TENDER SPECIFICATION

BHEL:PSSR:SCT: 1291

FOR

Handling at Site Stores / Storage yard, Transportation to site of work, Erection, Testing and Commissioning of 1 x Frame VI Gas Turbine Generator and its auxiliaries, Balance Of Plant equipment, piping related to Main steam lines, Cooling Water lines, Naptha supply ,oil supply ,Cooling Water Lines etc.,and Application of Insulation and including Supply & Application of Final Painting for Unit 1

at

BPCL – KRL – KOCHI CO GENERATION PLANT
AMBALAMUGAL
ERNAKULAM
KERALA STATE

PART – I TECHNICAL BID

BOOK NO :

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

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BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

Tender Specification No. BHEL:PSSR:SCT: 1291

Messrs Date :

Dear Sir,

Sub:Handling at Site Stores / Storage yard, Transportation to site of work, Erection, Testing and Commissioning of 1 x Frame VI Gas Turbine Generator and its auxiliaries, Balance Of Plant equipment, piping related to Main steam lines, Cooling Water lines, Naptha supply ,oil supply ,Cooling Water Lines etc.,and Application of Insulation and including Supply & Application of Final Painting for Unit 1of Co-Generation Plant at BPCL–KRL Kochi ,Ambalamugal Kerala .

Please find enclosed one set of non-transferable tender documents containing - **139** - pages of Tender Specification Booklet for the above work.

You are requested to go through the tender documents 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. 2,00,000/-** (**Rupees Two Lakhs only**) in the form of Demand Draft drawn in favour of M/s. Bharat Heavy Electrical Limited Chennai - 35. 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 09.)

The completed quotations shall reach the office of the under signed on or before **30.04.2008** at **16.00** Hrs. The Technical bids, will be opened on the same day at **16.30** hrs. We shall separately intimate the date for opening the price bids only to those parties who are technically Qualified. You are requested to depute your authorized representative at the time of opening.

ANY REVISION OF RATES / PRICES WHATSOEVER 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.

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

ADDITIONAL GENERAL MANAGER / CONTRACTS

BHARAT HEAVY ELECTRICALS LIMITED

(A Gvernment of India Undertaking)
Power Sector : Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

SPECIAL INSTRUCTIONS TO BIDDERS

The Bidder must submit their bids as requested in a sealed cover prominently super scribing 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 seven 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's Banker as per G.C.C

04. Turnover of the Company in last 3 Financial years pertaining to this scope of work 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 Term 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

a) The bidder should have executed Erection , Testing and Commissioning of Gas Turbine Generator and Auxiliaries packages of capacity **Frame III** or above in the last seven years.

or

should have executed Erection , Testing and Commissioning of Steam Turbine Generator and Auxiliaries package of Capacity **7** (seven) **MW** or above in the last seven years.

b) The bidders should have a minimum average financial turn over of **Rs. 111 Lakhs** per year in the preceding three years ending on 31.03.2007

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2007 and should have positive net worth as on 31.03.2007.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2007 with all annexures and schedules in support of above requirement.

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

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

15. TENDERERS HAVE TO FURNISH A DECLARATION SHEET INDICATING THAT THERE IS NO DEVIATION IN TENDER DOCUMENTS (AS IN PAGE 09) TENDERERS MAY FURTHER NOTE THAT THIS DECLARATION IS A PREREQUISITE FOR BHEL TO CONSIDER THEIR BIDS. BIDS SUBMITTED WITHOUT "NO DEVIATION DECLARATION" WILL BE REJECTED BY BHEL.

16. SAFETY PLAN

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

BHEL : PSSR : CONTRACTS
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 due date 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 Tenderers 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.2,00,000/- (Rupees Two Lakhs only). This EMD amount shall be submitted in the form of either pay order or demand draft only drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 35. 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.

Additional General Manager/Contracts.

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

TENDER NOTICE

Tender Specification No. BHEL:PSSR:SCT:1291

Description	EMD
Handling at Site Stores / Storage yard, Transportation to site of work, Erection, Testing and Commissioning of 1 x Frame VI Gas Turbine Generator and its auxiliaries, Balance Of Plant equipment, piping related to Main steam lines, Cooling Water lines, Naptha supply ,oil supply ,Cooling Water Lines etc.,and Application of Insulation and including Supply & Application of Final Painting for Unit 1of Co-Generation Plant at BPCL–KRL Kochi ,Ambalamugal Kerala ..	Rs. 2,00,000/- (Rupees Two Lakhs only)

Cost of Tender Documents (Including all Taxes)	:	Rs.1040/-	
Sale Starts on	:	16.04.2008	
Sale closes on	:	29.04.2008	
Due date and Time for Submission	:	30.04.2008	16.00 Hrs.
Date and time for opening Of Technical Bids	:	30.04.2008	16.30 Hrs.

QUALIFICATION REQUIREMENT

a) The bidder should have executed Erection , Testing and Commissioning of Gas Turbine Generator and Auxiliaries packages of capacity **Frame III** or above in the last seven years.

or

should have executed Erection , Testing and Commissioning of Steam Turbine Generator and Auxiliaries package of Capacity **7** (seven) **MW** or above in the last seven years.

b) The bidders should have a minimum average financial turn over of **Rs.111 Lakhs** per year in the preceding three years ending on 31.03.2007

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2007 and should have positive net worth as on 31.03.2007.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2007 with all annexures and schedules in support of above requirement.

c) Notwithstanding the above, BHEL reserves the right to reject any Tender or all the Tenders for the 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 either by Cash or A/c Payee Demand Draft drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 600 035. 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 tender without assigning any reason therefor. **TENDER NOT ACCOMPANIED BY THE PRESCRIBED EARNEST MONEY DEPOSIT ARE LIABLE TO BE SUMMARILY REJECTED.**

ADDITIONAL GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION : BHEL:PSSR:SCT:1291

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.

SIGNATURE OF THE TENDERER

OFFER OF CONTRACTOR

Additional General Manager/ Contracts
Bharat Heavy Electricals Limited,
Power Sector : Southern Region
690, Anna Salai,
Nandanam,
Chennai – 600 035.

Sir,

I/We hereby offer to carry out the work detailed in Tender Specification No.**BHEL:PSSR:SCT:1291** 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 agree 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/a sum of Rs.2,00,000/- (Rupees Two Lakhs only) vide DD.No. Dt. which shall be refunded should our offer not be accepted. Should our offer be accepted, I/We further agree to deposit such additional sum which along with the sum of Rs.2,00,000/- (Rupees Two Lakhs only) mentioned above, to make up the Security Deposit for the work as provided for in the Tender Specification within the stipulated time as may be indicated by BHEL, Power Sector : Southern Region, Chennai – 600 035.

I/We further agree to execute all the works referred to in the said documents upon the terms and conditions obtained 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

1.0	**Site Location**			
1.1	State	Kerala		
	Nearest important Town	Kochi		
	Nearest Railway Station	Tripunithura		
	Nearest Port	Kochi		
	Nearest Air port	Kochi International Air port		
1.2	Source of Water	BPCL , KR is drawing water from Periyar River		
1.3	Rainy Season	Mid May - September		
2.0	**METEOROLOGICAL DESIGN DATA**			
	a) Meteorogical Data			
Sl No	Para meter	Minimum	Normal/ Average	Maximum/ Design
1	Elevation above mean sea level (M)	Levels as per contour survey		
2	Barometric pressure ,mm Hg	750	754	757
3	Ambient Temperature, ^{O}C	20	35	38
4	Relative Humitity, %		88%	95%
5	**RAIN FALL DATA**			
a)	For 1 Hour Period			179 mm
b	For 24 Hour Period			250 mm
6	**WIND DATA**			
a	Wind Velocity		4 Km / Hr	8 Km/Hr or as per IS 875, Which ever as

				higher
b	Wind direction			North-East/ East in the morning and west & North West in the evening
B	**DATA FOR EQUIPMENT DESIGN**			
1	Design dry bulb temperature ,^{O}C			22.5 (During raining season) 38(During summer season)
2	Design wet bulb temperature, ^{O}C			21(min) 28(Max)
3	Low ambient Temperature for MDMT, ^{O}C			15
4	Design air temperature for air cooled exchangers where followed by water cooling ,^{O}C			38
5	Design air temperature for air cooled exchangers where not followed by water cooling ^{O}C			38
6	Coincident temperature and relative humitity for Air blower / Air Compressor design			30 ^{O}C /95%
7	Min Design temperature for equipment , ^{O}C			65

SECTION III

COMMON CONDITIONS OF CONTRACT

3.1 SCOPE OF WORK

3.1.1 The scope of contract includes handling, transportation to site of work, Erection, testing and commissioning of Gas turbine (Frame VI) , Generator and its connected auxiliaries, Balance of plants Piping related to Main Steam Lines, Cooling water lines, Naptha supply , Oil supply lines and application of insulation and including supply and application of final painting for unit 1 of Co Generation plant at KRL Kochi , Kerala

3.1.2 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 or material necessary for the proper and efficient services towards installation of the Plant shall not relieve the contractor of the responsibility of providing such services, facilities to complete and project or portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.

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

3.1.4 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.

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

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

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

3.1.8 Preservation of all components at all stages of pre-assembly/erection/testing and commissioning is also covered in this scope of work.

3.2 FACILITIES TO BE PROVIDED BY BHEL

3.2.1 OPEN SPACE

Minimum open space for building of 1 no temporary office / store shed will be provided free of charges . Contractor has to make his own arrangement for labour colony.

3.2.2 Water

Water will be provided at one point free of cost nearer to the project site. Further distribution shall be arranged by the contractor at his own cost. For drinking purpose the contractor has to make his own arrangement at his cost.

3.2.3 ELECTRICITY

3.2.3.1 For construction purpose Electricity will be provided at one single point Free of cost nearer to the project site. Further distribution shall be arranged by the contractor.

3.2.3.2 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, filler wires, welding electrodes, gas etc. are to be arranged by the contractor at his cost.

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

3.3.1 CIVIL CONSTRUCTION :

It shall be the responsibility of the contractor to construct his own office shed, stores shed with all facilities like Electricity ,water supply, sanitory arrangements in the area allotted to him for this purpose.

3.3.2 WATER DISTRIBUTION

Distribution of water from the given single point to the required places shall be arranged by the contractor at his cost.

3.3.3 ELECTRICITY DISTRIBUTION :

3.3.3.1 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.

3.3.3.2 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 / their customer with the appropriate statutory requirements shall be the responsibility of the tenderer / - contractor.

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

3.3.3.4 As there are bound to be interruptions in regular power supply power cut/loading shedding in any construction site due to inherent power shortage in Stage on this account, suitable extension of time if found necessary only by 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 load side of the supply with due regard to safety requirements at site. It shall

be responsibility of the contractor to have at least (2 to 4) diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by the tenderer at his cost. This may also be noted while quoting.

3.3.4 LIGHTING FACILITIES

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.

3.3.5 POWER REQUIREMENT

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.

3.3.6 CONTRACTOR'S OBLIGATION

On ompletion 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 the Contractor including overhead charges. The decision of BHEL Engineer in this regard is final.

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

3.4 GASES

3.4.1 All required gases like Oxygen / Acetylene / Argon / Nitrogen required for construction purpose shall be supplied by the Contractor at his cost. However Nitrogen Gas required for chemical cleaning alone will be supplied by BHEL free of 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 reason 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 All the integral lube and control oil pipelines required TIG welding operations are to be purged with **Nitrogen gas / Argon gas** for the purpose of creating inert atmosphere in the pipelines during the process of TIG welding. Nitrogen, Argon gas required for this purpose shall have to be arranged by the contractor at his cost. However, Nitrogen gas required for Chemical cleaning alone will be supplied by BHEL free of cost.

3.4.5 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 welding consumables for all works including TIG wires, electrodes, filler wires for HP welding are to be arranged by the contractor only.

3.5.2 All the required electrodes, filler wires, TIG wires 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 No. date of expiry etc.,

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

3.5.4 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 HP 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.

3.5.5 All filler wires and electrodes shall be preserved by the contractor carefully to prevent deterioration of their properties. Special care shall be taken to preserve alloy steel and other special electrodes/filler wires. Contractor shall exercise maximum care in using these electrodes/filler wires to minimise wastage by maintaining a record of all usages.

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

3.5.7 BHEL reserves the right to reject the use of any electrodes at any stages 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.

3.6 TOOLS & TACKLES

3.6.1 BHEL will provide the tools and plants indicated in (**Section – VII - Appendix VI for "T & P provided by BHEL" in the Tender Specification**) free of hire charges. 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.

3.6.2 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.

3.6.3 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.

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

3.6.5 Non-availability of any of the above equipment either due to breakdown / routine maintenance or due to distribution pattern of BHEL, shall not be quoted as reason for delay of work.

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

3.6.7 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 other 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.

3.6.8 Excepting those indicated as BHEL 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.

3.6.9 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.

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

3.6.11 Contractor shall have at all times experienced operators and technicians/ 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.

3.6.12 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.

3.6.13 The T & P indicated in Appendix – VI would be issued only at stores and it shall be the responsibility of contractor to take the delivery from stores, transport the same to site and return the same in good condition after use.

3.6.14 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. Test certificates should be submitted before their usage.

3.6.15 All instruments, measuring tools etc are to be celebrated periodically as per the requirement of BHEL and necessary calibration certificates are to be submitted to BHEL before use.

3.6.16 The contractor has to return the T & P in good working condition and cost of any replacement required has to be borne by the contractor.

3.6.17 The crane operators arranged by the contractor shall be tested by BHEL before they are going to operate the crane.

3.6.18 Contractor shall take into consideration the above clauses and quote the rates as called for in the Rate Schedule.

3.6.19 During the execution of the work, it becomes necessary for the Contractor to deploy his manpower for reduction / increasing the boom length of the crane to suit the erection condition. It shall be the intending contractor's responsibility to arrange for necessary manpower / hand tools, Illumination / supports / consumables etc and the quoted rate shall include such services. Similarly, all assistance required during preventive maintenance shall be provided by the contractor.

3.6.20 For movement of cranes etc., it may become necessary to lay sleeper bed for obtaining leveled safe approach for usage of equipment. It shall be the responsibility of the contractor to lay necessary sleepers. The required sleepers are to be arranged by the contractor at their cost.

3.7 Cranes

3.7.1 Following Cranes will be provided free of hire charges on sharable basis , operator and fuel for the cranes will be arranged by the contractor with in the quoted rates.

SlNo	Description	Qty
01	135 / 150 T crane	1
02	75 T	1

3.7.2 BHEL will not provide any other crane except above mentioned cranes for the erection works . For all the above cranes operator, fuel and lubricants shall be arranged by the contractor at his cost. Operator arranged / Deployed

for the above cranes shall be tested by BHEL before he is allowed to operate the crane. Contractor should arrange preferably tire mounted cranes since crawler crane is not permitted inside the project. If crawler crane is arranged the crane has to be moved only on wooden sleepers bed. Required wooden sleepers should be arranged by the contractor at his cost.

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 he proposes to use in the work along with his offer.

3.7.4 For the movement of cranes & trailors etc. of contractor (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 works 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 the job shall be employed. They shall hold valid certificates wherever necessary. BHEL reserves the right to decide on the suitability of the workers and other personnel who will be 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.

3.8.2 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.

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

3.8.4 The work shall be executed under the usual conditions 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 and other contractors personnel working in site and proceed the work in a manner that shall not delay or hinder the progress of work as a whole.

3.8.5 The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the 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 the drawings/instructions given by BHEL Engineers from time to time.

3.8.6 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.

3.8.7 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 shifts during commissioning and testing periods.

3.8.8 If the contractor or his workmen or employees shall break, deface, injure or destroy any part of a building, road, kerb, fence, enclosure, water pipes, cables, drains, electric or telephone posts or 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 the expenses (of which BHEL's decision is final) from any money due to the contractor.

3.9 CIVIL WORKS

3.9.1 Foundations of all equipments and plants and necessary civil works shall be provided by BHEL. 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 upto 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, sand, gravel etc. and cleaning consumables shall also be arranged by the contractor at his cost. The required special cement like CONBEXTRA-GP2 and SHRINKOMP N30 etc or its equivalent grade cement for grouting of turbine, generator shall be arranged by the contractor at their cost. 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.

3.9.3 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification or as advised by the Engineer or BHEL after preparing the foundation surface for grouting.

3.9.4 Contractor has to carry out the grouting as per the work instructions for grouting available at site.

3.10 SCOPE OF MATERIAL HANDLING

3.10.1 All the equipment furnished under this contract shall be received from the project stores, sheds / storage yards and transported to pre assembly area / erection site and stored in the storage spaces in a manner so that they

are easily retrievable till the contractor erects them. While drawing / lifting material from BHEL / customer stores, contractor shall ensure that the balance / other materials are stacked back immediately.

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

3.10.4 It shall be contractor's responsibility to arrange necessary cranes/tractors, trailor or trucks/slings/tools and tackles/labour including operators and load the materials/equipments on to transport equipment, move it to erection site/pre-assembly yard and unload the same at pre-assembly yard/erection site and the quoted rate shall include the same.

3.10.5 In the event of Contractor's inability to arrange in time any of the above equipment/T & P etc. BHEL shall provide the same on specific written request from contractor subject to availability of equipment of the normal hire charges of BHEL/Customer applicable from time to time and recoverable from contractor's subsequent months running bills.

3.10.6 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.

3.10.7 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 site 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 consumables from the storage area after getting the approval of the BHEL Engineer on standard indent forms to be specified by BHEL. At periodic/intervals 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 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 equipments during transit and storage are removed before these equipments are installed.

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 / 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 nature 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 aides 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 work are to 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 displayed 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 times. When the work is temporarily suspended he shall 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 regreasing, reconservation of components like bearings and machined surfaces 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 the 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.

3.11.12 The contractor shall take delivery of equipment as received and handed over to 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 claiming from the insurance to minimise his liability for the above.

3.11.14 The contractor shall carry out scrapping wherever required and machining of all the matching parts. The chipping of concrete surface to achieve the true contact as per specification between packers and the 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 WELDING, HEAT TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING

3.12.1 All necessary preheating, post heating of welds and stress relieving operation of welds are part of the erection work and shall be performed by the contractor in accordance with the relevant regulations and standards of BHEL practice and to the satisfaction of BHEL Engineer and in accordance with the drawings and specifications.

3.12.2. Erection of equipment involve good quality welding, dyepenetration test and heat treatment/Radiography work. Wherever required, 100% dye penetration test have to be carried out as per instructions of BHEL Engineer. Contractor's personnel Technicians along with labourers engaged should have adequate knowledge on the above works.

3.12.3. The pressure parts, pipings shall be erected in conformity with the provision of Indian Boiler Regulations and as may be directed as per any other standard/specification in practice in BHEL. The method of welding (viz) Arc, Gas, TIG or other method may be indicated in the detailed drawings. BHEL

Engineer will have the option of changing the method of welding as per site requirements.

3.12.4 Welding of high pressure parts shall be done by certified High Pressure Welders who possess valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The high pressure welders who possess necessary certificate shall appear well in advance before the expiry of the validity of their certificate for requalification test as per relevant provision of IBR and keep the certificate valid till the completion of work. The services of such welders the validity of whose certificates have expired shall have to be suspended forthwith.

3.12.5 All welders deployed on this work shall be tested and approved by BHEL Engineer before they are actually engaged on work though they may possess the IBR certificate. BHEL reserves the right to reject any welders without assigning any reason.

3.12.6. BHEL Engineer is entitled to stop any welder from the work, if his work is unsatisfactory for any technical reasons or there is a high percentage of rejection of joints welded by him which in the option of the BHEL Engineer will adversely affect the quality of the welding though the welder has earlier passed the tests prescribed by BHEL Engineer. The welders having passed qualification tests does not relieve the contractor of a contractual obligation to check on the welder's performance.

3.12.6 All charges towards testing of welders for destructive and non-destructive testing and approval of welders for engaging in the erection work shall be borne by the contractor.

3.12.7. All radiographs shall be free from mechanical/chemical process marks to the extent they shall not confuse the radiographic image and defect finding penetrameter as per ASME/SI shall be used for all exposures.

3.12.9 All welded joints shall be subject to acceptance by BHEL Engineer.

3.12.10. Preheating, post weld heating and stress relieving after welding are part of erectors work and shall be performed by the contractor in accordance with the instructions of BHEL Engineer. Contractor shall arrange to supply heating

equipment with automatic recording devices. Also the contractor shall have to arrange for labour, all heating elements thermocouples etc. insulating materials like mineral work, asbestos, cloth, ceramic heads, asbestos ropes etc., required for heat treatment and stress relieving works.

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

3.12.12. The contractor shall carry out the edge preparation of weld joints at site in accordance with details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting will be allowed only for edge preparation. Some extra lengths in various fabricated pipes given as erection allowance shall have to be cut and edges prepared to suit the site conditions at no extra cost.

3.12.13. Lead numbers, letters (Generally of 6mm size) are to be used for identification of radiographs. Contract No joint identification, source used, welders identification SFD used are to be noted down on the paper cover of radiograph. Lead intensifying screens for front and back of the film shall be used as per the instructions of BHEL Engineer.

3.12.14. The weld joint is to be marked with permanent mark A,B,C etc. to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down stream side of the weld. For, multiple exposures on pipes an overlap of about 25mm of film shall be provided.

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

3.12.16. All the data such as heating temperature, heating rate, soaking time, maximum temperature reached during heat treatment shall be properly recorded and documented which will be property of BHEL.

3.12.17. Oxy-acetylene flame heating or exo-thermic chemical heating for stress relieving is not permitted. Heating shall be by means of Electric Induction coil or Electric resistance coil. Potentiometric type recorders shall only be used for temperature recording purposes.

3.12.18. Radiography work of welds connected with this contract shall be arranged by the contractor including provisions of services of technicians and necessary equipment and consumables like Isotope camera, X-Ray films, chemicals and other dark room facilities etc. Also contractor has to provide necessary labour required such as Riggers, Helpers etc. to assist the technicians for carrying the above radiography work and making other arrangements, such as providing scaffolding, approaches, platform lighting arrangements at his cost as per the instructions of BHEL. It may please be noted that invariably the radiography will be carried out after the normal working hours only.

3.12.19. Radiography inspection of welds shall be performed in accordance with the requirements and recommendations of BHEL Engineer. The minimum extent of radiographic inspection shall be as per provision of IBR Regulations. They may however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer/Boiler inspection authority. It is the responsibility of the contractor to get the IBR clearance, wherever required including arranging for IBR Inspection.

3.12.20. If the contractor does not carry out radiography work in time due to non-availability of film, chemicals etc. BHEL shall get the work done departmentally or through some other agency at the risk and cost of the contractor.

3.12.21 Wherever radiographs are not accepted on account of exposure, joints shall be re-radiographed and new films submitted for evaluation. Radiographs shall be taken again on joints after carrying out repairs. However, if the defects persist after first repair as per radiograph, carrying out radiography shall be repeated till the joint is made

acceptable. In case the joint is not repairable the same shall be cut, rewelded and re-radiographed at contractors cost.

3.12.22 Contractor has to make his own arrangements for air conditioned dark room to process the radiographs.

3.12.23 Quantum of radiography (percentage of joints) shall be as per IBR –Standard and as per specifications and drawings.

3.12.24 BHEL Engineer reserves the right to alter the quantum of radiography of joints. The decision of the BHEL Engineer in this regard is fixed and final and binding on the contractor. Any defects as pointed out by BHEL Engineer shall have to be rectified by the Contractor at his cost. All X-ray films of joints radiographed at site in connection with work shall be properly preserved in airconditioned rooms and shall become the property of BHEL.

3.12.25 All field joints shall be subjected to dyepenetration examination as specified in the respective drawings and shall have to be accepted by BHEL Engineer. Any rectifications shall have to be done by the contractor at his cost.

3.12.26 Contractor shall make out a list of actual site welds welded by them including material specification, electrodes and filter wire consumed. This is to be submitted along with every running bill. This is required to BHEL for their Data Bank records.

3.13 DRAWINGS AND DOCUMENTS

3.13.1 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.

3.13.2 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.

3.13.3 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.

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

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

3.14 SITE CLEANLINESS AND SAFETY REQUIREMENTS

3.14.1 Contractor shall strictly follow all safety requirements/conditions as per clause 2.15.0 and its sub clauses of General Conditions of contract booklet enclosed with this tender, including specification of Health, Safety and Environment (HSE) management of customer / consultant.

3.14.2 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 Measures	Fine (Rs.)
01	Not wearing safety helmet	50/-
02	Not wearing safety belt	100/-
03	Grinding without goggles	50/-
04	Not using 24V 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 cylinders 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 & Ps	500/-

The contractor should exclusively deploy one safety Engineer along with a safety supervisor for effective implementation and co-ordination of safe working conditions

3.15.0 PROGRESS OF WORK

3.15.1 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.

3.15.2 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.

3.15.3 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.

3.15.4 The manpower reports shall clearly indicate the manpower deployed categorywise daily specifying also the activities in

which they are engaged. The periodicity of the reports will be decided by BHEL Engineer at site.

3.15.5 The contractor shall arrange for weekly progress review meeting with the "Engineers" at site during which actual progress during the week vis-a-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.

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

SPECIFIC REQUIREMENTS FOR ISO 9001 - 2000

3.16.0 IMPORTANT NOTE

Contractors shall ensure that all their Staff/Employees are exposed to periodical training programme 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 equipment that are used, whether owned by the contractors or used on loan, are calibrated by the authorized 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

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

3.17.2 Preparation of quality assurance log sheets and 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.

3.17.3 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.

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

3.17.5 All the Important Measurements shall be recorded in the Daily Log Book with sketches based on BHEL Drawings indicating Readings / Measurements actually Taken and Signed by BHEL/Customer / Contractor Representatives.

3.17.6 Approval given by Customer / BHEL for welding, results and other tests of pressure parts etc. shall also be recorded in the log book.

3.17.7 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. Welder's Performance Record shall be furnished

every month. The performance Report of Welders shall indicate the percentage of Repair for each welder.

3.17.8 Heat Treatment details of 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. Welder's performance Record shall be furnished every month. The performance Report of Welders shall indicate the percentage of Repair for each welder.

3.17.9 All the Electrical/Technical Measuring and Testing Instruments/Guages, Feeler Guages, Height Guages, Dial Guages, Micrometers, Levels Spirit Levels, Surface plates, straight Edges, vernier calipers and all measuring instruments shall be provided by the contractor for checking, leveling, 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 Certificates as per the Requirements BHEL Engineer.

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

3.17.11 The Welders performance will be reviewed from time to time as per the BHEL / IBR Standards and any welders not performing to the Standards set by BHEL/IBR Standards will be removed from working. Contractor shall arrange for the Alternate welders immediately.

3.17.12 All the welders shall carry identity cards as per the proforma prescribed by BHEL only Welders Duly authorized by BHEL / Boiler Inspector / Consultant shall be engaged on the work.

3.17.13 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 complied with before effecting Gas turbine erection, Generator erection, Structural work, Dampers erection, Ducts erection, Trial Run of Equipment, Pre-commissioning and any other tests required to be conducted for completing erection and commissioning.

3.18.0 STAGE INSPECTION BY FES / QA ENGINEERS

3.18.1 Apart from Day-to-Day Inspection by BHEL Engineers stationed at site and also by Customer's Engineers, Stage Inspection of 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 Unit / Factory Quality Assurance Teams and Commissioning Engineers. Contractor shall arrange all labour, Tools and Tackles, etc. for such stage inspections free of cost.

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

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

3.18.4 Any major Rectification or Major Repair / Major Rework of Defective work found out during stage Inspection verification / checking, but not attributable to contractor shall also be carried out. Claims of contractor if any, shall be dealt as applicable.

3.19.0 STATUTORY INSPECTIONS

3.19.1 The scope includes getting the approvals from the Statutory Authorities like Boiler inspector and Labour officers. This includes arranging for inspection visits of boiler inspector periodically as per BHEL Engineer's instructions, submitting documents, radiographs, etc. and following up the matter with them.

3.19.2 All fees connected with the contractors for testing his welders / men / workers and testing, inspection, calibrating of his instruments and equipments, shall be paid by the contractor. It shall be his responsibility to obtain approval of statutory authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities. Any cost arising from this shall the contractor's Account. However, BHEL shall pay all other fees (FEES FOR VISITS, INSPECTION FEES, REGISTRATION FEES, ETC.) In case these inspection have to be repeated due to default / fault of the contractor and fees have to be paid again, the contractor shall have to bear the charges. These would be deducted from his bills.

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 continous 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 sub contractor to be provided. First Aider should undergo training on 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 persons 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 for 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. They 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 authorise 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 be 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 platform to be explained to the user.

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

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

16. All IMTE's 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 in charge, 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 – VI

SPECIAL CONDITIONS OF THE CONTRACT

6.0.0 The scope of work under this specification covers, but not limited to the following:

6.1.0 Handling at site stores / Storage yard, transporting to site, inspection, preparation of foundation, erection, leveling, centering, alignment, grouting & final alignment of Gas turbine, GT Generator and auxiliaries, pre-assembly, erection, alignment welding, NDT, fixing hangers & supports, chemical cleaning / pickling, oil flushing, water flushing, hydro testing, & steam blowing of integral piping / oil piping, surface finish, supply & application of primer & finish paints including labeling on equipments & piping, pre-commissioning, commissioning, trail operation & handing over of Frame VI Gas Turbine & Generator Auxiliaries at KRL Kochi , Kerala.

6.1.1 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

6.1.2 Contractor shall erect all the equipments as per the sequence prescribed by BHEL at site. The sequence of erection and methodology will be decided by the BHEL Engineers depending upon the availability of materials, fronts and other in puts etc., No claim for extra payment from contractor will be entertained on the grounds of deviation from the methods of erection adopted in erection of similar GTG set in other places.

6.1.3 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely operation of equipment installed. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.

6.2.0 TRANSPORTATION FROM STORES/ STORAGE YARD

6.2.1 Loading at BHEL/Customer stores and storage yard, transport to site, unloading at site/working area of equipment placement on respective foundation/location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall inclusive of the same. Required cranes for loading & unloading of materials will be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting of the components at site.

6.2.2 Contractor shall take delivery of the components and equipments from the storage area after getting the approval of BHEL Engineer on standard indent forms to be specified by BHEL. Complete and detailed account of the equipments erected as well as the progress shall be submitted to the Engineer as directed.

6.2.3 All the 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 equipments with out the specific permission of BHEL Engineer. The equipment 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/loss of such equipment at site.

6.2.4 Contractor shall plan and transport equipments, components from storage yard to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor’s shed/work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

6.3.0 ERECTION

6.3.1 Preparation of foundation: Providing necessary skilled and other labour to BHEL/Customer for checking of dimensional accuracy, axis, elevation, levels etc., with reference to bench marks of foundations and anchor bolts pits. Also adjustments of foundation level, dressing and chipping of foundation surfaces up to 25mm depth, as per BHEL Engineers instructions, should be done by the contractor as a part of work. Contractor should log before taking over the foundations for erection.

6.3.2 Contractor shall carry out scrapping and blue matching of embedment plates/packers of rotating equipments so as to achieve prescribed percentage of contact. Chipping and bedding of concrete surfaces, finely dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of the work. The fine dressing of concrete shall be with Prussian blue matching checks.

6.3.3 BHEL will provide only shims and packer plates(either machined or plain), which will go as permanent parts of the equipment, at free of cost. Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL, will have to be cut out from steel plates/sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting or chiseling, grinding and filling for de-burring the packers. However machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.

6.3.4 Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineers instructions.

6.3.5 Grouting of equipments is included in the scope of contractor. Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., de-watering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved

methods etc., form/shuttering work are within the scope this work. All grouting materials like cement, including special cements such as non-shrinkable free flow cements like Conbextra GP2/Shrinkomp N30 or its equivalent etc. as approved by BHEL, shall be arranged by the contractor within his quoted rate.

6.3.6 Brief list of equipments/sub-assemblies to be erected by the contractor & approximate weight and size of individual heavy components are given in the appendices and is meant for giving general idea to the tender only about magnitude of the work involved. The components are sent in parts for convenient transportation. They are to be cleaned, assembled in stage by stage, welded, erected and aligned as per the drawing dimensions/tolerance and instructions of BHEL Engineers.

6.3.7 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work with in the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

6.3.8 Gas Turbine received either Skid mounted or in lose assemblies with associated auxiliaries. Main part of gas turbine generator will be supplied in three independent packages such as rotor, stator & Excitor.

6.3.9 Air filter, inlet ducting, exhaust ducting, guillotine damper and diverter damper, by-pass stack will be supplied in individual loose sections. Site job involves complete assembly, welding and erection.

6.3.10 For erection of by-pass stack (Height – 30 mtr) contractor to make suitable arrangement for erection of the same with available crane provided by BHEL. If required for the few top most pieces contractor has to make suitable arrangements at his cost for erection.

6.3.11 Water wash skid shall involve welding of stainless steel pipe to and from skid. The piping shall be site routed.

6.3.12 Normally weld neck valves will have prepared edges for welding. It may be occasionally necessary to prepare new edges, re-prepare the edges to suit site conditions, which shall be done by the contractor at no extra cost. All fittings like elbows, tees, reducers, flanges, inserts etc., shall be matched with pipes for welding which may required re-edge preparation, grinding etc., The valves will have to be checked, lapped or overhauled in full or in parts before erection/after chemical cleaning/during commissioning. Experienced technicians shall be arranged by the contractor at his own cost.

6.3.13 For skid mounted equipment, the checking and re-alignment required at site is in the scope of wok.

6.3.14 All rotating machineries and equipments shall be cleaned, lubricated checked for their smooth rotation, if necessary by dismantling and re-fitting before erection by the contractor. If, in the opinion of the BHEL engineer, the equipment is to be further checked at any stage of the work, necessary manpower, complete facilities for dismantling, cleaning & refitting, consumable, shall be provided by the contractor at no extra cost.

6.3.15 All the shafts of rotating equipment shall have to be properly aligned to those of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment.

6.3.16 All the equipments /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like

coolers, oil tanks, Rubber expansion joints assemble and other components as per instruction of BHEL Engineer during erection at the quoted rate. Necessary paints for this work will be provided by BHEL free of cost.

6.3.17 Wherever equipments are supplied in pre-fabricated assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor's scope.

6.3.18 All the bearings, Gearboxes etc., of the equipment and electrical motors to be erected are provided with protective greases only. Contractor shall arrange as and when required by the engineer for cleaning the bearing/gear boxes etc., with kerosene or some other agent if necessary by dismantling some of the parts of the equipment during erection and shall arrange for re-greasing/lubricating them with recommended lubricants and assembling back . Lubricants will however be supplied by BHEL at free of cost.

6.3.19 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.

6.3.20 Certain instruments like pressure switches, gauges, air sets, regulators, filters, junction boxes, power cylinders, dial gauges, thermometers, flow meters, valve actuators, flow indicators etc., are received in assembled conditions as integral part of equipments. Contractor shall dismantle such instruments and re-erect whenever required prior to commissioning. Some time this may have to be handed over to store or instrumentation contractor.

6.3.21 All the motors/pumps shall be stripped opened, thoroughly serviced with proper care and re-assembled properly before erection by the contractor. During servicing, pre-commissioning & commissioning, if any deficiency is observed the same should be taken up with BHEL Engineer at site and rectified at site without any delay

6.3.22 All the oil & gas piping flanges, wherever provided are to be blue matched using surface plates for at least 80% contact area to attain leak proof of joints.

6.3.23 All the lubricant oil for flushing and during trail run of the equipment including first fill up, chemicals for detergent flushing, acid pickling/cleaning/trail run etc., will be arranged by BHEL at free of cost. Required manpower shall be provided by the contractor for handling, filling, emptying and re-filling etc., as part of the work without any extra cost, till the unit is handed over. Transportation of all the above shall be arranged by the contractor from BHEL store/yard to work site and returning of the empty barrels/drums to stores at their cost. Care should be taken to avoid any spillage/wastage.

6.3.24 The contractor shall also carry out erection, testing, and commissioning of the oil centrifuge with in their quoted rate.

6.3.25 Transportation of CO2 & H2 cylinders from the store and filling of Gas in their generator stator cooling systems, GT CO2 protection system etc., as and when required till the unit is commissioned and handed over shall be the responsibility of the contractor.

6.3.26 Wherever equipment are supplied in pre-fabricated assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor's scope.

6.3.27 For other agencies, such CW piping, Cabling, instrumentation etc., to commence their work from/on the equipments coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence/continue the work so as to keep the over all project schedule.

6.3.28 All dimensions/elevations refers to centerline of pipe unless otherwise specified, the pipe routing shall be carried out as per the drawing. Wherever the dimensions are not specified / shown as approximate the same may be routed as per site requirement / convenience as per site engineer's advice.

6.3.29 All site-fabricated pipes will be issued in running metres as straight. These are to be cut and edge prepared at site to required length to suit layout as given in the erection drawing. All the attachments like lugs, stoppers, cleats etc., will be supplied as loose items and to be cut and welded to the pipes at site as per erection drawing Necessary drilling of holes on main pipe for welding stubs shall also be done at site by the contractor. Fittings like bends, tees, elbow, mitre bends, reducers, flanges etc., will be supplied as loose items.

6.3.30 Certain extra lengths of portions/parts of various site fabricated ducts/components 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/components/bellows/piping casing etc. may have to be added to suit conditions and layouts. No extra payment will be admitted for such works.

6.3.31 Erection of all the piping systems supplied along with equipments pumps and other auxiliaries covered in this contract, is to be erected by the contractor with in the quoted rate.

6.3.32 Carrying out piping as per the specification between equipments constituting terminal points, whether the terminal equipments fall with in the scope of work/specification, contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, fixing gaskets, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with- in the quoted rate. IBR/ statutory requirements, if any, shall be in the scope of contractor and necessary drawing/details only will be given by BHEL.

6.3.33 Certain adjustments in length may be necessary while erecting pipelines of GTG & Auxiliaries and the contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges afresh and adopting specified heat treatment procedure, are in the scope of work.

6.3.34 Minor adjustment like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified heat treatment procedure with in the quoted rate.

6.3.35 Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.

6.3.36 Contractor shall arrange all the equipments, alignment bolts, tools, consumables like welding electrodes (all type), TIG wires (all type) and argon gas cylinders etc. for welding of pipes at his cost. Consumables like jute, cotton waste, hacksaw blades, petrol, Kerosene oil etc. are in contractor’s scope.

6.3.37 Contractor shall use only bolted clamps for achieving alignment of piping. Wherever "L" shaped stoppers and wedges are to be used for aligning piping and equipments, the same shall be subject to the approval of BHEL Engineer. Contractor shall remove the bridge, stopper etc., and not by hammer. Any burrs left on the equipments/piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.

6.3.38 Flame cutting of piping and other equipment shall be strictly done as per BHEL Engineer’s instructions and in his presence only.

6.3.39 All piping have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position.

6.3.40 Suspension for piping etc. will be supplied in running lengths and shall be cut to suitable sizes and adjusted as required. Hangers components which are being supplied in loose shall be assembled at site and erected as part of the work.

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

6.3.42 The surface of the pipes to be joined shall be suitably prepared as per instructions of BHEL Engineers. Edge preparation shall be done by chamfering machine, whenever required and all welding surfaces must be cleaned thoroughly. All works due to the mistake of the contractor, shall be repaired / redone at contractor's cost. Instrumentation drains, stubs which are sent in loose from manufacturing units are to be welded at site as per BHEL Engineer's instructions.

6.3.43 Impulse piping wherever required for BHEL equipment is to be fabricated by the contractor including erection and welding of root valves as per the instructions of BHEL Engineer. The required piping and root valves will be supplied by BHEL free of cost.

6.3.44 All the weld joints on equipments and piping shall be ground or filed after completion of welding and before radiography as per instructions of BHEL Engineer so as to achieve smooth surface to avoid of ripples, undulations etc.,

6.3.45 Pipelines shall be cleaned off welding slag and burrs by hand files, wire brushes and flexible grinders wherever required and using cloth.

6.3.46 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.

6.3.47 Wherever elbows of 45 deg or any other angle are required, the same shall be cut from 90 deg. elbow supplied and used. No extra cost shall be paid.

6.3.48 The work on piping systems (air, water, oil, steam, gas etc.) will include laying, edge preparation, fixing and welding of the elbows/fittings/valves etc. welded on the lines, fixing and adjustment of supports/hangers/shock absorbers and carrying out all other activities/works to complete the erection and also carrying out all pre-commissioning/commissioning operations mentioned in the specification as per BHEL Engineer's instructions and/or as per approved drawings/documents.

6.3.49 Flow nozzles, orifice, spray nozzles etc shall be mounted/ erected after chemical cleaning/flushing/or steam blowing at site.

6.3.50 Erection of flow switches, steam traps, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL/Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

6.3.51 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles/orifices/ metering elements fixed on piping as per the instructions of BHEL Engineer.

6.3.52 All drains/ vents/ relief/ escape/ safety valve piping to various tanks/ sewage/ drain canal/ flash box/ flash tank/ condenser/ sump/ atmosphere etc. from the stubs on the piping and equipments erected by the contractor is completely covered in the scope of work.

6.3.53 Contractor should fabricate bends at site from running meters of piping for the above and cut, edge prepare and lay the piping as per BHEL Engineer's instructions.

6.3.54 Cooling water line segmental bend is to be fabricated at site from the supplied pipes. The fabrication of segmental bends is to be carried out within the quoted rate. No extra payment will be made for fabrication of segmental bends.

6.3.55 The contractor has to fabricate stainless steel orifice plate within the quoted rate. No extra payment will be made for fabrication of above orifice plates. The required stainless steel plate will be supplied by BHEL.

6.3.56 Fixing / fitting / welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc. on different lines / equipments (which will be supplied by BHEL) is within the scope of work. Fixing of Pick-Ups, Probes & Accessories for vibration monitoring system is the scope of this specification.

6.3.57 Fixing and seal welding of thermo well plugs before hydro test of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermo wells after hydro test / steam blowing of lines as part of work.

6.3.58 Welding of all thermo wells, draft, pressure and temperature instrumentation points and all other instrumentation points on piping and auxiliaries and welding of thermocouple pads for permanent system as well as for performance guarantee test is in the scope of work.

6.3.59 The contractor shall also weld all thermo wells, small length of pipes to all pressure, flow and level tapping points, isolating valves and root valves on all equipment under scope of erection of this contract. All embedded temperature measuring elements provided in the bearings will have to be terminated at the junction box by the contractor. Thermo wells tapping point connections incorporated shall be plugged during the pressure testing and steam blow out of piping systems. Upon completion of blow out operation all thermo wells and flow elements with branch pipes be installed and welded.

6.3.60 All instrumentation impulse lines up to root valves shall also be erected and welded by TIG welding only by the contractor within their quoted value.

6.3.61 Contractor has to fabricate and erect temporary spool pieces wherever required hue to non receipt of valves in time and after receipt of valves the spool pieces are to be replaced with regular valves at free of cost. For spool pieces materials will be supplied free of cost by BHEL.

6.3.62 The contractor shall conduct non destructive tests like radiography ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc. on weld joints, castings, valve bodies and other equipments etc. as per BHEL Engineer's instructions.

6.3.63 Plate/Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc. shall be supplied by BHEL duly bent and threaded. Assembly and necessarily cutting work etc. shall be carried out at site by contractor within the quoted rate.

6.3.64 Wherever hanger and support materials of piping are not received from manufacturing unit in time to suit the erection schedule, contractor shall erect the piping system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap/spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports.

6.3.65 All Operating/ Approach platforms, cross over, canopies, ladders etc., shall have to be fabricated from raw materials supplied by BHEL and erect as per instruction of BHEL, by the contractor with in the quoted rate.

6.3.66 Contractor shall be supplied with two extra blue prints of the layout & isometrics. Contractor to incorporate in one of the blue prints with red ink all the changes/deviations/alterations etc. carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

6.3.67 All piping will be supplied in running metres, contractor has to cut and edge prepare as per the standards / drawings and as per the instruction of BHEL Engineer. The total number of edge preparation is approximately equal to the total number of joints indicated in the welding schedule. Contractor has to note this aspect and quote accordingly. No separate payment will be made for the edge preparation Standard fittings such as bends, Tees etc. will be supplied by BHEL for piping work.

6.3.68 Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc, preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

6.3.69 Contractor has to made fittings like bends etc. for pipe size less than 2" Dia at site within the quoted / accepted rate.

6.4.0 PRESERVATION / TOUCH UP PAINTING

6.4.1 Contractor shall carryout cleaning and preservation/ touch up painting as a part of erection work for the materials / equipments under this tender specification right from pre-assembly stage, during erection and after erection till the equipment is cleared for final painting, wherever deficiency in painting / rusting is noticed. The primer paint shall be matching shop primer. BHEL will supply the preservation paint on free of charges and required manpower, other required consumables, T&P etc., shall be provided by the contractor with in the quoted rate.

6.4.2 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.

6.4.3 Any failure on the par to contractor to carry out work according to above clauses will entitle BHEL to carryout the job though any other party and recover the cost from contractor.

6.5.0 HYDRAULIC TEST, PRE – COMMISSIONING & COMMISSIONING

6.5.1 Acid circulating pumps for pipe lines shall be provided by BHEL free of hire charges. The servicing, installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc, shall be carried out by the contractor as part of this work without any extra charges.

6.5.2 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks ,valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. Temporary piping, pumps, valves, flanges, blanks etc shall be removed by him and returned to BHEL.

6.5.3 All the above tests shall be repeated till all the equipment satisfy the requirement of BHEL to their customer. As far as the hydraulic pressure test is concerned and same shall be conducted to the satisfaction of Boiler Inspector wherever applicable. Any rectifications required shall have to be done/redone by the contractor at his cost.

6.5.4 Lube oil piping shall be flushed. Contractor will have to lay temporary piping to connects the entire system irrespective of whether the equipment/system connected has been erected by the contractor or not. Decisions of BHEL Engineer in this regard will be final and binding on the contractor.

6.5.5 Transportation of oil drums from customer's/BHEL's stores. Filling of lubricants and filling of oil for flushing and first filling and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer/BHEL stores. Similarly transport of chemicals for various pre-commissioning activities/processes mentioned in the above clauses and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of the contractor.

6.5.6 Cleaning of oil tank as per the instructions of BHEL Engineer before and after oil flushing is responsibility of the contractor.

6.5.7 Replacing / changing mechanical / other seals of removal and cleaning / replacing of filters etc. during pre-commissioning / commissioning stage is within the scope of work.

6.5.8 Overhauling, cleaning, Servicing of tanks, pumps, equipments, barring gear, valves, governing system during erection and commissioning stages are in the scope of work. Gaskets packing for replacement will be provided by BHEL free of cost.

6.5.9 Contractor shall lay the temporary pipelines with fittings, accessories and erection/commission pumps, tanks and other installations as instructed by BHEL, Engineer for the purpose of chemical cleaning/alkali flushing/steam blowing/ steam washing/ steam flushing/water flushing/ water washing/oil flushing etc., of piping and other equipments are in the scope of work. Necessary, materials for this will be provided by BHEL. Overhauling/cleaning/servicing of valves, pumps, fittings in temporary system and acid cleaning tanks etc prior to the above operations/ activities will also be carried by the contractor at his cost. All the chemicals will be supplied by BHEL free of cost.

6.5.10 Chemical cleaning (Acid cleaning of piping / alkali flushing) will involve the installation of temporary piping, valves, cutting of some of the existing valves, placing the rubber for chemical and for mixing. Necessary temporary access platforms to mixing tank are to be made by the contractor. The dissolving tank, neutralizing tank etc. required for acid pickling will have to be fabricated by the contractor. Required materials will be provided by BHEL free of cost. Chemicals for chemical Cleaning will be provided by BHEL. All other consumable would have to be provided by the contractor. All the above works to be carried out by the contractor, within the quoted rate.

6.5.11 Pre commissioning of oil lines includes oil flushing of the pipelines till the entire system and the pipelines are accepted as satisfactorily cleaned after inspection of sediments in the centrifuge bowl and laboratory tests of the oil samples taken from the system. After declaration of complete oil flushing of system including oil tank and coolers shall be completely drained thoroughly cleaned and refilled with fresh oil for putting the set on operation. The contractor shall provide in three shifts requisite Man-power like skilled/semi skilled workmen during oil flushing as a part of this contract without any extra charges. Before commissioning of oil system the pipelines should be hydraulically tested using the hydraulic test pump to the required pressure.

6.5.12 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic tests and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.

6.5.13 During the initial stages of work, trenches for draining water may not be available after alkali flushing or mass flushing or mass flushing for discharging and employing the system and piping. Necessary low point drains and temporary piping for this will have in be erected by contractor from materials provided by BHEL.

6.5.14 After the chemical cleaning has been successfully completed, removing all temporary piping, fittings of tanks etc. Checking all the valves for any accumulation of foreign materials, welding the valves, pipes which were cut and cleaning, re-fixing as per BHEL Engineer’s instructions is within the scope of work/ specification.

6.5.15 The contractor as per BHEL requirements will suitably make preservation of cleaned surfaces. All shaft journals and bearings shall be periodically inspected and preservation will be done as per BHEL Engineer's instructions/BHEL quality instruction manuals.

6.5.16 Raw materials for all temporary piping necessary for conducting hydraulic test. Chemical cleaning, steam blowing, flushing, effluent disposal etc. Will be provided by BHEL free of cost. However, fabrication servicing, erection

and dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

6.5.17 The contractor shall carryout the required tests on the equipments and the pipelines such as gas tightness test/air tightness test, kerosene test, hydrostatic testing of the equipment/piping etc. and rectify all the defects caused due to contractor's fault at his own cost. Contractor may have to replace old/damaged gaskets / packing etc. for equipments and the same shall be carried out by contractor as per requirement. Compressed air for pneumatic testing is to be arranged by contractor. The contractor shall carry out the trial run of motors including checking the direction of rotation in the uncoupled condition checking aligning and coupling the motor to the respective driven equipment. Before starting the motor IR values of insulation shall be recorded and if found necessary dry out by the contractor to improve the IR value at no extra cost.

6.5.18 In case any erection defect is detected during various tests / operations trial runs as detailed above such as loose components undue noises or vibration strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. If any readjustment and realignments are necessary the same shall be done as per BHEL Engineer's instructions. If any part needs repairs rectification and replacement the same shall be done by the contractor at no extra cost. The parts to be replaced shall be provided by BHEL free of cost If insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

6.5.19 Welding of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable deaeration / venting / draining points with valves as per BHEL Engineer’s instructions, for performing hydro-test of piping and other equipments is within the scope of work. Gaskets, valves, fasteners will be provided free of cost by BHEL. Contractor shall cut steel blanks from steel provided without charging extra. After

completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL Engineer's instructions.

6.5.20 Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract.

6.5.21 Transportation of CO2 and H2 cylinders from the plant stores and filling of gas in the generator stator cooling system as and when required till the unit is commissioned and handed over shall be the responsibility of the contractor.

6.5.22 The contractor shall carryout kerosene test of all the bearing housing of turbine and generator, bearing housing of pumps and other equipments and do the repair work if any. The contractor at his cost shall also arrange kerosene.

6.5.23 The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.

6.5.24 Temporary blinds/lugs/caps, piping and associated equipments like tanks, pumps etc required for oil flushing / alkali cleaning / acid cleaning of piping &, other equipments during erection & pre-commissioning shall be erected by contractor within the quoted rate.

6.5.25 In case any malfunctioning and/or defect is found during tests/trials runs such as loose components, undue noise or vibrations, strains etc. on equipment, the contractor shall immediately attend to these defects/malfunctioning and take necessary corrective measures. If any readjustment and re-alignment are necessary the same shall be done as per BHEL Engineer's instructions as part of work at no extra cost.

6.5.26 During the stages of pre-commissioning / commissioning / post commissioning, if any part of the GTG, and auxiliaries need, repair/rectification / rework / replacement, the same shall be done expeditiously and promptly by the contractor.

6.5.27 During this period, though BHEL's and customer's staff will also be associated in the work, the contractor's responsibility will be to make available resources in his scope till such time the commissioned units are taken by the customer.

6.5.28 Contractor shall cut/open works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning opening of valves changing of gaskets attending to leakages minor modification rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower in all the three shifts. In case any rework is required because of contractor’s faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.

6.5.29 Contractor to provide necessary commissioning assistance from pre-commissioning stage onwards and up to continuous operation of Gas turbine, GTG and Auxiliaries. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programmes made to achieve the schedule agreed with customer.

6.5.30 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance for a period of six months or till handing over of sets to customer, which ever is earlier.

6.5.31 It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

6.5.32 During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.

6.5.33 It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable till the completion of work under these specifications including for trial operation, commissioning of GTG and the other equipments is delayed due to reasons not attributable to the contractor.

6.6.0 UTILITY POINTS

6.6.1 No of utility points (Service / plant air, service / plant water, service / washing steam, inert gas (N2) etc. shall be indicated in the P & I diagram. Contractor to locate the utility points as adviced by site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout with B O M to BHEL for approval.

6.6.2 The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe.

6.7.0 PLATFORMS, CROSSOVERS & CANOPIES

Platforms, ladders crossovers for sleepers and canopies shall be facricated by contractor at site as per site engineer’s advice within the quoted / accepted rate. Platforms shall also be provided at places where it has not been shown in drawings but felt necessary by site engineer.

Conopies shall be provided for all out door pumps and motors.

6.8.0 AS BUILT DRAWINGS

Contractor shall be supplied with two extra blue paints of the layout & isometrics. Contractor to incorporate in one of the blue prints with Red ink all the changes / deviations / alterations etc carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

6.9.0 WELDING DETAILS

For edge preparation of pipe / pipe fittings refer plant standard HY-062 05 99 and Drg. No. 3-0381033-00033 welding details for fillet welts. For welding details as electrodes, heat treatment and testing details refer the relevant standards.

6.10.0 INSULATION :

The insulation scope of GTG and its auxiliaries is minimum. The contractor has to carryout insulation of the following.

i. Diesel Engine exhaust
ii. Ducting Joints
iii. Bypass stack shell to shell joints
iv. Duct with expansion joints
v. Piping (Please refer insulation Schedule)

6.11.0 PAINTING

6.11.1 The scope of work shall include supply and application of final painting as required and specified for the components of Gas turbine, Generator and its auxiliaries and piping.

6.11.2 All exposed metal parts of the Gas turbine, Generator and its auxiliaries and piping, structures, tanks vessels etc. shall be cleaned and Painted (Primer & final paint) as per the **Customer Painting Specification** attached herewith.

6.11.3 Required paints, thinner and other consumables like wire brush, cotton waste, Emery paper etc shall have to be arranged by the contractor at his cost.

6.11.4 If needed and insisted either by BHEL / Customer in certain cases spray painting has to be carried out within the Quoted rates.

6.11.5 Before commencement of final painting, contractor has to obtained written clearance from BHEL / Customer for surface preparation.

6.11.6 Contractor has to procure paints from the BHEL/ Customer approved agencies only, and the paints should be as per the customer painting specification.

6.11.7 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL/ Customer. The instrument for checking the thickness of the coat is to be procured by the contractor and should be calibrated after periodic intervals.

6.11.8 GI, Stainless steel, Brass, Aluminum, Copper and other non ferrous materials shall not be painted unless other wise specified.

6.11.9 The customer painting specification which forms part of the tender, and should be strictly followed.

6.12.0 TIME SCHEDULE

6.12.1 The contractor has to mobilise in all respects with in two weeks from the date of issue of Fax letter of Intent.

6.12.2 The entire work of erection, testing and commissioning of Gas Turbine & Generator with associated auxiliaries, turbine integral piping as detailed under this tender specifications shall be carried out and completed with in **Nine (09)** months from the date of actual commencement of work at site.In case BHEL desires to advance the commissioning activities contractor has to complete all the works with in the quoted / accepted rate, to suit the advanced commissioning.

6.12.3 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 respect only when the unit is operation. The decision of BHEL in this regard shall be final and binding of the contractor.

6.12.4 During the total period of contract the contractor has to carryout the activities in a phased manner as required by BHEL and the program of milestone events.

6.13.0 TERMS OF PAYMENT:
85 % of lumpsum contract price for GT shall be paid progressively as follows.

6.13.1 Gas Turbine - 40%

SNo	ACTIVITY	Payment %
1	Foundation Preparation and Sole Plate grouting	4%
2	Placement of Gas Turbine	8%
3	Alignment of GT with Generator	6%
4	Erection of GT base Enclosure	6%
5	Erection of Lube Oil & Gas Fuel Mode includong LO Centrifuge	6%
6	GT vent fans & Exhaust frame cooler fans	4%
7	GT CO_2 Racks	2%
8	Miscellounous works on GT	4%
	Total	**40%**

6.13.2 Ducting – 30%

SNo	ACTIVITY	Payment %
1	Inlet Filter Unit	7%
2	Inlet Ducting inlet Silencer	3%
3	Exhaust Diffuser	2%
4	Exhaust Duct & By Pass Duct	10%
5	Support Structures	4%
6	Dampers with Seal air fans	4%
	Total	**30%**

6.13.3 Generator – 15%

SNo	ACTIVITY	Payment %
1	Preparation of Foundation and levelling of base plates & Packers etc.,	1%
2	Erection of Generator Stator	5%
3	Erection of LG B	2%
4	Erection of starting means	1%
5	Alignment of starting means and Generator	2%
6	Erection of Generator and ACC module Co2 Rack & Cooling Duct	2%
7	Mist Eliminator with blower	1%
8	Miscellounous items	1%
	Total	**15%**

6.13.4 BOP :

85% on Tonnage rate shall be paid for the BOP equipments given in the list on as prorata basis as per the activities indicated below

a) Erection of Pumps , Motors,Skids, EOT etc., 50%
b) Alignment of the equipments / Skids/ EOT 30%
c) Trial run of BOP equipments 5%

6.13.5 Insulation

85% as tonnage rate shall be paid for the insulation on prorata basis as per the activities indicated below .

a) Transportation from store & application of insulation 45%

b) Completion of sheeting 40%

6.13.6 PIPING :

85% on tonnage rate shall be paid on prorata basis as per the activities indicated below **:**

a) Transportation from store & Pre-Assembly 15%

b) Placement in position wherever pre assembly is involved 20%

OR

c.) Transportation from store, Pre-assy & Placement Where pre-Assy is not involved 35%

d.) Completion of Alignment, ,welding 35%

e.) Completion of UT / Radiography, NDT & Heat treatment (if any) 10%
f.) Compliton of hanger and supports 5%

6.13.7 Commissioning (5%) (on lumpsum price and also on executed tonnage value as applicable)

SNo	ACTIVITY	Payment %
1	Cranking of GT	1%
2	Full speed No Load	1%
3	Synchronisation	1%
4	Completion of Trial operation	2%
	Total	**5%**

6.13.8 Others Activities : 5 % (on lumpsum price and also on executed tonnage value as applicable)

SNo	ACTIVITY	Payment %
1	Completion of all works including supply & application of final painting	3%
2	Submission of protocols / FQA checks and work completion certificate by BHEL& materials reconciliation, Submission and passing of final bill	2%

6.13.9 Field Quality Assurance formats: It is the responsibility of the contractor to collect and fill up the relevant FQA Log sheets / Welding logs & Heat treatment charts and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and relevent Electricity Board / IBR in token of their acceptance. Monthly RB Payment to the contractor will be linked with the submission of these Log sheets.

6.13.10 The balance amount of 5% of the executed value will be paid after the guarantee period of 12 months. The guarantee period shall commence from the date of handing over of the set to customer or 6 months from the date of successful completion of trial operation whichever is earlier provided all erection, testing and commissioning works are completed in all respects. However the above 5% payment

can be released against submission of a matching Bank guarantee from a nationalized / Schedule Bank in the prescribed Proforma of BHEL valid for one year from the date commencement of guarantee period.

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

6.13.12 **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 work**.

6.13.13 **CONTRACTOR SHALL NOTE THAT THE FINAL BILL BE RELEASED ONLY ON PRODUCTION OF A CERTIFICATE ISSUED BY SITE IN CHARGE THAT THE CONTRACTOR HAS FULFILLED ALL THE CONTRACTUAL / STATUTORY REQUIREMENT.**

6.14.0 **EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK**

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 in 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 these work done through other agencies if they so desire.

6.14.1 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 designer/supplier or competent authority only will be considered for payment.

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

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

6.14.4 Average single man hour rate including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, including consumables for carrying out any rework, re-vamping as may arise during the course of erection **Rs.40/- man hour**.

6.14.5 Average single man hour rate including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals excluding consumables for carrying out any rework/revamping as may arise during the course of erection **Rs.25/- per man hour**.

6.15.0 EXTRA WORK DOES NOT INCLUDE

6.15.1 Nominal dressing of foundations, holes, bases, nuts and bolts, in case of abnormal conditions, this can be mutually discussed before starting of such work.

6.15.2 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 rectification of components which have been received in damaged conditions during transit, rectification of components wrongly manufactured at work, any other works which do not fall in the scope of this contract.

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

6.16.0 OVER RUN CHARGES

6.16.1 Incase due to reasons not attributable to the contractor, the work gets delayed and completion time gets extended beyond **Nine (09) months** from the date of commencement of the work, the contractor shall be entitled for any over run compensation **(ORC)** for a period after the expiry of **Nine (09) months**. Incase of ORC arise the same will apply at **Rs.45,000/- (Rupees Forty Five Thousand only)** per month for the extended period beyond **Nine (09) months.**

6.16.2 The period of overrun if any will have to be ascertained in consultation of erection Engineer before completion of 9 months contract period.

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

6.16.4 The payment of overrun charges for extended stay for reasons not attributable to contractor will be subject to achieving the monthly programme of work as mutually agreed upon during the extended stay.

6.17.0 PRICE ESCALATION

6.17.1 PVC applicable from the calender month of commencement of work.

$$P1 = 0.75 \times PO \times \frac{(F1-FO)}{FO}$$

Applicable even when F1 is lesser than FO. (Price reduction as applicable).

FO = New all India average consumer price index published by Labour Bureau, Simla, Government of India for Industrial workers (Base 2001 = 100)

applicable from the month of commencement of work.

F1 = All India average consumer price Index published by labour Bureau, Simla, Government of India, for Industrial workers (Base 2001 = 100) applicable for the months under consideration.

P1 = Increase in the billing amount as per the escalation formulae for the particular month of billing.

PO = Billing amount calculated on the accepted contract rate.

6.17.2 Price escalation as per above formula will be calculated and paid (excluding payments towards extra works and overrun, if any) on month to month basis. BHEL however, reserves the right to freeze escalation for that such of duration of delays, from time to time which are entirely attributable to the contractor.

6.17.3 With the provision of price escalation as per the above no claim / compensation on account of any increase whatsoever, (irrespective of whether escalation are steep / unanticipated or not compensated by the above escalation provisions in full towards minimum wages, consumables, electrodes, gases or any other item / reasons) will be payable during the entire period of execution.

PVC is to be restricted to 10% of the contract value.

6.18.0 TAXES

6.18.1 <u>Value Added Tax (VAT) for the works</u>

Price quoted shall be inclusive of ALL TAXES except service tax.

Notwithstanding the fact that this is only an erection service contract not involving any transfer of materials whatsoever and not attracting VAT liability, being labour oriented job work, for the purpose of VAT the contractor has to maintain the complete data relating

to the expenditure incurred towards wages etc. in respect of the staff/workers employed for this work as also details of purchase of materials like consumables, spares etc., interalia indicating the name of the supplier, address and VAT Registration No. and VAT paid for the purchases etc.

The bidder shall get registered with **Kerala** VAT authorities and the registration certificate shall be forwarded to BHEL immediately after commencement of work.Incase , the bidder had already registered under **Kerala** VAT, they must quote their registration number and forward copy of Registration Certificate while submitting this tender. The bidder has to obtain VAT clearance certificate from the concerned authorities on completion of work and submit along with the final bill as one of the document for contract closure.

In case the Bidder decides to include any VAT element along with the quoted price, they shall specify in the price bid,(1) The value of VAT included in the quote, (2) The rate of VAT adopted and (3) On what value, etc. as additional information. If no VAT element is included in the price, the same shall be indicated in the quote.

The bidder shall quote very competitive price after taking into consideration of above points.

6.18.2 SERVICE TAX

Price quoted shall be exclusive of Service Tax. The service tax as statutorily leviable and payable by the bidder under the provisions of service tax Law / Act shall be paid by BHEL as per bidder claim through various running bills. **The bidder shall furnish proof of service tax registration with Central Excise Department specifying the name of services covered under this contract.** Registration Certificate should also bear the endorsement for the premises from where the billing shall be done by the bidder on BHEL for this project. The bidder shall obtain prior consent of BHEL before billing the service tax amount.

6.18.3 OTHER TAXES

Any other taxes and duties (except VAT & Service Tax) viz. Entry Tax, Octroi, Seigniorage, Licenses, Deposits, Royalty, Stamp Duty, other charges / levies, etc. prevailing / applicable on the date of opening of technical bids and any variation thereof during the tenure of the contract are in the scope of bidder. In case BHEL is forced to pay any such taxes, BHEL shall have the right to recover the same from the bidder either from running bills or otherwise as deemed fit.

6.18.4 NEW LEVIES & TAXES

In case Government imposes any new levy / tax after award of the work during the tenure of the contract, BHEL shall reimburse the same at actuals on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

6.18.5 STATUTORY VARIATIONS

Statutory variations are applicable only in the cases of Value Added Tax and Service Tax. The changes implemented by the Central / State Government in the VAT Act / Service Tax during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision shall be paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract including extended period, if any.

6.18.6 DIRECT TAXES

BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act/Rules.

6.19.0 IMPORTANT CONDITIONS FOR PAYMENT

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

i. PF Regn. No.

ii. Labour License No.

iii. Workmen Insurance Policy No.

iv. Un Qualified Acceptance for Detailed L.O.I.

v. Initial 50% Security Deposit.

vi. Rs 100 /- Stamp Paper for Preparation of Contract agreement.

vii. Acceptance for E remittance the form is provided in the section VII- Appendix- IX

6.20.0 PROVIDEND FUND & MINIMUM WAGES

6.20.1 You 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 provisions 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 payments due to you.

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

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

6.21.0 OTHER STATUTORY REQUIREMENTS

1. The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no alongwith the first running bill.

2. The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. Incase of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contactor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.

3. The contractor shall submit monthly running bills alongwith the copies of monthly wages (of the preceding month) u/r 78 (1) (a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.

4. The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workmen under I D Act 1948, copies of Form 6-A(Annual Return of PF Contribution) along with Copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act1948 (If applicable) to BHEL along with the Final Bill.

5. Incase of any dispute pending before the Appropriate authority under I D act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.

Incase of any dispute prolonged/pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL

SCOPE AT A GLANCE
SECTION VII – APPENDIX I
BHEL:PSSR:SCT: 1291 - Frame VI GTG Erection
SITE FACILITIES

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
1.1.0	**ESTABLISHMENT**			
1.1.1	**FOR CONSTRUCTION PURPOSE:**			
A	Open space for office	Yes	--	
B	Open space for storage	Yes	--	
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
D	Bidder's all office equipments, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
F	Fire fighting equipments like buckets, extinguishers etc		Yes	
G	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
A	Open space			
B	Living accommodation			

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
1.2.0	**ELECTRICITY**			
1.2.1	Electricity For construction purposes **(to be specified whether chargeable or free)**			
1.2.1.1	Single point source	Yes	--	Free of cost.
1.2.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	
1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:		Yes	
1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	
1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.2.2.4	Living facilities for office use including charges		Yes	
1.2.2.5	Demobilization of the facilities after completion of works		Yes	
1.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(**in case BHEL provides this facility, the scope should be given without ambiguity)**		Yes	
1.3.0	**WATER SUPPLY**			
1.3.1	**For construction purposes:**			
1.3.1.1	Making the water available at single point	Yes		Free of cost

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.2	**Water supply for bidder's office, stores , canteen etc**			
1.3.2.1	Making the water available at single point	--	--	
1.3.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.4.0	**TRANSPORTATION**			
1.4.1	For construction purposes:		Yes	
1.4.1.1	For the site personnel of the bidder		Yes	
1.4.1.2	For the bidder's equipments and consumables (T&P, consumables etc)		Yes	
1.5.0	**LIGHTING**			
1.5.1	For construction work (supply of all the necessary materials) 1. At office storage area 2. At the preassembly area 3. At the construction site /area		Yes	
1.5.2	For construction work (execution of the lighting work/ arrangements) 1. At office storage area 2. At the preassembly area 3 At the construction site /area		Yes	
1.5.3	Providing the necessary consumables like bulbs, switches, etc during the course of construction		Yes	
1.5.4	Lighting for the living purposes of the bidder at the colony / quarters		Yes	

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
1.6.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
1.6.1	Telephone, fax, internet, intranet, e-mail etc		Yes	
1.7.0	**COMPRESSED AIR SUPPLY**			
1.7.1	Supply of Compressor and all other equipments required for compressor and compressed air system including pipes, valves, storage systems etc		Yes	
1.7.2	Installation of the above system and operation and maintenance of the same .		Yes	
1.7.3	Supply of the all the consumables for the above system during the contract period		Yes	

SCOPE AT A GLANCE
SECTION VII – APPENDIX I
BHEL:PSSR:SCT: 1291 - Frame VI GTG Erection
SITE FACILITIES

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.1.0	Engineering works for Construction :			
2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		
2.1.2	Drawings for construction methods	Yes		
2.1.3	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	
2.1.4	Shipping lists etc for reference and planning the activities	Yes		
2.1.5	Preparation of site erection schedules and other input requirements	Yes	Yes	
2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes		
2.1.7	Weekly erection schedules based on Sl No 2.1.5		Yes	
2.1.8	Daily erection / work plan based on Sl No 2.1.7		Yes	
2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in 15 days.		Yes	
2.1.10	Preparation of preassembly bay		Yes	
2.1.11	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself		Yes	
2.1.12	Arranging the materials required for preassembly		Yes	

Note : * All the tools and plants required for this scope of work, except the Tools & Plants provided by BHEL are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. Any additional T & P required to be arranged by the contractor.

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.0	SUGGESTED LIST OF TOOLS AND PLANTS (BHEL should indicate the proposed number of items considered as free issue)			
2.2.1	250 T crawler crane	--	--	
2.2.2	250 T tyre mounted crane	--	--	
2.2.3	150 T / 135 T crawler crane	Yes	--	
2.2.4	150T tyre mounted crane	--	--	
2.2.5	100 T crawler crane	--	--	
2.2.6	100T tyre mounted crane	--	--	
2.2.7	75 T crawler crane One No (1)	Yes	--	
2.2.8	75 T tyre mounted crane	--	--	
2.2.9	60T Kroll tower crane	--	--	
2.2.10	15 T crawler crane	---	--	
2.2.11	18/20 T tyre mounted crane one			
2.2.11 A	8T Escort crane			
2.2.12	30T gantry crane	--	--	
2.2.13	15 T gantry crane	--	--	
2.2.14	10T gantry crane	--	--	
2.2.15	30T tractor trailor	--	--	
2.2.16	20T trailor	--	Yes	
2.2.17	10 T trailor / truck	--	Yes	
2.2.18	Electrical winches 15 T with / wire ropes			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.19	Electrical winches 10T with / without wire ropes		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.20	Electrical winches 5 T with / without wire ropes			
2.2.21	Electrical winch 3 T with or without wire rope			
2.2.22	Electrical winches with/without wire ropes			
2.2.23	Pneumatic winches 1 T with / without wire rope			
2.2.24	Welding generators			
2.2.25	Welding rectifiers			
2.2.26	Welding transformers air cooled			
2.2.27	Welding transformers oil cooled			
2.2.28	Chain pulley block 10T			
2.2.29	Chain pulley block 5 T			
2.2.30	Chain pulley block 3T			
2.2.31	Chain pulley block 1T /2T			
2.2.32	Pulling & lifting machines 5T			
2.2.33	Pulling & lifting machine 3T			
2.2.34	Pulling and lifting machine 2T / 1T			
2.2.35	Multi sheave pulley block 200 T (4) Drum Lifting			
2.2.36	Multi sheave pulley block 100 T			
2.2.37	Multi sheave pulley block 50T			
2.2.38	Multi sheave pulley block 30T			
2.2.39	Multi sheave pulley block 20T			
2.2.40	Multi sheave pulley block 5T			
2.2.41	Single sheave shackle pulley blocks 20T			
2.2.42	Single sheave shackle pulley block 10T			
2.2.43	Single sheave shackle pulley block 5 T			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.44	25 V transformer with sufficient spare bulbs		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.45	Gas cutting torches with regulators			
2.2.46	Torque wrench			
2.2.47	Pipe vice			
2.2.48	Bench vice			
2.2.49	Anvil			
2.2.50	Baking oven for welding electrodes			
2.2.51	Portable drying oven for baked welding electrodes			
2.2.52	GQA grinding machine			
2.2.53	FF2 grinding machine			
2.2.54	Angle grinders AG7			
2.2.55	Tig welding sets			
2.2.56	Air conditioners 1.5 T			
2.2.57	Sheet bending machine			
2.2.58	Sheet rolling m/c			
2.2.59	Sheet grooving m/c			
2.2.60	Pedestal drilling m/c			
2.2.61	Drilling m/c 31 mm			
2.2.62	Drilling m/c 20mm			
2.2.63	Drilling m/c 10 mm			
2.2.64	Hand drilling m/c 6 mm			
2.2.65	D shackles 30 T			
2.2.66	D shackles 20T			
2.2.67	D shackles 15 T Drum lifting			
2.2.68	D shackles 10T			
2.2.69	D shackles 5T/3T			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.70	Wire rope sling 6x36 12mmx6m		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.71	Wire rope slings 12mmx10m			
2.2.72	Wire rope slings 16mmx4m			
2.2.73	Wire rope slings 16mmx6m			
2.2.74	Wire rope slings 16mmx10m			
2.2.75	Wire rope sling 19mmx15 m			
2.2.76	Loose wire rope 16mm			
2.2.77	Loose wire rope 19 mm			
2.2.78	Loose wire rope 25mm			
2.2.79	Loose wire rope 32mm			
2.2.80	Wire rope clamps for the above sizes sufficient quantity			
2.2.81	Manila ropes of sufficient quantity in different sizes			
2.2.82	Hydraulic jacks 250/200T			
2.2.83	Hydraulic jacks 100T			
2.2.84	Hydraulic jacks 50T			
2.2.85	Hydraulic jacks 25 T			
2.2.86	Hydraulic jacks 10T			
2.2.87	Tower crane 50T			
2.2.88	Derricks 30T with 70 M high with all necessary accessories 2 nos			
2.2.89	EOT cranes in TG hall ♦ Main hook ♦ Aux hook	Yes		
2.2.90	Sleepers both wooden and concrete for movement of cranes at site			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.91	Concrete blocks for pre assembly works at site		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.92	15 T snatch pulley blocks Drum lifting			
2.2.93	Hydro test pump 600 bar / 400 bar (One No)			
2.2.94	Hydro test pump 250 bar			
2.2.95	Hand operated hdro test pump			
2.2.96	Boiler filling pump 100m head with ~ 15 LPSec			
2.2.97	Pressure gauges 400 bar			
2.2.98	Pressure gauges 600 bar			
2.2.99	Pressure gauges 100 bar			
2.2.100	Acid cleaning pumps with all accessories including switch gears			
2.2.101	Stress relieving / preheating equipments including transformers, controllers, heating pads and insulating materials and consumables			
2.2.102	Hydrauli pipe bending machines to suit up to 80mm dia and 11 mm thick			
2.2.103	Electric driven pipe chamfering machines up to 100 mm dia tubes with necessary cutting tools and other consumables			
2.2.104	Electric driven pipe chamfering m/c to suit pipes from dia 100 mm to 500/600 mm			
2.2.105	Theodolite 1 min accuracy			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.106	Dumpy level		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.107	6 point temp. recorder			
2.2.108	Radiographic equipments with suitable isotopes/ x ray machines			
2.2.109	MPI test kit			
2.2.110	Ultrasonic flaw detector			
2.2.111	Dye penetrant test kits (as required)			
2.2.112	Moving platforms Sky Claimber			
2.2.113	Passenger cum goods lift (1)			
2.2.114	Dip lorries			
2.2.115	Rails and sleepers for dip lorries, both supply and installation			
2.2.116	Calibrated steel tapes of different sizes			
2.2.117	Plumb bobs			
2.2.118	Micro meters of different sizes both inside and out side			
2.2.119	Vernier calipers of different sizes			
2.2.120	Surface plate			
2.2.121	Straight edges of different lengths			
2.2.122	Feeler gauges of different lengths			
2.2.123	Inside and out side calipers			
2.2.124	Bolt heating equipments including thermo couples			
2.2.125	Dial gauges with magnetic base			
2.2.126	Magnifying glass			
2.2.127	Piano wires			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.128	Precision water level micrometer		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.129	Parallel blocks			
2.2.130	Taper wedges			
2.2.131	Micro jacks			
2.2.132	Lead wires			
2.2.133	Dial bore micro meter			
2.2.134	Thermo meters of different ranges			
2.2.135	Depth gauges			
2.2.136	"GO & "NO GO" gauges			
2.2.137	Drill sets			
2.2.138	Taps and die sets			
2.2.139	Spirit levels			
2.2.140	Master spirit level			
2.2.141	Spring balance			
2.2.142	Hg manometer			
2.2.143	Vibro meter			
2.2.144	Noise level meter			
2.2.145	Litmus paper			
2.2.146	Portable gas purity meter			
2.2.147	Dead weight tester			
2.2.148	Temp bath for calibration			
2.2.149	250V/500V megger			
2.2.150	½.5/5.0 KV motorised megger			
2.2.151	Ammeter and voltmeters			
2.2.152	HV test kit			
2.2.153	Double Kelvin Bridge			
2.2.154	DC bridge			
2.2.155	Mano meters			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.156	Auto transformers		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.157	CT(100/5A)			
2.2.158	Purge test kits			
2.2.159	Multi meters			
2.2.160	Variac 3phase 10 A			
2.2.161	Phase sequence meter			
2.2.162	Dual beam osciiloscope continuity tester			
2.2.163	Rheostats			
2.2.164	Milli seconds syn timer			
2.2.165	Ultra violet recorder			
2.2.166	Tong tester			
2.2.167	Hardness tester			
2.2.168	Bolt stretching device			
2.2.169	Reamers of various sizes			
2.2.170	Vacuam cleaner			
2.2.171	Sand blasting machine with accessories			
2.2.172	Spray painting equipments			
2.2.173	Oil filtration units			
2.2.174	Bearing pullers of different sizes			
2.2.175	Bearing scrappers			
2.2.176	Slip gauges			
2.2.177	Elko meter to measure paint thickness			
2.2.178	MIG welding machines			
2.2.179	Files of different sizes			
2.2.180	Socket wrenches			
2.2.181	Spanner and pipe wrenches sets			
2.2.182	Hammers of different sizes both soft and hard			

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.183	Allen keys sets		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.184	Fire proof tarpaulins			
2.2.185	Steel scaffolding materials			
2.2.186	Pipe cutters			
2.2.187	Magnetic base for drilling machines			
2.2.188	Vibrator for grouting			
2.2.189	Mixing machine for grouting and concreting			
2.2.190	Tube expanding machine ie drives – hydraulic or pneumatic ( )			
2.2.191	Tube expanders – both for expansion and flaring			
2.2.192	Mercury plumb bob			
2.2.193	Band saw machines			
2.2.194	Copper rods			
2.2.195	Needle vibrators			
2.3.0	All consumables including :			
	Ordinary cement		Yes	
	Grouting cement		Yes	
	Any special cement		Yes	
	Sand, bricks etc		Yes	
	Tig wires	Yes	--	
	Electrodes		Yes	
	Brazing rod, flux etc		Yes	
	Soldering		Yes	
	DA, oxygen, argon			
	Nitrogen required for chemical cleaning	Yes		
	Nitrogen required for construction		Yes	
	Supply of Preservative paints and thinner etc. for preservation of components	Yes		Application & arrangement of brushes, cleaning materials etc by bidder.
	Supply of Final Paints including thinner, brushes, cleaning materials etc and application for final painting , as per specifications		Yes	

Sl.No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.4.0	**WELDING**			
2.4.1	All welding works		Yes	
2.4.2	All radiography and other testing works like DPI, MPI, UT,		Yes	
2.4.3	All connected works like preheating, post heating, stress relieving,		Yes	
2.4.4	Providing certified either IBR or as per other relevant welders for the works. BHEL will not provide materials, test certificates etc for the above purpose unless specifically stated .		Yes	
2.4.5	To submit the welders to BHEL/client's approval (preproduction test) before putting them on regular work. Required materials for preproduction test to be arranged by BHEL.		Yes	
2.4.6	The accessories required for the welders to be arranged by the bidder		Yes	
2.5.0	**CHEMICAL CLEANING**			
2.5.1	Supply of pumps, motor, starters, cables, piping and other materials required for the operation	Yes		
2.5.2	Servicing the required equipments and commissioning		Yes	
2.5.3	Chemicals required for the operation including Nitrogen gas	Yes		
2.5.4	Handling equipments / consumables for the chemical cleaning works	Yes		
2.5.5	Effluent disposal system	Yes		
2.5.6	Services for the effluent disposal		Yes	

SCOPE AT A GLANCE
SECTION VII – APPENDIX I
BHEL:PSSR:SCT: 1291 - Frame VI GTG Erection
SITE FACILITIES

Sl.No	Description **PART III** **ERECTION TESTING & COMMISSIONING**	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.1.0	**SCOPE OF WORK**			
3.1.0.1	Handling at site stores/ storage yard		Yes	
3.1.0.2	Transportation within the site		Yes	
3.1.0.3	Erection testing & commissioning		Yes	
3.1.0.4	Final painting of erected materials including supply of paints, thinners etc		Yes	
3.1.0.5	Carrying out P.G.test	Yes		
3.1.1.0	**HANDLING & TRANSPORTATION**			
3.1.1.1	Stores/storage yard to preassy area/ erection site		Yes	
3.1.1.2	Pre assembly area to site of installation		Yes	
3.1.1.3	Erection site to pre assembly area / stores/ storage area if required		Yes	
3.1.1.4	Touch up painting wherever required till final painting.(please refer the relevant clause for supply of paints, thinners etc)		Yes	
3.1.1.5	Preparation storage at site for proper stacking of materials	Yes	Yes	
3.1.2	**ERECTION TESTING & COMMISSIONING**			
3.1.2.1	Erection drawings/documents/working instructions etc	Yes		
3.1.2.2	Welding schedules	Yes		

Sl.No	Description **PART III** **ERECTION TESTING & COMMISSIONING**	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.1.2.3	Engineering drawings for construction methods	Yes		
3.1.2.4	Organising the resources required for erection, testing &commissioning of the materials covered under the scope and executing the work as per instruction of BHEL engineer		Yes	
3.1.2.5	Final painting of all the materials erected		Yes	
3.1.2.6	Demobilization of the erection site		Yes	
3.1.2.7	Cleaning of / upkeep of erection / preassembly /storage areas		Yes	
3.1.2.8	Return of excess materials drawn to BHEL stores/ customer		Yes	
3.1.2.9	Reconciliation of all the consumables, T&P drawn from BHEL / customer ` s store		Yes	
3.1.2.10	Filling up quality log sheets		Yes	
3.1.2.11	Providing all temporary arrangements like platforms, scaffoldings etc for execution		Yes	
3.1.2.12	Assistance for P.G test		Yes	
3.1.3	**CIVIL WORKS**			
3.1.3.1	Taking over of foundations		Yes	
3.1.3.2	Checking, chipping and correcting final dimensins of the foundations if required		Yes	
3.1.3.3	Placement, erection of embedded parts integral for the scope of work and coordination with customer's civil/other agencies for embedments		Yes	
3.1.3.4	Bolt grouting with grout as specified		Yes	
3.1.3.5	Final grouting of all the equipments covered under this scope		Yes	

Sl.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.4	**STATUTORY CLEARANCES**			
3.1.4.1	Labour license		Yes	
3.1.4.2	Provident fund		Yes	
3.1.4.3	Insurance what ever comes under bidder's scope		Yes	
3.1.4.4	Workmen compensation		Yes	
3.1.4.5	Minimum wages		Yes	
3.1.4.6	Sales tax		Yes	
3.1.4.7	Local laws governing the works like electrical inspectorate, factory inspectorate, etc		Yes	
3.1.4.8	Professional tax		Yes	
3.1.4.9	Safety rules and regulations		Yes	
3.1.4.10	Approval from competent authority for installation like IBR etc		Yes	
3.1.5	**SUBMISSION OF REPORTS**			
3.1.5.1	Man power deployment category wise and area wise		Yes	
3.1.5.2	Deployment of tools and plant , area wise		Yes	
3.1.5.3	Consumables used		Yes	
3.1.5.4	Erection log		Yes	

Sl.No	Description **PART III** **ERECTION TESTING & COMMISSIONING**	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.1.5.5	Erection data PGMADU wise		Yes	
3.1.5.6	Data on joints welded as per log sheet/ welding schedule		Yes	
3.1.5.7	Materials management reports as per instruction of BHEL		Yes	
3.1.5.8	Meeting between BHEL and bidder at BHEL office every day for monitoring the progress	Yes	Yes	

SECTION – VII APPENDIX – II

BHEL PSSR SCT: 1291

WEIGHT AND DIMENSION SCHEDULE

WEIGHT SCHEDULE:-

Sl. No	Description	Approx. Total Design Wt. (MT)
1	**Gas Turbine and its auxiliaries**	**490**
2	**BOP**	**120**
3	**PIPING**	**200**
	A) Carbon Steel / Alloy Steel	190
	B) Stainless Steel	10
4	**Insulation**	**20**
	a) Wool Mattress	16
	b) Aluminium Sheet	4
	Total	**830**

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
Description	**Length (m)**	**Width (m)**	**Height (m)**	**WT (Metric Tons)**	**Remarks**
Gas Turbine Package (Flange to Flange	7.4	3.6	3.9	64.0	
Load Coupling	2.1	0.6	0.8	0.3	
Accessory Base	7.2	3.5	4.8	30.0	
Load Coupling Guard	2.2	1.5	1.0	0.2	
Accessory Coupling	1.5	0.5	0.5	0.1	
Accessory Coupling Guard	1.5	0.6	0.6	0.1	
GT Walkway+Ladders WALKWAYS IS SPLIT INTO PIECES	3.0	1.0	1.5	1.5	
Diesel Engine Muffler	4.0	3.0	2.0	1.5	
CO2 bottle Racks-1	3.8	1.0	2.2	2.5	
CO2 bottle Racks-2	2.4	1.0	2.2	1.3	
Main Filter House (will be shipped loose)	8.0	3.0	3.5	60.0	
Turbine Vent Fans (5 Nos)	2.5	2.5	2.0	2.0	
GT Vent Ducting(4nos)	2.0	1.5	8.0	5.0	

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
Air Processing Skid	3.0	1.0	2.5	1.0	
Air processing skid panel	3.0	0.5	2.0	0.2	
Compressor Water Washing skid	6.5	3.0	3.2	5.0	
Lube oil Centrifuge	3.0	1.5	1.8	1.5	
Field Inter connection piping				3.0	
Foundation Bolts and Misc.Hardware	-	-	-	5.0	
GT off-base Enclosures	7.0	3.5	3.0	60.0	
Exhaust frame blowers (2 no's)	3.0	3.0	1.5	2.0	
Generator package	7.4	3.2	2.9	87.0	
Generator stator 65.6 mt					
Generator rotor 15.2 mt					
Generator bearing 3.2 mt					
Exciter 2.3 mt					
Enclosures 7.0 mt					
Foundation item 6.0 mt					
Cooler duct 5.0 mt					
Gear box 12.0 mt					
Inlet Ducting					

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
Inlet Duct Transition Pieces	4.0	4.0	3.0	25.0	
Inlet Duct Expansion Pieces	4.0	0.5	4.0		
Inlet Duct Elbow No.1	4.0	4.0	4.0		
Inlet Duct Elbow No.2	4.0	4.0	4.0		
Silencer	4.0	2.0	3.0		
Straight Duct No.1	4.0	3.0	3.0		
Straight Duct No.2	4.0	3.0	3.0		
Support Structure	6.0	3.0	3.0		
Exhaust Ducting (OFE)					
Expansion Joints (Total 4)	4.4	4	0.5	1.2	
Silencer Duct SL1	4.7	5.1	3.2	10.2	
Silencer Duct SL2	4.3	4.7	1.6	5.1	
Diverter 57:57Damper	6.0	3.5	3.0	19.0	
Guillotine Damper	6.0	0.8	3.0	10.0	
Horizontal Duct D1	4.5	4.1	3.9	9.7	
Horizontal Duct H1	4.1	2.5	2.8	4.7	
Horizontal Duct D5	3.9	3.9	0.6	1.8	
Horizontal Duct D6	4.1	4.1	1.1	2.9	
Transit Duct D2	4.7	4.3	2.6	5.1	

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
Transit Duct D3	4.5	4.3	2.1	4.1	
Vertical Duct VD8 (4 NOS.)	4.3	4.3	3.4	4.7	
Vertical Duct VD9	4.5	4.5	3.4	5.0	
Stack support Structure					
(columns beams, angles)	-	-	-	10.0	
GD & GFD Seal Air Fan Assy	3.0	2.0	2.0	1.0	
Miscellaneous Item (Ladders , platforms,bolts				4.0	
Lube Oil Mist Eliminator	2.0	2	1.0	1.0	
HAZ gas mon. Sys-110v ac-naphtha fuel GT consists of detectors gas hazardous atmosphere, with dust guard (HSD & gas) etc. Alarm mod. Gas monitor, panel mount rack, portable purge calibrator	0.2	0.361	0.2	0.5	
Portable LO Drain Pump	1.0	1.0	0.8	0.2	
Portable LO Drain Pump	0.9	1.22	1.7	0.8	
Portable LO Drain Pump	6.0	3.0	5.0	8.0	
Deaerator	8.5	3.0 dia		20.0	
Boiler feed pumps (motor driven) 4 nos	4.0	2	2.0	12.0	

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
Boiler feed pumps (turbine driven) 1 no	6.2	2	2.0	3.0	
Make up water pumps 2 nos	2.0	1	1.0	2.0	
L.P dosing skid (Hydrazine) 1 No				2.0	
L.P dosing skid (Morpholine) 1 No				2.0	
H.P dosing skid 1 Nop				6.0	
Cooling tower 1 No				2.0	
Chemical dosing skid 1No				1.5	
Cooling water pumps 2 nos				2.0	
DMW to CW heat exchanger 1 No	5.3	dia 0.6		3.4	
DM pumps for gt atomising atr pre cooler 2Nos				1.0	
Instrument air receiver	9.0	dia 3.0		8.5	
Naptha forwrding pump skid (motor driven) 1No				3.0	
Naptha forwrding pump skid (turbine driven) 1 No					4.0

TENTATIVE WEIGHTS AND DIMENSIONS FOR GAS TURBINE AND AUXILIARIES					
PROJECT: 1 X FR6 BPCL, KOCHI					
naptha magnetic filter skid 1 No				1.0	
naptha filter skid 25 microns 1 No				0.7	
naptha filter skid 5 microns 1No				0.7	
naptha coalescent filter skid I No				1.0	
hitech additive skid I No				1.5	
drain tank for naphtha, lco,/kero system 4 nos	3.0	dia1.5		8.0	
LCO forwarding pump skid 1 no				3.0	
LCOcentrifuge skid 1 no				4.0	
LCO magnetic filter skid 1 no				1.0	
LCO 25 micron filter skid 1 no				1.0	
LCO 6 micron filter skid 1 no				1.0	
Water injection skid for nox abatement 1No				6.0	
Eot crane				15.0	
piping, valves ,etc				200.0	
insulation				20.0	

TENTATIVE LIST OF BOP TO BE ERECTED

SNo	Name of the Equipment	No off
1	Boiler Feed Pumps (Motor Driven)	4 Nos
2	Boiler Feed Pumps (Turbine Driven)	1 No
3	Make up water Pumps	2 Nos
4	LP Dosing Skid (Hydrazine)	1 No
5	LP Dosing Skid (Morpholine)	1No
6	HP Dosing Skid	1 No
7	Cooling Tower	1No
8	Chemical Dosing Skid	1 No
9	Cooling Water Pumps	2 Nos
10	DMW to CW Heat Exchanger	1 No
11	DM pumps for GT Atomising ATR pre cooler	2 No
12	Instrument Air receiver	
13	Naphtha forwarding pump skid (Motor driven)	1 No
14	Naphtha forwarding pump skid (Turbine driven)	1 No
15	Naphtha Magnetic Filter Skid	1 No
16	Naphtha Filter Skid 25 microns	1 No
17	Naphtha Filter Skid 5 microns	1 No
18	Naphtha Coalescent Filter Skid	1 No
19	Hitech Additive Skid	1 No
20	Drain Tank for Naphtha LCO / Kero System	4 Nos
21	LCO forwarding Pump Skid	1No
22	LCO Centifuge Skid	1 No

SNo	Name of the Equipment	No off
23	LCO Magnetic Filter Skid	1 No
24	LCO 25 micron Filter Skid	1 No
25	LCO 6 micron Filter Skid	1 No
26	Water injection Skid for NOX Abatment	1 No
27	EOT Crane	

NOTE FOR DIMENSION & WEIGHT SCHEDULE:

1. The information furnished in Section – VII, Appendix – II is only a description regarding the items to be erected by the contractor. BHEL reserves the right of adding or excluding any components / items / system according to the site requirements / customer requirements to complete various systems in all respects.

2. Any other systems / Components which are integral to GTG its auxiliaries and BOP supplied by the manufacturing unit are also to be erected and commissioned by the contractor with in the quoted / accepted tonnage rate / lumpsum value.

3. The above statement show the approximate weight of the various sub assemblies of the GTG associated auxiliaries, BOP and piping, fittings etc. The weights mentioned above are only approximate and for general guidance and they are subject to variation as per design consideration.

4. The designed dimensional details of components are indicated above. The actual dimension/ Weight may change as per the manufacture and assembly.

5. Please refer Section VII – Annexure , which eloborates the method of erection and commissioning of the Balance of plants –(Product standard GT 57167 Rev 01 (Pages 12))

SECTION – VII APPENDIX – III

BHEL PSSR SCT: 1291

WELDING SCHEDULE

WELDING SCHEDULE FOR SS PIPES

SNo	SIZE	Schedule	No of welds	Pipe (M)
1	½″	80 S	50	80
2	¾″	80 S	25	36
3	1″	40 S	120	207
4	1 ½″	40 S	2	4
5	2″	40 S	40	48
6	3″	40 S	270	284
7	4″	40 S	110	92
8	6″	40 S	10	20
9	8″	10 S	140	180

WELDING SCHEDULE FOR CARBON STEEL

SNo	SIZE	Schedule	No of welds	Pipe (M)
1	½″	160	47	280
2	¾″	160	1250	460
3	1 "	80	925	680
4	1 ½″	80	50	10
5	2″	80	840	888
6	3″	40	590	895
7	4″	40	460	1315
8	6″	40	460	430
9	6″	80	460	99
10	8″	40	460	379
11	10″	80	460	105
12	10″	80	460	70
13	12″	40	460	170

SNo	SIZE	Schedule	No of welds	Pipe (M)
14	12″	80	460	30
15	16″	40	15	18
16	20″	20	3	6
17	24″		5	

NOTE FOR WELDING SCHEDULE:

1. The number of Joints Indicated above and the number of site welds in the list of above welding schedule is for guidance and estimation purpose. However it is to be noted that piping for fine fittings, trim piping shall be supplied mostly in running metres which will be fabricated as per site requirements and erected and the all joints are to be welded as per the drawings / site routing within the quoted rates by the bidder. All the joints are to be welded within the quoted rates.

2. The number of joints to be welded as mentioned in the list consists of only butt welds. All the other welds viz. attachment welds pressure parts/non-pressure parts, fillet welds non-pressure welding in the GT/ piping, piping supports has to be carried out by the bidder within his quoted rates.

3. All the butt welds/socket welds shall be carried out root run by TIG welding and subsequent run by ARC welding or TIG welding as per the decision of BHEL Engineer at site. The decision of BHEL Engineer regarding the welding process to be followed at site is final and binding on the contractor. The contractors quoted rates shall be inclusive of all such contingencies. Full TIG welding wherever necessary as mentioned in the drawing / documents shall be carried out within the quoted / accepted rate.

4. The welding process, weld joint details, joint configuration and material specification may change to suit the site design requirements. The contractors quoted rates shall be inclusive of such contingencies.

5. All welds involved in the erection of temporary pipe lines for hydraulic test, chemical cleaning, alkali flushing and steam blowing etc. are not included in the above mentioned lists. Contractors shall carry out all the temporary piping welding also within the quoted rates.

6. All attachment of welding required for supporting the piping and instrument tapping points and all the attachment welds involved both in pressure/non-pressure parts of the GT / Piping has to be carried out by the contractor within their quoted rates.

7. Pre-heating, PWHT/Stress relieving have to be carried out for headers, higher thickness pipes/tubes and alloy steel tubes/pipes as per the Drawings / Specification or as per the direction/instructions of BHEL Engineer within the quoted rates.

8. Radiography and other NDT requirement are to be carried out as per the welding schedule or as per the directions / instructions of BHEL Engineer within the quoted rates.

9. All piping will be supplied in running metres contractor has to cut and edge prepare as per the standards / drawings and as per the instruction of BHEL Engineer. The total number of edge preparation is approximately equal to the total number of joints indicated in the welding schedule. Contractor has to note this aspect and quote accordingly. No separate payment will be made for the edge preparation Standard fittings such as bends, Tees etc. will be supplied by BHEL for piping work.

10. Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc, preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

11. Contractor has to made fittings like bends etc. for pipe size less than 2” Dia at site within the quoted / accepted rate.

12. CS _ Piping _ Pipe A 106 Gr B , Fitting A 105 / A234 WPB , Valves A 216 WCB / A 105

13. SS Piping Pipe A 312 TP 321, Fittings A 182 F321 / A 403 WP321. Valves A 351 CFB / A 182 F321

14. No of welds are including required for valves, fiitings and also considering pipe joints for every 6 m pf pipe length.

SECTION – VII APPENDIX – IV

BHEL PSSR SCT: 1291

List of T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis.

SNo	Description	Qty
1	135 T / 150 T Crane	1 No
2	75 T Crane	1No
3	Hydraulic Test pump	1 No
4	EOT crane in GT hall	
5	Temp piping , Valves/ Pumps tanks etc., required for any commissioning requirement	

Note:

1. EOT crane will be made available for GT erection as provided by the customer. Lubricants and chemicals for pre commissioning and commissioning activities will be supplied by BHEL free of charge.

2. The construction machinery given above is to be shared by all the sub-contractors working for BHEL at site and as such allotment will be done by "Engineer" which shall be final and binding on the contractor. In case of non-availability of these equipments, due to any reason i.e. unavoidable breakdown, major overhaul or by any other reason, etc. the contractor should make arrangement at his own cost to meet the erection targets.

3. No extra claim will be admitted due to non-availability of any of the above equipments. No delay in execution of work shall be accepted on this account.

4. Besides the T & P mentioned above, which is being made available to the contractor on free of hire charges, any additional crane and other T & P which may be required for successful and timely execution of the work covered within the scope of this tender shall be arranged and provided at site by the contractor at his cost. In case if the contractor fails to provide such equipments, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL

overheads, as applicable from time to time which may vary even during contract period.

5. All the distribution boards, connecting cables, hoses etc., temporary connection work including electrical connections shall have to be arranged by the contractor at his cost.

If addition to the above any special tools and tackles if supplied by the manufacturers will also be provided to the contractor free of hire charges.

Cranes are only for erection purpose and shall not be available for material handling for transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.

Crane operator deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

The day-to-day and routine maintenance including replacement of spares of consumables nature like filters, hose, belts etc., for the equipments will be carried out by the contractor at his own cost and machinery issued to him by BHEL shall be maintained in good working condition during the entire period of use. Equipments in defective/damaged condition will not be accepted at the time of return. However, BHEL shall supply spare parts free of charges for normal wear and tear only for the cranes.

SECTION – VII APPENDIX – V

BHEL PSSR SCT: 1291

INSULATION SCHEDULE

SNo	Pipe Size	OD in mm	Qty (Metre)	Temp ^{0}C	Insulation Thickness in mm
Carbon Steel					
1	½″	21	280	390	75
2	¾″	26	324	180	50
3	1″	33	162	380	75
4	2″	60	490	390	75
5	3″	89	405	390	100
6	4″	114	5	180	50
7	6″	168	72	180	75
8	6″	168	100	130	75
9	8″	219	90	280	75
10	8″	219	12	280	75
11	10″	273	105	130	75
12	12″	323	30	390	125
13	16″	406	18	280	125
14	24″	600	6	180	75
Stainless Steel Piping					
1	3″	89	110	100	25
2	4″	114	6	100	25
3	8″	219	42	100	50

NOTE :

1. The Insulation schedule given above is approximate and for guidance and for estimation purpose only. However the contractor has to carryout the insulation as per drawings / specifications within the quoted / accepted rate.

SECTION VII

APPENDIX – VI

SPECIFICATION FOR ERECTION & COMMISSIONING OF BALANCE OF PLANT

PLANT STANDARD GT 57167

SPECIFICATION

FOR

ERECTION & COMMISSIONING

OF

BALANCE OF PLANT (B.O.P.)

EQUIPMENT & PIPING

IN THE SCOPE OF

PROJECT ENGG. DEPARTMENT (P.E.D.)-MECHANICAL

CONTENTS

1.0 INTENT OF SPECIFICATION:

This specification intends to define scope of erection, commissioning and other site related activities to be taken care of by BHEL site office through their mechanical contractors for items in P.E.D. Mechanical scope. For balance scope of BHEL supply in the project, BHEL site office may take up with other agencies in BHEL. For details regarding the present work, refer Annexure enclosed.

2.0 GENERAL:

2.01 Specification covers:

i) Collecting the BHEL (Hyderabad) supplied material from Purchaser's stores
ii) Supply of consumables material included in contractor's scope
iii) Services as specified in various clauses

2.02 Scope includes taking the delivery of free issue of pipes, flanges, fittings, valves, hangers, tie rods, structural material. Prefabrication at site, erection, testing and commissioning are in contractor's scope. The material shall be stored properly at site with proper protection.

2.03 Temporary blinds / lugs/ caps/ pipes and associated equipments like tanks, pumps etc required for oil flushing / alkali cleaning / acid cleaning of piping/ steam blowing/Hydro testing etc & other equipments during commissioning shall be arranged by contractor.

2.04 Contractor shall arrange the necessary clearance from the statutory authorities as required for installation of the plant and equipment and render all assistance, service required in this regard. Also see point no. 10.0.

2.05 Contractor shall arrange all paint materials (reputed make, customer approved), required for before erection and final painting and also should arrange tools, facilities required for the complete and proper painting application & protection of all structural material, equipments & piping.

2.06 Contractor shall arrange all equipment, tools, consumables like welding rods, TIG wires and gas cylinders etc. for welding of pipes and auxiliary piping support structure. Also the post and pre weld heat treatment, radiography, and liquid penetration test for weld joints etc shall be in contractor's scope.

2.07 Consumables like jute, cotton waste, hacksaw blades, petrol, Kerosene oil etc, are in contractor's scope.

2.08 Any additional equipment, materials, services which are specifically not mentioned but required for completion of job shall be arranged by contractor.

2.09 All the enclosed specifications / schedules / drawings shall be part of this contract. For fabrication of piping, isometrics shall be prepared and submitted during detailed engineering.

2.10 Alignment of Bolts, Shims & others for fabrication of pipes and rack shall be in contractor's scope.

2.11 Material required for grouting of all equipments on respective foundation including grout mixture shall be in the scope of contractor. This shall cover entire scope including pipe rack structure. Foundation bolts shall be supplied along with the equipment.

2.12 Wherever equipment are supplied in pre-fabricated Assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor's scope.

2.13 All piping items including pipes, valves, flanges, pipefittings, etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope as per isometrics drawing.

No prefabrication at BHEL (Hyderabad) works is envisaged. Wherever elbows of 45 deg or any other angle are required, the same shall be cut from 90° elbows.

For LP piping (Mech. Design pressure<10 Ata) of 12" and above, elbows and reducers may not be supplied. Segmental bends and reducers shall be fabricated from pipe at site.

2.14 Grating:
All operating platforms shall erected by contractor have grating indicated in S.O.Q. by P.E.D. Civil, BHEL (Hyderabad) and shall be.

2.15 Single plate with std. size to be supplied, cutting of plate to the required size (like 500mm x 500 mm) and pipe shoe supports shall be fabricated at site by the contractor (typical drawings shall be furnished later), other supports namely Hangers, U-clamps etc shall be supplied by BHEL (Hyderabad). Contractors shall carry out assembly and necessary cutting work etc. at site.

2.16 Following instruction shall be followed while executing the job.
a) All dimensions/elevations refers to centerline of pipe unless otherwise specified.

b) Pipe routing shall be carried out as per the drawing. Wherever the dimensions are not specified / shown as approximate the same may be routed as per site requirement / convenience as per site engineer's advice.

c) For pipes nominal size 1.5" (40NB) and below detailed pipe routing shall be shown in piping layouts the same to be routed / connected as shown in schematics and the routing is shown in layouts only for guidance and the same shall be routed and supported as per site requirement / convenience as per site engineer's advice.

d) Flow nozzles, orifices, spray nozzles of desuperheaters shall be mounted / erected after chemical cleaning and / or stream blowing at site.

e) Slope of 1:500 shall be maintained towards drain point unless otherwise specified.

f) For various pipes support arrangement will be shown in isometrics. Fabrication of auxiliaries pipe support, anchor supports from the supplied material and erection of supports shall be contractors scope.

g) For insulated pipe, steel protectors for the insulation shall be provided at points where the pipe is supported on rollers, slides or other equipment where contact with such members is required outside the insulation.

3.0 DRAINS:

a) Steam & condensate: All local drains (at lowest point of pipe) shall be terminated to a drain pit / storm water drain located in the vicinity of the point. Drain from steam line shall be through steam trap and the outlet of steam trap shall be routed up to storm water drain and shall not be left open.

b) Drain arrangement of various services will be shown in isometrics.

c) The fabrication of drip legs shall include the complete assembly of all arrangements required for their operation such as traps, valves, by-passes flash tanks, connections to sewers, separators etc.

4.0 VENTS:

a) All Steam & gas vents located inside the building shall be left outside the building at an elevation of at least 2 meters above the building. All field (on pipe rack etc) vents shall be left at safe height as per site engineer's advice. If building is very close by then the vent to be piped & left at least meters above the building height.

b) Vent lines on condensate, feed water and cooling water lines shall be brought to the ground level and let into the nearest drain pit.

c) All other vents shall be local with necessary valves flange and blind flange.

d) Safety valve outlet lines shall be routed into drip pans which shall be anchored. Fabrication of drip pans at site is included in the scope of contractor.

5.0 BURRIED PIPE:

5.1 Excavation and back filling, supply and application of protective coating (cl no. 5.2 of this spec) shall be in contractor's scope of work for buried piping.

5.2 COATING / WRAPPING PROCEDURE :

Application of one coat of coal tar primer (min 1mm thick) confirming to AWWA C203/1978 followed by through cleaning by wire brushing.

Application of hot coal tar enamel confirming to AWWA C203/1970 (thickness 2.4mm+0.8mm) over the above primer.

Reinforced fiberglass tissue having min. thickness of 0.5mm to be spirally wrapped over coal tar enamel, with a lap of min 12 mm.

Immediately after application of coal tar enamel and wrapping of fiber glass mat. A final flood coat of coal tar enamel confirming to AWWA C203/1978 (min thickness of 0.9mm) shall be applied.

On the other coat of coal tar enamel, craft paper shall be spirally wrapped.

5.3 PIPE INSERTS FOR ROAD CROSSINGS:

At road crossing suitable Hume / steel pipe inserts depending on type of road to be provided. Please note that above pipe inserts are to be arranged by erection contractor.

6.0 UTILITY POINT:

6.1 No. of utility points (service/plant air, service / plant water, service / washing steam, inert gas (N2) etc) shall be indicated in the P&I Diagram. Contractor to locate the utility points as advised by site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout within 8 days to designer for approval.

6.2 The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe. Above fittings are to be arranged by the contractor.

7.0 PLATFORMS, CROSSOVERS & CANOPIES :

Contractor at site as per site engineer's advice shall fabricate platforms, ladders, crossovers for sleepers, and conopies. Platforms shall also be provided at places where it has not been shown in drawings, but felt necessary by site engineers. All required valve platforms, valve stands, access ladders, handrails etc. Will be erected completely, after piping has been installed.

Canopies shall be provided for all out door pumps and motors.

8.0 AS BUILT DRAWINGS:

Contractor shall be supplied with two extra blue prints of the layout & isometrics. Contractor to incorporate in one of the blue prints with re ink all the changes / deviations / alterations etc carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to designs for approval.

9.0 WELDING DETAILS:

For edge preparation of pipefittings refer plant standard HY 062 05 99 and drg. No.3-38103-00033 welding details for fillet welts. (part of doc GT 57124) For welding details as electrodes, heat treatment and Testing details refer GT 57124. For welding schedule refer job specification enclosed.

All welding for pipe joints and fabrication, shall be done by qualified welders and according to the appropriate Codes / Indian boiler Regulations where applicable.

All welds shall be made in such a manner that complete fusion and penetration are obtained. Consumable inserts shall be used in high pressure lines. Backing ring shall not in any case be used.

If tack welds are used for aligning, the tacks shall be either fused into first layer of weld or else chipped out.

All welding by the shielded electric are process shall be done using electrodes in accordance with ASTM A233 or equivalent and carried out in accordance with the electrode manufacturer's recommendations.

Welded joints in pipe work shall be pre-heated to a temperature as required by the agreed Standard or code to the approval of the Engineer. The temperature shall be maintained during the welding operation and recorded continuously using a recording thermometer.

The thickness of metal applied for each bead or pass, shall not exceed 3 mm.

The completed weld shall be cleaned of slag and spatter metal on all surfaces and the inside beads shall be ground smooth where practicable.

Before being assigned to welding work, each operator shall have an identification number which shall be indicated on all welds.

Equipment for stress relieving will be subject to the approval of the Engineer. Stress relieving temperature shall be measured by thermocouple pyrometers or other suitable equipment. Readings of temperature against time shall be recorded. Stress relieving shall be carried out as per applicable codes.

Welded joints to be stress relieved and shall be as follows :

Joints in alloy steel piping, in all thickness.

Joints in carbon steel piping / strips with wall thickness 15 mm or more.

10.0 IBR INTERACTION :

Designer shall furnish the necessary piping drgs to the contractor for submission to concerned Chief Inspector of Boiler authorities of the state in which the Project is being executed. The contractor shall arrange to get the necessary approval of drgs., arrange for ground inspection of the materials and stage inspections. The contractor shall be fully responsible for completion of all formalities with the Chief Inspector of Boilers (C.I.B) which is required for execution with the job satisfactorily.

11.0 INSULATION :

Mechanical contractor shall do erection of piping Insulation. BOM for erection shall be given to contractor by BHEL in the form of Insulation schedule. Insulation schedule will be furnished later.

12.0 PAINTING AND PROTECTIVE COATING:

12.1 Primer & finish coat shall be of reputed paint supplier (Asian paints / British Paints / Jenson & Nicholson, Berger paints or approved by customer)

12.2 GI, stainless steel, brass, aluminium, copper and other non-ferrous materials shall not be painted unless otherwise specified.

12.2 Selection of paint

a) INSULATED PIPE:
Steel surfaces shall be applied with one coat of drying oil based red oxide zinc chrome primer as per IS. 2074 for protection against corrosion during fabrication & storage. After insulation the aluminum cladding shall be painted with 150mm wide colour bands at a spacing of every 15.0M for identification of pipe service. The paint shall synthetic enamel paint as per IS 2932.

b) UNINSULATED PIPE :
Bare outer surface of piping shall be first provided with two coats of primer suitable for synthetic enamel paint (red oxide-zinc chrome IS 2074).

12.3APPLICAION:

a) All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter.

b) Such that shall be applied in an even a uniform film free from lumps, streaks, runs, sags, and uncoated spots.

c) Each coat (primer, intermediate, finish) shall have a minimum thickness of 40 microns and total thickness of 120 microns unless otherwise specified.

d) Two coats to form a final dry film thickness of 40 microns. The primer shall be either red oxide zinc chromate or epoxy based of reputed manufacturer(s).

e) Two or three coats to achieve desired dry film thickness of 120 microns. The finish shall be done with chlorinated rubber paint or epoxy coating or synthetic enamel.

f) No paint shall be applied when temp is above 55 deg cen. 0r below 10 deg cen. When the humidity is greater than 90%.

13.0CLEANING OF PIPING AT SITE:

All field fabricated piping shall be cleaned at time of the fabrication by any suitable means (mech, tools, wire brush etc.) and shall be blown out with compressed air at the termination of cleaning.

Fuel oil (Naphtha/HSD) piping shall be acid cleaned prior to erection. SS piping shall also be acid cleaned.

Steam piping shall be cleaned by steam blowing method.

All the materials required for performing the steam blowing including target plate assembly, pipes, temporary supports are in the scope of mechanical contractor.

Contractor shall furnish the cleaning procedure for the approval of BHEL site office prior to start cleaning of piping.

All the materials required for cleaning of piping as described above shall be in mechanical contractor.

Special care shall be taken during final assembly and commissioning that all pipes are thoroughly cleaned and free of grit, scale jointing materials, tools etc. the Contractor shall accept full responsibility for any damage that may be caused to any equipment by neglect of such care.

For all steam blown lines temporary strainers shall be installed at the equipment terminals so as to prevent inflow of particles where they may cause any damage or harmful effect. The temporary strainers shall be kept on lines for some time after the plant starts normal operation as per the discretion of the Engineer.

Where flow meters are to be installed in pipe requiring steam blowing initially the pipes shall be erected with the flow meter branch pipes replaced by temporary spool pipe. After the steam blowing, the temporary spool pipes shall be removed and the temporary branch pipes shall be erected in position. The Contractor shall provide flushing connections in all pipes where sediment or dust may collect in order to facilitate maintenance.

14.0 TESTING OF PIPING INSTALLATIONS:

GENERAL

Unless otherwise noted, piping systems after erection, shall be given a hydrostatic test equal to 1.5 times the design working pressure. Pipelines coming under the purview of IBR shall be hydrostatically tested as per IBR.

In all cases, the required test pressure shall be maintained for a sufficient length of time to enable an inspection to be made of all joints and connection, but in any case, for a minimum of 2 hours.

PREPARATION FOR TESTING:

GENERAL

a) When piping is required to be painted or insulated, the insulation shall not be applied to the pipe joints until the tests are completed.

b) Hammer testing shall not be performed.

c) All hydrostatically tested overhead piping shall be equipped with vent valves. Once the test has been completed, the pipe nipples and valves shall be removed and a threaded plug inserted and seal welded. Vent locations will be subject to approval by the Engineer.

d) No tests shall be performed until all anchors, hangers, supports, test gauges; plugs, bulkheads, blanks, etc. are installed. Tests shall be made

against bulkheads or blanks and are not set against closed valves except where permitted by the Engineer.

15.0 PRESSURE TESTING:

a) GENERAL

The test pressure shall not be applied until the piping and its contents reach the same temperature.

b) HYDROSTATIC TESTING

i) Hydrostatic testing shall not be with water or other suitable liquid as approved by the Engineer

ii) The hydrostatic test pump, piping etc to be provided by the Contractor will be with a check valve in the discharge and two (2) relief valves.

iii) The Contractor shall install Two (2) calibrated test gauges. One (1) gauge will be installed in the pump discharge and the other on the line to be tested.

iv) Contractor shall furnish and install a recorder to check and record pressure during the testing operation. The Engineer shall approve this recorder.

v) Complete piping for carrying out Hydro test, shall be by contractor. Piping supplied by Designer for system shall not be used for this purpose.

c) PNEUMATIC TESTING

i) Pneumatic testing shall not be substituted for hydrostatic testing.

ii) Any pneumatic test shall include a preliminary check at a pressure not more than 1.75 kg / sq. cm(g). This preliminary check shall include inspection of the tested piping including joints.

iii) Pneumatic test shall be limited to 110% of maximum working pressure.

iv) While holding the test pressure all joints shall be inspected by soapsuds test.

v) Compressor, or manifold nitrogen cylinders will exert test pressure. Two relieving devices will be installed to prevent an overpressure condition.

vi) Two (2) calibrator test gauges shall be supplied and installed by the Contractor. One (1) gauge will be installed on the compressor discharge piping (or on the gas cylinder manifold) and the other on the line to be tested.

Ref. Doc.

RECORD OF REVISIONS

Rev. No.	Date	Revision Details	Revised By	Approved By
00	11.08.97	FIRST ISSUE	S.B.R.	A.V.S.
01	17.08.06	GENERALLY REVISED	K.S.	S.B.R.

SECTION VII

APPENDIX – VII

DECLARATION SHEET

I, hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL:PSSR:SCT:1291 are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations in detail and agree to comply which 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

SECTION VII

APPENDIX – VIII

TENDER SPECIFICATION NO BHEL:PSSR:SCT:1291

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 conditions.

TENDERER'S NAME AND ADDRESS

Place:

Date :

SIGNATURE OF AUTHORISED REPRESENTATIVE WITH NAME & ADDRESS:

OFFICE SEAL

SECTION VII

APPENDIX – IX

e- Remittance Form

<u>Form to be filled by vendors for registering for e-payment</u>

DETAILS OF CONTRACTOR/SUPPLIER FOR E-REMITTANCE OF PAYMENTS BY BHEL/PSSR

NAME & ADDRESS OF THE CONTRACTOR/SUPPLIER

BANK A/C NO

TYPE OF A/C (CC / CURRENT)

NAME OF THE BANK

NAME OF THE BRANCH

BRANCH CODE

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector: Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

SECTION VII

APPENDIX – X

CHECK LIST

TENDER SPECTFICATION NO, BHEL: PSSR : SCT : 1291

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 specifications 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

SIGNATURE OF THE TENDERER

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 status	:	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 3 years	:	YES/NO
	h)	Audited Balance sheet for the Last 3 years	:	YES/NO
	i)	Income Tax clearance certificate (latest)	:	YES/NO
	j)	Solvency Certificate from a Nationalised 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 Visitors and workers/labourers For satisfactory completion of Work under this specification	:	YES/NO

SIGNATURE OF THE TENDERER

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 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 THE TENDERER

TENDER SPECIFICATION

BHEL:PSSR:SCT: 1291

FOR

Handling at Site Stores / Storage yard, Transportation to site of work, Erection, Testing and Commissioning of 1 x Frame VI Gas Turbine Generator and its auxiliaries, Balance Of Plant equipment, piping related to Main steam lines, Cooling Water lines, Naptha supply ,oil supply ,Cooling Water Lines etc.,and Application of Insulation and including Supply & Application of Final Painting for Unit 1

at

BPCL – KRL – KOCHI CO GENERATION PLANT
AMBALAMUGAL
ERNAKULAM
KERALA STATE

PART – I PRICE BID

BOOK NO :

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

TENDER SPECIFICATION NO:BHEL:PSSR:SCT:1291

NAME OF WORK

Handling at Site Stores / Storage yard, Transportation to site of work, Erection, Testing and Commissioning of 1 x Frame VI Gas Turbine Generator and its auxiliaries, Balance Of Plant equipment, piping related to Main steam lines, Cooling Water lines, Naptha supply ,oil supply ,Cooling Water Lines etc.,and Application of Insulation and including Supply & Application of Final Painting for Unit 1of Co-Generation Plant at BPCL–KRL Kochi ,Ambalamugal Kerala.

(PRICE BID)

PART II

Issued to
M/s.

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

Additional General Manager/Contracts

(This tender document is not transferable)

Place: Chennai-600 035.
Date:

SECTION – VII APPENDIX – XI -BHEL PSSR SCT: 1291-RATE SCHEDULE

Sno	Description of Work	Approximate weight (MT)	Rate /MT (Rs)	Total Amount (Rs)
1	Erection, Testing and Commissioning and completion of trial operations of GTG and its auxiliaries and piping as per the detailed description and Supply of labour, all consumables and Tools and Tackles (except those specifically indicated as BHEL supply in the Tender specification) required for Erection, Testing and Commissioning of GTG (Frame 6) associated auxiliaries, Piping and BOP for GTG etc. Application of Insulation and supply & Application of Final Painting as per detailed description and nature of work enumerated in the Tender specification including all handling and other incidental works, modification and rectification work of GTG (Frame 6). and auxiliaries, Piping and BOP for GTG works required prior to and during pre-assembly, Erection, Testing and Commissioning of the entire system. This shall also include handling and Transportation of the materials and equipments from BHEL / Customer stores / storage yard to pre-assembly yard and place of erection.			

Signature of Tenderer

Sno	Description of Work	Approximate weight (MT)	Rate /MT (Rs)	Total Amount (Rs)
1a	**GTG & Auxiliaries**	**490 (Lumpsum)**		
1b	**BOP**	**120**		
2	**PIPING**			
2a	**Carbon Steel / Alloy Steel**	**190**		
2b	**Stainless Steel**	**10**		
3	**Insulation**			
3a	**Wool Mattress**	**16**		
3b	**Aluminium Sheet**	**4**		

Total contract value (1a + 1b+ 2a + 2b+ 3a+ 3b)

_____

Imn words _____

Signature of Tenderer

NOTE TO RATE SCHEDULE:

1. The quantities indicated in column 3 are approximate and are liable for variation and alteration at the discretion of BHEL. The quoted unit rate shall be applicable for any additional product groups of manufacturing unit, if included at a later date. The work executed shall be measured and priced at unit rate quoted by the contractor and accepted by BHEL.

2. The lumpsum quoted rate shall include for the variation of PLUS 10% in quantity, for Erection Works. Incase of variation in weight beyond +10% (ie beyond 535 MT) the quantity exceeding +10% of the tendered quantity will be paid at the average tonnage rate arrived at by dividing the Lumpsum Quoted / accepted value by 490

3. The Tenderer is expected to fill up the rate column after satisfying all terms and conditions of Tender Specification.

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

5. The rate quoted includes all charges towards pre heating, welding, post heating, heat treatment and NDT of all joints involved in this work including that of all joints of site routed piping and any other joints.

6. Radiography and other NDT testing such as LPI, UT, and MPI will have to be arranged by Contractor at their cost.

7. Additional information to be furnished by the bidder alongwith the price bid

1. Element of VAT added with the above quoted price Rs _____

2. Rate of VAT % _____%

3. Value on which VAT has been inclued_____