL JACKS 10 TONS / 5 TONS 5 NO.S EACH
41. MICROMETER WITH PLUS ATTACHMENT
42. PNEUMATIC GRINDER
43. AIR COMPRESSOR UNIT SUITABLE FOR 10 KG PER SQ CM
44. DUMPY LEVEL
45. JET PUMP
46. INTERCOM SUFFICEINT NUMBERS
47. THEDOLYTE
48. DIGITAL TONG TESTER MULTIMETER

49. MAGNIFYING GLASS – ILLUMINTED

50. HAND LAMP – 24 VOLTS

51. PORTABLE EMERGENCY LIGHT SETS

52. HALOGEN LAMPS

51. HEAERS – 40 KW

52. SPRAY GUNS

53. SURFACE PLATE

54. MERCURY TJERMOMETER

55. HIGH VOLTAGE TEST KIT – SUITABLE FOR TESTING INDIVIDUALPOLES, COILS/STATOS SEGMENTS/STATOR

HIGH VOLTAGE TEST :

a The H.V. test on generator stator & Rotor shall be conducted as per instruction of BHEL / PEL Engineers. It is responsibility of the contractor to arrange required H.V. test for the above test at their cost BHEL will not provide any H.V. test kit for this test. Contractor to make a note of this aspect and quote accordingly.

b. This wound stator segment prior to start of balance winding work at site shall first to be tested for healthiness to ensure no defect of the segments. For this purpose and additional stage high voltage test shall be carried out for the above segments and the requirements of IR, PI & HV test shall be as indicated below.

For 11 kv machines

1. Minimum IR value	-	200 mega-ohm with 2 kv megger.
2. Minimum PI value	-	2.0
3. H.V. test values	-	(For each stator segment)

Shop tested machines	Others
20kv 50Hz Ac (Rms) for 1 min. to earth	24kv 50Hz Ac (Rms) for 1 min. to earth

NOTE: THIS INFOMRATION IS GIVEN AS A GUIDANCE ANY CHANGES CORPORATED WILL BE INTIMATED LATER.
THE QUANTITY AND SPECIFICATION OF EACH ITEM TO BE MADE AVAILABLE BY THE CONTRACTOR WILL DEPEND ON THE NUMBER OF SETS/RATING OF THE UNIT / CONTRACT DURATION. THE LIST INDICATED IS TENTATIVE ALL TOOLS AND PLANTS REQUIRED FOR THE WORK THOUGHNOT SPECIFICALLY MENTIONED SHALL BE MADE AVAILABLE BY THE CONTRACTOR.

SECTION VII

APPENDIX – VII

TENDER SPECIFICATION NO BHEL:PS:SCT: GK1115-078:T-01:10-11

CERTIFICATE OF DECLARATION FOR CONFIRMING KNOWLEDGE ON SITE CONDITIONS

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

TENDERER'S NAME AND ADDRESS

SIGNATURE OF AUTHORISED
REPRESENTATIVE WITH NAME &ADDRESS:

Place:

Date

OFFICE SEAL

SECTION VII

APPENDIX – VIII

DECLARATION SHEET

I,hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL:PS:SCT: are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations in detail and agree to comply with the requirements and intent specifications.

I further certify that I am duly authorized representative of the under mentioned tenderer and a valid power of Attorney to this effect is also enclosed.

TENDERER'S NAME & ADDRESS

AUTHORISED REPRESENTATIVE'S
SIGNATURE WITH NAME & ADDRESS

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Southern Region, SAS

39, Sarojini Devi Road, Secunderabad – 500 003.

SECTION VII
APPENDIX – IX
CHECK LIST

Tenderers are required to fill in the following details:

1.	a)	Name of the Tenderer with address	:	YES/NO
	b)	Telegraphic/Telex address	:	YES/NO
	c)	Phone (Office/Residence)	:	YES/NO
	d)	Management Structure of firm (Pvt. Ltd/Public Ltd./Partnership/Sole Proprietorship) Documentary proof For the same enclosed)	:	YES/NO
2.		Whether EMD submitted as per Tender specification terms and Conditions	:	YES/NO
3		Validity of offer (offer shall be kept open for acceptance for minimum six months)	:	YES/NO
4.		Whether tenderer visited the erection site and acquainted with the site conditions before quoting	:	YES/NO
5.		Whether the following details are furnished	:	YES/NO
	a)	Previous Experience	:	YES/NO
	b)	Present assignments	:	YES/NO
	C)	Organization chart of the company	:	YES/NO
	d)	Company financial statue	:	YES/NO
	e)	Incase of company, proof of registration of the company	:	YES/NO
	f)	Memorandum & Articles of association of company/copy of partnership deed	:	YES/NO
	g)	Profit & Loss account for the last 2 years	:	YES/NO

	h)	Audited Balance sheet for the last two years	:	YES/NO
	i)	Income Tax clearance certificate (latest)	:	YES/NO
	j)	Solvency Certi ficate from a nationalized Bank	:	YES/NO
	k)	Power of Attorney of the person signing the tender duly attested by a Notary Public	:	YES/NO
	l)	Manpower organization chart with deployment plan at site for posting of Engineers/super visors and workers/labourers for satisfactory completion of work under this specification	:	YES/NO
	m)	Names and address of directors, partners, their experience and qualification	:	YES/NO
6.		Whether the Tenderer is conversant with local labour laws & conditions	:	YES/NO
7.		Whether the tenderer is aware of all safety rules and codes	:	YES/NO
8.		Whether the Declaration sheet (as per appendix) enclosed	:	YES/NO
9.		Time required for mobilization of site organization and start of work	:	YES/NO
10.		Whether list of tools and Plants available with the contractor and proposed to be deployed for this work enclosed	:	YES/NO
11.		Whether all the Pages are read understood and signed	:	YES/NO
12		Deviations, if any Pointed out	:	
13.		Whether PF exemption No. is allotted by RPFC of your area if so, indicate number	:	YES/NO

SIGNATURE OF TENDERER

NOTE : The tenderers are requested to peruse the Tender specification terms and conditions carefully and furnish the above information also in detail as required.

Section VIII
Appendix - X
REVERSE AUCTION PROCEDURE
BHEL PSSR SCT 1427
GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION

Against this NIT for the subject work, tender shall be processed through 'REVERSE AUCTION PROCEDURE' i.e. ON LINE BIDDING on INTERNET.

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 the vendor in writing in case reverse auction, the details of service provider to enable them to contact and 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 (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 schedule 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 action without fail.

10. During Reverse Auction, the process of reverse auction is unsuccessful then BHEL at its discretion may decide to call the LI bidder of reverse auction for further negotiation.

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 bidder 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.

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 online bid value and signed document will be considered as sabotaging the tender process and will invite disqualification of vender 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 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, cannot be cancelled/withdrawn and bidders shall be bound to execute the work as mentioned above at the final bid price. BHEL shall take appropriate action as the lowest bidder do not execute the contract as per the rates quoted by him.