

TENDER SPECIFICATION

BHEL: PSSR: SCT: 1327

FOR

Handling at Site Stores / Storage yard,
Transportation to Site of Work, Erection, Testing
and Commissioning of Steam Turbine, Generator,
Integral piping, pumps and other Auxiliaries
connected with the system including Supply and
application of Final Painting for Unit – 5 of 210 MW
set, Stage III,

at

Rayalaseema Thermal Power Project
(Muddanur) V.V.Reddy Nagar,
Kalamalla Post, Cuddapah District,
Andhra pradesh

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.

INDEX SCT: 1327

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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: 1327

Messrs

Date:

Dear Sir,

Sub: Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Steam Turbine, Generator, Integral piping, pumps and other Auxiliaries connected with the system including Supply and application of Final Painting for Unit-5 of 210 MW set at Stage-III, RayalaseemaTPP for APGENCO, Muddanur, Cuddapah Dist, Andhra Pradesh.

Please find enclosed one set of non-transferable tender documents containing 106 pages along with general conditions of contract Booklet for the above work.

You are requested to go through the tender documents, GCC Booklet and drawings 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 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 8.)

The completed quotations shall reach the office of the under signed on or before 06.01.2009 at 15.00 Hrs. The Technical bids will be opened on the same day at 15.30 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 WHAT SO EVER AFTER THE TIME AND DATE MENTIONED IN TENDER SPECIFICATION FOR SUBMISSION OF COMPLETED QUOTATIONS SHALL NOT BE ENTERTAINED UNLESS CALLED FOR SPECIFICALLY BY BHEL.

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

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

This Tender document is not transferable.

Place: Chennai -35

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

BHARAT HEAVY ELECTRICALS LIMITED
(A government 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 five years indicating contract value, duration, completion period and present engagement as per G.C.C.
02. Organization 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 in case of any conflict or inconsistency between the General conditions and the Terms and conditions of the tender specification, the provisions contained in the Terms and conditions (NIT, Rate Schedule, Common conditions, Special Conditions including Appendices) shall prevail.
13. THE BIDDERS ARE REQUESTED TO FURNISH THE DOCUMENTS LIKE COPIES OF LOI'S, WORK ORDER'S ETC PERTAINING TO THE EXPERIENCE INDICATED IN QUALIFYING REQUIREMENTS, AS GIVEN BELOW.

QUALIFICATION REQUIREMENT

- a) The bidders should have executed erection and commissioning of STG and associated auxiliaries and equipments of minimum one unit of capacity
60 MW or above in a thermal power plant during the last seven years.

Note:

Executed means – “The Unit is synchronized”

- b) The bidders should have a minimum average financial turn over of **Rs.1.72Crores** in last three financial years ending on 31st March 2008.

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2008 and should have positive net worth as on **31.03.2008**.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2008 in support of above requirement.

- c) Notwithstanding the above, BHEL reserves the right to reject any or all the Tenders for reasons whatsoever beyond 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 8) 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.

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

PROCEDURE FOR SUBMISSION OF SEALED BIDS

The Tenderers must submit their bids as required in two parts in separate sealed covers prominently super scribed 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 super scribed and submitted to Additional 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 booklets, 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 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.

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

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

Tender Specification No. BHEL: PSSR: SCT: 1327

Description	EMD
Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Steam Turbine, Generator, Integral piping Pumps and other Auxiliaries connected with the system including Supply & Application of Final Painting for Unit – 5 of 1x210 MW set, Stage III, at Rayalaseema Thermal Power Project (Muddanur) V.V.Reddy Nagar, Kalamalla Post, Cuddapah District, Andhra Pradesh.	Rs 200000.00 (Rupees Two lakhs only)

Cost of Tender Documents : (Including all Taxes)	Rs.1040/-
Sale Starts on :	15.12.2008
Sale closes on :	05.01.2009
Due date and Time for Submission :	06.01.2009 15.00Hrs
Date and time for opening of Technical Bids:	06.01.2009 15.30 Hrs.

QUALIFICATION REQUIREMENT

- a) The bidders should have executed erection and commissioning of STG and associated auxiliaries and equipments of minimum one unit of capacity 60 MW or above in a thermal power plant during the last seven years.

Note:

Executed means –“The Unit is synchronized”

- b) The bidders should have a minimum average financial turn over of **Rs1.72Crores** in last three financial years ending on 31st March 2008.

The bidder must have earned profit in any one of the last three financial years ending on 31.03.2008 and should have positive net worth as on **31.03.2008**.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending on 31.03.2008 in support of above requirement.

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

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

Interested parties can get the Tender documents from the office of the Additional 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.

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 thereof.

TENDER NOT ACCOMPANIED BY THE PRESCRIBED EARNEST MONEY DEPOSIT IS LIABLE TO BE SUMMARILY REJECTED.

ADDITIONAL GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION: BHEL: PSSR: SCT: 1327

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: 1327 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 **GENERAL** : Project Information
- 1.1 Authority : APGENCO
- 1.2 Name of Project : Rayalaseema Thermal Power Project
St.II (2 x 210 MW Units), Muddanur
- 2.0 **SITE LOCATION** : V.V.Reddy Nagar
Kalamalla Post, Cuddapah Dist
AP, PIN 516 312 STD: 08563
- 2.1 Nearest Town : Prodattur (STD – 08564)
- 3.0 **SITE CONDITIONS**
- 3.1 Climate : Tropical – Hot – Humid
- 3.2 Altitude : 190 Meters above mean sea level
- 4.0 **AMBIENT TEMPERATURES (DRY BULB)**
- 4.1 Daily Minimum (Mean) : 19.1 Deg C
- 4.2 Daily Maximum (Mean) : 40.3 Deg C
- 4.3 Design ambient temperature
For continuous rating of meter : 50.0 Deg C
- 5.0 **RELATIVE HUMIDITY**
- 5.1 Maximum during monsoon
(June to October) : 49 to 74%
- 5.2 Humidity during summer
(March to June) : 35 to 60%
- 5.3 Humidity during winter
(November to March) : 55 to 70%
- 6.0 **RAINFALL**
- 6.1 Maximum per annum : 1273.6 mm
- 6.2 Average per annum : 742.8 mm
- 6.3 Tropical Monsoon : June to October
- 7.0 **WIND VELOCITY & PRESSURE**
- 7.1 Maximum Wind velocity : 175 KMPH
- 7.2 Basic Design wind Pressure : Upto 30 M height: 200 kg / m²

8.0 **SEISMIC FACTORS**

8.1 Horizontal seismic co-Efficient : As per latest ISS: 1893

8.2 Vertical seismic co-Efficient : As per latest ISS: 1893

9.0 **Longitude** : 18 Deg 28' East

Latitude : 14 Deg 42' 3" North

10.0 **Nearest Aerodrome** : Hyderabad / Bangalore – 300 Kms

11.0 **Nearest Railway Station** : Muddanur on Madras –
Bombay Railway line

**SECTION III
COMMON CONDITIONS OF CONTRACT**

3.1 SCOPE OF CONTRACT

- 3.1.1 The Intent of this specification is to provide erection and commissioning services for execution of projects according to most modern and proven techniques and codes. The omission of specific reference to any method and equipment or material necessary for the proper and efficient services towards installation of the Plant shall not relieve the contractor of the responsibility of providing such services, facilities to complete the project or portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.
- 3.1.2 The contractor shall carry out the work in accordance with instructions/ drawings/ specification/ standard practices supplied by BHEL from time to time.
- 3.1.3 Provision of all types of labour, Supervisors, Engineers watch and ward as required, tools and tackles as required, consumables as required under various clauses of tender specification for handling transportation, erection, testing and commissioning.
- 3.1.4 Proper out-turn as per BHEL plan and commitment.
- 3.1.5 Completion of work in time.
- 3.1.6 Good quality and accurate workmanship for proper performance of equipment / systems.
- 3.1.7 Preservation of all components at all stages of pre-assembly/erection/ till unit is handed over, as specified in detail in clause 3.10.0 for preservation.

3.2 FACILITIES TO BE PROVIDED BY BHEL

3.2.1 OPEN SPACE :

Open space for building of temporary office shed and contractor's stores shed(s) will be provided free of charges. Contractor has to make his own arrangements for labour colony.

3.2.2 ELECTRICITY:

For construction purpose, electricity of 415 V- 3 Phase Supply will be provided free of charge at one single point nearer to the site as provided by the customer. Further distribution shall be arranged by the contractor for his office & Stores Shed and for construction at his cost. 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.

3.2.3 WATER:

Water for construction purposes will be provided at single point, free of charge, as provided by customer to BHEL nearer to the site. Further distribution shall be arranged by the contractor at his cost.

3.2.4 TOOLS & TACKLES:

All the tools and tackles required for the complete erection of components shall be arranged by the contractor, except the items specified and agreed upon, by BHEL as given in Section - VII Appendix - VII and the quoted rate shall be inclusive of such requirements.

However one EOT crane will be made available on free of charges to the contractor, as provided by customer for the erection of STG and connecting equipments. One more EOT crane will be provided by the customer at the time of stator lifting. However the Operators for the EOT cranes are to be arranged by the contractor at his cost.

A Crawler crane of Suitable capacity as decided by BHEL engineer on sharable basis will be provided for FST & Deaerator erection on free of charges. The required fuel, lubricants are to be arranged by the contractor at his cost. Operator to be arranged by the contractor if 75 T or less capacity is provided and operator will be provided by BHEL if more than 75T capacity crane is provided.

3.2.5 CONSUMABLES:

TIG welding wire for C.S, A.S., and S.S. welding electrodes, gases and consumables are to be arranged by the contractor at his cost. However nitrogen for chemical cleaning work will be supplied by BHEL free of cost.

3.3 FACILITIES TO BE PROVIDED AND DEVELOPED BY THE CONTRACTOR 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, sanitary arrangements in the area allotted to him for the purpose.

3.3.2 WATER DISTRIBUTION:

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

3.3.3 ELECTRICITY DISTRIBUTION:

Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, cables, etc. observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

3.3.4 POSSESSION OF GENERATORS:

As there are bound to be interruptions in regular power supply, power cut / load shedding in any construction sites, due to inherent power shortage in State on this account, suitable extension of time, if found necessary only be given and contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be the responsibility of the contractor to have atleast (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 tenderers. This may also be noted while quoting.

3.3.5 LIGHTING FACILITY:

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.

3.3.6 POWER DISTRIBUTION:

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.

3.3.7 CONTRACTOR'S OBLIGATION ON COMPLETION :

On Completion of work, all the temporary buildings, structures, pipe lines, cable 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, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

3.4 GASES :

3.4.1 All required gases like Oxygen/ acetylene/ argon/ Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non-availability of gases cannot be considered as reasons for not attaining the required progress. However Nitrogen Gas required for chemical cleaning alone will be supplied by BHEL free of cost.

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

3.4.3 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

3.4.4 The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.

3.4.5 The contractor shall arrange air / gas manifold ensuring proper distribution and reduction of handling time.

3.5 ELECTRODES

3.5.1 All the required electrodes as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding, suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

- 3.5.2 All welding consumables for all works including electrodes, filler wires, and TIG welding wires for welding, are to be arranged by the contractor at his cost.
- 3.5.3 Storage of electrodes shall be done in an air conditioned / humidity controlled room as per requirement, at his own cost by the contractor.
- 3.5.4 All low hydrogen electrodes shall be baked/dried in the electrode drying oven to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at his cost.
- 3.5.5 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.
- 3.5.6 BHEL reserves the right to reject the use of any electrodes at any stage if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

3.5 TOOLS & TACKLES

- 3.6.1 BHEL will provide T & P free of hire charges on sharing basis as indicated in Section VII Appendix – VII only.
- 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 equipments 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 equipments shall be to contractor's account and the expenditure on these accounts 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 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 Monthly utilisation report of the above equipment shall be furnished by 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 to 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 All other T & P required for the satisfactory execution of work shall be arranged by contractor.
- 3.6.9 All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.
- 3.6.10 All instruments, measuring tools etc. are to be calibrated periodically as per the requirement of BHEL and necessary calibration certificates are to be submitted to BHEL before use.
- 3.6.11 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.
- 3.6.12 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 All the T & P would be issued only at BHEL stores and it shall be the responsibility of the contractor to take delivery from BHEL stores, transport the same to site and return the same to BHEL stores 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 The list of major T & P required to be deployed by the contractor is indicated in APPENDIX – I The list is minimum and not exhaustive but anything required over and above these to suit the site condition / status of progress / nature of work shall be arranged by contractor at his own cost.
- 3.6.16 Contractor shall take into consideration the above clause and quote the rates as called for in the Rate Schedule.
- 3.6.17 For the movement of cranes, etc., it may become necessary to lay sleeper bed for obtaining leveled safe approach for use of equipment. It shall be the contractor's responsibility to lay necessary sleepers. The required sleepers are to be arranged by the contractor at his cost. BHEL will not supply any sleepers for this activity.
- 3.6.18 Contractor shall make good any loss or damage to the equipments supplied to him and day to day maintenance and operations of equipments shall be borne by the contractor including all consumables like petrol, diesel, oil and air filters etc.
- 3.6.19 BHEL will provide one EOT crane capacity 125 T / 30 T as provided by customer will be made available to the contractor. Contractor has to arrange required experienced operator for the operating EOT crane. One more EOT crane without operator will be provided by customer for lifting and placement of generator stator.
For Deareator & FST crane of Suitable capacity, as per BHEL engineer's decision will be provided by BHEL on sharable basis. Contractor has to arrange required fuel and lubricants for operating the crane. Operator to be arranged by the contractor if 75 T or less capacity is provided and operator will be provided by BHEL if more than 75T capacity crane is provided

3.6.20 It may be noted that Contractor fails to provide experienced EOT crane operators, Helpers or Mechanics , BHEL reserves the right to engage them at the cost of Contractor.

3.7 SUPERVISORY STAFF AND WORKMEN

3.7.1 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, Serangs, 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 him unsuitable and the contractor shall forthwith remove him.

3.7.2 The supervisory staff employed by the contractor shall be qualified (Engineers – Graduates in Engineering and Supervisors – Diploma Holders) and experienced in the area of work. They 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 BHEL's client.

3.7.3 The Contractor shall also furnish daily labour report showing by classification the number of employees engaged in various categories of work and a progress report of work as required by BHEL Engineer. The contractor shall also give a summary report at the end of the month and plan of deployment for the consequent month as per the plan of activities as required by BHEL, to meet the overall contract requirement.

3.7.4 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 other contractor coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

3.7.5 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. Wherever finish or tolerances are not specified in drawings/documents, BHEL Engineers instruction is taken as final.

3.7.6 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.

- 3.7.7 It is the responsibility of the bidder to engage his workmen in shifts or on overtime basis for achieving the target set by BHEL and also during erection, commissioning and testing period. The contractor's quoted rate shall include all these contingencies.
- 3.7.8 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 the erected components etc. The contractor shall make the same good at his own expense or in default, BHEL may cause the same to be made good by other workmen or by other means and deduct the expenses (of which BHEL's decision is final) from any money due to the contractor.

3.8 CIVIL WORKS

- 3.8.1 Equipment foundation and foundation of other plants and necessary civil works shall be provided by BHEL as provided by customer. The dimension 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 adjustments of foundations surfaces, chipping, enlarging the pockets in foundations etc. as may be required for the erection of equipments plants shall be carried out by the contractor.
- 3.8.2 The contractor at his cost shall arrange for grouting of equipments as specified in the drawings / specification or as advised by the Engineer of BHEL after preparing the foundation top surface for grouting. All the materials for grouting (sand, gravel & cement including spl. Cement) shall be arranged by the contractor. The grouting has to be done as per the instruction of BHEL Engineer. The required consumables like portland cement, gravel, sand etc., have to be provided by the contractor at his cost. Special cement like CONBEXTRA – GP2, GP1 / SHRINKOMP or its equivalent and as approved by BHEL, shall be arranged by the contractor at his cost. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost, including any miscellaneous expenditure for this activity. BHEL will not pay any service and incidental charges for arranging the supplier representative. The contractor to take note of this aspect and quote accordingly.
- 3.8.3 The contractor at his cost shall arrange for grouting of anchor points of T & P issued to him and also grouting of winches or any other supports required for T & Ps. All the necessary grout materials are to be arranged by the contractor at his cost.

3.9 SCOPE OF MATERIAL HANDLING AND SITE STORAGE AND OTHER RESPONSIBILITIES

- 3.9.1 While BHEL will endeavor to store/stack/identify materials properly in their open/closed storage yard/shed it shall be contractor's responsibility to assist BHEL in identifying materials 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.
- 3.9.2 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.

- 3.9.3 It shall be contractor's responsibility to arrange necessary cranes/tractors, trailer or trucks/slings/tools and tackles/labour including operators for loading the materials/Equipments from stores/storage yard, 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.
- 3.9.4 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.
- 3.9.5 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.
- 3.9.6 All welding filler wires if issued to the contractor shall be preserved by him carefully to prevent deterioration of their properties. Special care shall be taken to preserve alloy steel and other special electrodes / filler wires. Contractors shall exercise maximum care in using these electrodes, filler wires to minimize wastage by maintaining a record of all usages.
- 3.9.7 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.
- 3.9.8 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 and maintain records.
- 3.9.9 The contractor shall take delivery of the components and equipments 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.
- 3.9.10 The contractor shall submit monthly plan for erection and the same will be mutually agreed upon after discussion. The contractor shall arrange for Engineers, Supervisors and labour force and tools and plants and consumables to suit the above plan and execute the work accordingly.
- 3.9.11 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.
- 3.9.12 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.
- 3.9.13 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.
- 3.9.14 All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and / or handling of the equipments without the specific written permission of the Engineer. The equipments from the storage yard shall be moved to the actual site of erection /

location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage for such equipments at site.

- 3.9.15 The work covered under this scope of work is of highly sophisticated nature requiring best quality / precision workmanship engineering and construction management. He should also ensure successful and timely commercial operation of equipment installed. The contractor must have adequate quantity of precision tools, construction aids in possession. Contractor must also have adequate trained qualified and experienced supervisory staff and skilled personnel.
- 3.9.16 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.
- 3.9.17 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. Wherever necessary suitable temporary fencing and lighting shall have to 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.
- 3.9.18 The contractor shall be responsible for taking all safety precautions during the construction and keeping 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 operations of the station when it goes into services. 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.
- 3.9.19 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. The history cards for major equipments to be maintained by the contractor.
- 3.9.20 The contractor shall take delivery of equipment from storage yard/stores/sheds. He shall also make arrangements for verification of equipment, maintain records and keep safe custody watch and ward of equipment after it has been handed over to him 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.
- 3.9.21 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

3.10.0 PRESERVATION OF COMPONENTS

- 3.10.1 It shall be the responsibility of the contractor to apply touch up painting on all equipment before erection. It shall be contractor's responsibility to arrange for required labour, brush and other consumables like cotton waste, cloth etc. for carrying out preservative painting. The quoted rate shall inclusive of above

work. The required paint (red oxide) and thinner shall be arranged by BHEL at free of cost.

- 3.10.2 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts, then and there for their protection.
- 3.10.3 Any failure on the part of contractor to carry out work according to above clauses will entail BHEL to carry out the job from any other party and recover the cost from contractor.
- 3.10.4 Due to atmospheric conditions erected materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required paint (Red oxide) and thinner shall be arranged by BHEL free of cost. All other consumables like painting brush, emery paper, cotton waste, cloth etc. have to be procured by the contractor at his cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint.

3.11.0 DRAWINGS AND DOCUMENTS

- 3.11.1 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.
- 3.11.2 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.
- 3.11.3 The data furnished in various appendices and the drawings enclosed with this Tender Specification, describes the equipment to be installed, tested and commissioned under this specification briefly. 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.
- 3.11.4 Should any error or ambiguity be discovered in the specification, or information, the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
- 3.11.5 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimensions/details without specific approval of BHEL.

3.12.1 SAFETY AND CLEANLINESS

- 3.12.1 Contractor shall strictly follow all safety regulations/conditions as per the general conditions of contract booklet enclosed with this tender.
- 3.12.2 Non-confirmity of safety rules and safety appliances will be viewed seriously and the BHEL has right to impose fines on the contractor as under:

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/-

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

3.12.4 CONTRACTOR SHALL DEPLOY A SAFETY OFFICER EXCLUSIVELY TO HANDLE SAFETY REQUIREMENT

SPECIFIC REQUIREMENTS FOR ISO 9001 - 2000

3.13.0 IMPORTANT NOTE

Contractors shall ensure that all their Staff/Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9001 – 2000 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 contractor 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 contractor for the non-conformances if any, observed and pointed out by BHEL.

3.14.0 INSPECTION / QUALITY ASSURANCE / QUALITY CONTROL STATUTORY INSPECTION

- 3.14.1 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.
- 3.14.2 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.
- 3.14.3 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.
- 3.14.4 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.
- 3.14.5 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.
- 3.14.6 Approval Given by Customer/BHEL for welding, results tests etc. shall also be recorded in the log book.
- 3.14.7 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.
- 3.14.8 Heat Treatment details of HP Welds indicating minimum Temperature Recorded, Heating Rate, Cooling Rate, soaking Time, Etc., shall also be Recorded and documented by contractor as per BHEL Engineer's Instructions. High pressure Welder's performance Record shall be furnished every month. The performance Report of Welders shall indicate the percentage of Repair for each welder.
- 3.14.9 All the Electrical / Technical Measuring and Testing Instruments /Gauges, Feeler Gauges, Height Gauges, Dial Gauges, Micrometers, Levels, Spirit Levels, Surface plates, straight Edges, vernier calipers and all measuring instruments shall be provided by the contractor for checking, 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 of BHEL Engineer.

- 3.14.10 Total Quality is the Watch Ward of the work and standards, Procedures laid down by BHEL. We shall follow all the Instructions as per BHEL Drawings and Quality / Standards. Contractor shall provide for the services of quality Assurance Engineer.
- 3.14.11 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.
- 3.14.12 All the welders including the HP 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.
- 3.14.13 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 column erection, Ceiling Beams erection, drum lifting, further structural work, Hydraulic Test, Trial Run of Equipment, Pre-commissioning and Post commissioning and any other tests required to be conducted for completing erection and commissioning.

3.15.0 STAGE INSPECTION BY FES / QA ENGINEERS

- 3.15.1 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 Field Quality Assurance Unit/ Factory Quality Assurance and commissioning Engineers. Contractor shall arrange all labour, Tools and Tackles, etc. for such stage inspections free of cost.
- 3.15.2 Any modifications suggested by FES and QA Engineers Team shall be carried out. Claims of Contractor, if any shall be dealt as applicable.
- 3.15.3 Any minor rectifications of minor repairs of defective work found out during stage Inspection shall be rectified free of cost, by the contractor.
- 3.15.4 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.

3.16.0 STATUTORY INSPECTION

- 3.16.1 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, radiograph, etc. and following up the matter with them.

- 3.16.2 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 the contractor's 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 be the contractor's account. However, BHEL shall pay all other fees. (FEES FOR VISITS INSPECTION FEES, REGISTRATION FEES, ETC.) In case these inspections 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 continuous basis to meet any emergency situation arising at site work in which his staff and workers are engaged.
04. To provide appropriate facilities for prompt first aid treatment of injuries and illness at work. One first Aider for each 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 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 authorize a person at site to stop work if there is a unsafe work noticed as per his knowledge.
12. Fitness for use of erected scaffolding to 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 imtes should have valid calibration certificate from recommended institution / testing lab and these should be in place.
17. All lifting tackle and plant equipment should have safe working load certificate.
18. The right worker should be deployed for right job and the resume of site 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 CONTRACT

6.1 SCOPE OF WORK

6.1.1 The work to be carried out at quoted/accepted rates by the contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipments at the pre-assembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge/surface preparation, welding, grinding, radiography, LPI/MPI/UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, steam /air blowing light up, chemical cleaning including inter connection all the termination points, erection of platforms , around MD-BFP, , H.P by pass valves, and other equipments as required and as instructed by site engineer, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs of the equipments, and supply and application of final painting covered under the tender specifications and providing adequate assistance during entire commissioning and unit trial operations and final painting of Unit 5 T.G & Auxiliaries, pumps etc of Rayalaseema TPP, Cuddapah District, Andhra Pradesh.

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

6.1.3 Field Quality Assurance Formats

It is the responsibility of the contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and customer in token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets.

6.2 FOUNDATION DRESSING AND GROUTING

6.2.1 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 30 mm for obtaining proper face for packer plates / shims, as may be required for the erection of the equipment / plants will have to be carried out by the contractor without extra cost.

- 6.2.2 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipment/equipments based on the foundations.
- 6.2.3 All equipment bases and structural steel bases and foundations pockets shall be grouted and finished as per these specifications unless otherwise recommended by the equipment manufacturers.
- 6.2.4 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. The contractor shall ensure perfect matching of the packer plates with foundations by dressing the foundation and between the packer plates and base plates of structural columns to the satisfaction of BHEL Engineer.

6.2.5 PROCEDURE FOR GROUTING

Contractor has to carryout the grouting as per the work instructions for grouting available at site. The contractor has to arrange a representative from the supplier of special cement for witnessing the grouting and other works at bidders cost. BHEL will not pay any amount for the supplier representative.

- 6.2.6 All the materials required for grouting including special cements like conbextra GPI,GP2, ACC-Shrinkkomp – N20, Sika Ankor, NSG / NSG – 1, CICO Excem GP, or its equipvalent as approved by BHEL, and other materials like Portland cement, sand, etc. are to be arranged by the contractor at his cost.

6.3.0 ERECTION

- 6.3.1 Providing necessary skilled and other labour to BHEL Engineers for checking of dimensional accuracy of foundations and also for minor adjustments of foundation levels, dressing and chipping up to 30 mm depth of foundation surfaces of all equipment as per BHEL's instructions.
- 6.3.2 Loading at storage yard, transporting to site or preassembly yard, pre-assembly of equipment at the pre-assembly yard for inspection, checking and erection, any fixture and supports required for temporary supporting, pre-assembly checking and welding and for lifting and handling during pre-assembly and erection shall be done by the contractor.
- 6.3.3 Erections of condenser and TG sub-assembly / components are detailed in the appendices. The schedule of sub-assemblies and weight of individual heavy components given in weight schedule are approximate and meant for giving a general idea to the tenderer only about magnitude of the work involved. The condenser and Turbine Generator components are sent in parts for convenient transportation. They are to be cleaned, assembled, stage by stage, welded, erected and aligned as per drawing dimensions / tolerance and instructions of BHEL engineers.
- 6.3.4 The condenser and the tubes will be supplied separately. Contractor has to insert the tubes and carryout the expansion at site after the installation of condensers on their foundation, as per the specifications / drawings and as per the instruction of BHEL Engineer. Contractor's Quoted Rate shall inclusive of

the same. All required T & P like tube cutter, Expander etc., tube expansion on M/c shall be arranged by the contractor at his cost.

- 6.3.5 Before insertion of tubes the contractor shall check for absence of any dents, mechanical damages or any other defects of tubes caused during storage or during transportation. Tubes should be thoroughly internally cleaned for all extraneous matter. Only fine emery paper shall be used for cleaning the tubes at the ends where expansion has to be carried out.
- 6.3.6 Before insertion of tubes, the contractor shall clean the surface of the holes in the tube plates and tubes support plates for paint, corrosion spots, oxide scales etc. using chemical cleaning agent like carbon tetra chloride.
- 6.3.7 The tube shall be inserted such that the tube shall project 2 to 3 mm beyond the tube plate's outer surface. The tubes shall be expanded using an automatic electronic torque control tube expanding unit or pneumatic tube expander so as to get 7 to 10% thinning of the tube walls and elongation of the tube ends should be 0.4 to 0.6 mm. The tube expansion shall be checked with bore dial gauge indicator. The expansion in no case shall exceed a length of 70 to 80% of the tube plate thickness. Finally proper chamfering of the tube shall be carried out.
- 6.3.8 All the work such as cleaning, checking, leveling, assembling temporary erection, alignment, dismantling of certain equipment for checking and cleaning, overhauling of valves, face preparations, fabrication of sheets / plates, tubes, pipes as per general engineering practices at site, cutting, grinding, straightening, filing, chipping, drilling, reaming, lapping, shaping, machining, fitting as may be applicable in such erection works are treated as incidental to erection and necessary to complete the work as satisfactory. These shall be carried out by the contractor as part of the work.
- 6.3.9 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 conditions which shall be done by the contractor at no extra cost. All fittings like "T" pieces, weld neck flanges, reducers etc. shall be suitably matched, re-edge prepared with pipes for welding. The valves will have to be checked, lapped or overhauled in full or in parts before erection after chemical cleaning and during commissioning. Experienced Technicians for overhauling of valves and labour required to assist the Technicians shall be arranged by the contractor at his own cost.
- 6.3.10 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.
- 6.3.11 Field run piping of dia 65mm and below may be supplied in running lengths or in fabricated condition as per convenience for dispatch. The Tenderer shall cut and fabricate to suit the site conditions and layouts. The tenderer has to carry out necessary fabrication of these pipes / tubes at site including hot / cold bending as desired by BHEL Engineer, at no extra cost. The number of welds falling under this clause is excluded from the total number of welds to be carried out by the Tenderer as per the contract.
- 6.3.12 All rotating machineries and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting 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 facilities for dismantling, cleaning, lubricating and refitting shall be provided by the contractor at no extra cost.

- 6.3.13 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 / re done 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.
- 6.3.14 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.
- 6.3.15 The contractor shall have to carryout assembly and erect condenser components on the condenser foundation directly. This includes complete fabrication of shall out of steel plates, welding of hot well with bottom plates, assembly of water chambers, assembly of support plates baffles and stiffening structures etc. while carrying out the assembly, stitch welding shall be done only after the due approval for alignment by BHEL Engineer. Final welding shall have to be carried out by step back seam method to ensure minimum deformation of the welding parts.
- 6.3.16 All the weld seams shall be properly ground and subjected to 100% radiographic examination. If any paint or rust (other than steam washable paint) noted in the steam side of condenser parts, these are to be removed either by sand blasting or buffing method.
- 6.3.17 The contractor shall carry out the condenser neck welding with Turbine casing. It shall be ensured that all spring supports are evenly loaded and the gap between the condenser and the different spring supports is within 1.0 mm. The clearance between the condenser neck and the exhaust hood of the turbine should be within 3 mm, by suitably lifting the condenser. Machined packers of suitable thickness are to be used under the spring supports and condenser load is to be gradually transferred on these packers. The neck welding shall be subjected to non-destructive testing.
- 6.3.18 The hydrostatic testing of steam space with the condenser vacuum system and hydraulic testing of water space with the circulating water lines after assembly of water boxes are also included in the scope on the contractor. Dummies are to be provided by the contractor at inlet and outlet for Hydraulic Test. Required M.S. plates shall be supplied by BHEL free of cost. Fabrication of dummies shall be done by the contractor at his cost.
- 6.3.19 Water boxes inside surfaces are to be sand blasted before Hydraulic testing. After Hydraulic testing of C.W. side, the water boxes and the water chambers are to be thoroughly cleaned for removal of all traces of dirt, grease, oil and rust if any. It shall be dry and free from burns and shall have a metallic surface. Sand blasting equipment shall be provided by Contractor at his cost. All accessories and all consumables shall have to be arranged by the contractor within the quoted value.

- 6.3.20 After the successful completion of hydraulic testing the interior surfaces of the water boxes, main tube plates shall be painted with suitable anticorrosive paints as per special procedures laid down by BHEL. Necessary paints and thinner shall be arranged by BHEL.
- 6.3.21 The condenser main tube plates will be dispatched to site from works with surface protection only for water box side. The same shall be removed suitably by sand blasting or with steam mixed with caustic soda as per the instructions of the Engineer before erecting the same. The surface protection of these tube plates shall be done by the contractor after the completion of the tube insertion and expansion activities. The surface shall be first painted with at least two coats of chemical resistant oxyzinc chrome primer (Apcodur C P 684) after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oil and other foreign materials. Afterwards the above parts shall be finished with two coats of high build black coal tar coating (Apcodur C F 651). Before the painting is taken up, the contractor shall clean the tube holes and plug all the holes with suitable tapered plastic / rubber plugs to avoid any damage to the tube ends. The plastic rubber plugs required for the above operations shall be arranged by BHEL. The paints required shall be arranged by BHEL. During painting, procedures, specifications of the above paints etc. are to be strictly followed.
- 6.3.22 The condenser steam space shall be surface protected at least two coats of suitable steam washable paint. Before the painting is taken up, the contractor shall clean the surfaces thoroughly by sandblasting or with steam mixed with caustic soda. The paint required for the above shall be arranged by contractor. This work should be carried by the contractor before tube insertion.
- 6.3.23 The contractor is responsible for arranging all the materials required for carrying out the painting work of equipment and piping covered under the scope of this specification at no additional cost.
- 6.3.24 The contractor shall clean all slag burrs etc. and paint all the site weld with red-oxide primer immediately after the welding is completed to provide protection. Red oxide required for this purpose shall be arranged by the contractor at his own cost. The protective coating required to be carried out for the circulating water system shall have to be carried out as per the specifications / directions by the contractor.
- 6.3.25 The Generator stator has to be lifted to foundation level by a special lifting beam and special slings with the help of EOT cranes.
- 6.3.26 The instructions of the motor manufactures regarding storage of motors and re conservation must be strictly followed without any deviation.
- 6.3.27 All the motors shall be stripped open, thoroughly serviced with proper care and reassembled properly before erection, by the contractor if required. During servicing if any deficiency is observed, the same should be taken up with BHEL Engineer at site without any delay.
- 6.3.28 All oil and gas piping flanges, wherever provided, are required to be blue matched using surface plates for atleast 80% contact area to attain leak-proof of joints.

- 6.3.29 The contractor shall carry out all necessary checks, such as accuracy of levels, center lines, bolt positions, hanger supports etc. sufficiently in advance to ensure correctness of installation of all equipment covered in the scope of work.
- 6.3.30 All equipment material to be taken inside the plant buildings shall be cleaned thoroughly before taking them inside and the erected equipment and piping shall also be kept clean by regular cleaning.
- 6.3.31 All the shafts of the 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. All bearings, shafts and other rotating parts shall be thoroughly cleaned and lubricated as per the recommendations of BHEL Engineers before starting.
- 6.3.32 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 in the steam service 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.
- 6.3.33 All lube oil and jacking oil pumps are to be stripped open, thoroughly cleaned and re-assembled.
- 6.3.34 For Gas tightness test of gas system, stator, the contractor has to arrange mercury Manometer at his cost.
- 6.3.35 All instrumentation impulse lines after root valves shall also be erected and welded by TIG welding only by the contractor within their quoted value.
- 6.3.36 The contractor shall carry out the erection of Metallic expansion bellows and connected joints (Supplied by BHEL) within their quoted value as per the requirement and as per the layout drawings.
- 6.3.37 All internal and external parts of turbine are to be thoroughly cleaned as instructed and specified for removal of rust if required and painted before erection. Necessary equipments shall be arranged by the contractor at his cost including necessary paints, thinners etc.
- 6.3.38 The contractor shall also carry out erection, testing and commissioning of oil centrifuge within their quoted value. It is also to be noted that the contractor has to provide enough workman in round the clock shifts during oil filling, flushing and other commissioning operation without any extra payment.
- 6.3.39 All exhaust pipe lines after safety valves of all equipments like heaters etc., as part of the work as per layout within his quoted value.
- 6.3.40 The contractor shall carry out the Reaming and Honing of coupling holes with his own Reamers, Honing machine and honing accessories etc, at his own cost. Reaming and honing shall be carried out by him as per the instruction of BHEL Engineers and to their satisfaction.

- 6.3.41 Suction filters of BFPs, CEPs and TG bearing filters are to be cleaned as and when required during flushing / commissioning till the unit is handed over to the customer by the contractor at no extra cost.
- 6.3.42 Bolt stretching fixtures for TG Anchor bolts are to be arranged by the contractor at his cost.
- 6.3.43 Suction pipes of the Boiler feed pumps after the filter up to suction Flanges of B FPS and CRH pipes from Turbine to CRH NRVS are to be acid cleaned as directed by BHEL Engineers before Installation by the contractor at no extra cost.
- 6.3.44 Seal oil Unit which is supplied in assembled condition is to be dismantled if required to facilitate erection in its location within the quoted value.
- 6.3.45 Electrical, pneumatic valves and actuators erection and servicing is in the scope of TG contractor. Commissioning of these electrical and pneumatic actuators are excluded from their scope. However during commissioning if the actuators are to be dismantled for re-servicing, dismantling, re-servicing and re-erection in position is to be carried out by the contractor within the quoted value if the situation warrants.
- 6.3.46 Any stainless steel piping erection and welding envisaged in the air zone of condenser is to be carried out by the contractor at no extra cost.
- 6.3.47 Contractor has to fabricate and erect temporary spool pieces wherever required due 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.
- 6.3.48 Contractor has to fabricate and erect temporary supports and structures wherever necessary due to late receipts of hanger components. The temporary supports to be replaced by permanent supports and hangers after receipt. However, materials for the above temporary work will be supplied free of cost by BHEL. The above work also to be carried out by the contractor at no extra cost.
- 6.3.49 Deaerator will be sent in three parts. The feed water storage tank will be supplied in two pieces and one Deaerator. The Two pieces of F.S.T are to be assembled at site and welded. Required N.D.T Test and PWHT are also to be carried out for the above joints. Deaerator has to be welded with storage tank at site. BHEL will provide necessary materials for Erection of Deaerator platforms. The contractor has to fabricate and erect the Platforms from the supplied materials as per the drawing and as per the instruction of BHEL Engineer, with in the quoted rate.

6.4.0 HYDRAULIC TEST AND OTHER TESTS

- 6.4.1 Acid cleaning pump sets 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 and Hydraulic Filling pump and testing pump has to be arranged by contractor at his cost.

- 6.4.2 All pressure parts and some of the low pressure parts shall be subjected to hydraulic test as per the statutory requirements. In addition, gas tightness test of generator are to be carried out. The contractor shall supply necessary labour and other services and make necessary arrangements to carry out the required tests as per the instructions and directions of the BHEL Engineers.
- 6.4.3 The contractor shall carry out the air tightness test on generator stator to the satisfaction of BHEL Engineers. The necessary arrangement for testing with dry clean air shall be made by the contractor. Also the contractor has to arrange the mercury manometer and mercury at his cost.
- 6.4.4 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves and pressure gauges required for the test. Temporary piping, pumps, valves, flanges, blanks etc shall be removed by him and returned to BHEL, after completion of above tests.
- 6.4.5 The hydraulic testing of the equipment and piping covered under this scope of work including vacuum system testing by water filling has to be carried out by the contractor as per instructions of BHEL Engineer. The contractor shall provide all facilities required for hydraulic testing.
- 6.4.6 All valves coming in the gas system shall have to be hydraulically tested and cocks shall have to be checked for gas tightness before installation in the presence of BHEL Engineer.
- 6.4.7 All the weld joints of steam admission pipe lines to HPT, IPT and LPT shall have to be subjected to MPT, DPT and Hardness test in addition to radiography if necessary.
- 6.4.8 All the above tests shall be repeated till all the equipment satisfy the requirement / obligation of BHEL to their customer. Any rectifications required shall have to be done / redone by the contractor at his cost.
- 6.4.9 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.

6.5.0 WELDING, HEAT TREATMENT & RADIOGRAPHY

- 6.5.1 The pressure parts shall be erected in conformity with the provisions of Indian Boiler Regulations and as may be directed, as per other standard/specification in practice in BHEL. The method of welding (viz) ARC, TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions. All the prepared/patched edges will have to be suitably protected to prevent rusting or foreign material ingress.
- 6.5.2 Welding of high tensile structural steel and pressure parts shall be done by using certified welders who possess requisite certificate and who are approved by BHEL Engineer.
- 6.5.3 All Welders shall be tested and approved by BHEL Engineer before they are actually engaged on the work even though they may possess the requisite

certificate. BHEL reserves the right to reject any welder without assigning any reason. The welder identification code as approved by the BHEL Engineer shall be stamped by the welder on each joint done by them. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL statutory requirements.

- 6.5.4. BHEL Engineer is entitled to stop any contractor's welders from his work if his work is unsatisfactory for any technical reasons or there is a high percentage of rejections of joints welded by him in the opinion of BHEL Engineer, will adversely affect the quality of welding. Even though the welders have earlier passed the tests it does not relieve the contractor from his contractual obligations, to check the performance of the welders.
- 6.5.5 All charges for testing of welders (pre production test) including destructive and non-destructive tests at site shall have to be borne by the contractor. Necessary pipe material will be arranged by BHEL and all testing facility will be made available by the contractor.
- 6.5.6 All welded joints shall be subjected to acceptance by BHEL Engineer.
- 6.5.7 Pre-heating/post heating and stress relieving after welding are part of erection 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 the labour, all heating elements, thermocouples, compensating cables, insulation materials like mineral wool, asbestos cloth, ceramic beads, asbestos rope, etc required for the heat treatment and stress relieving works. During the heat/stress relieving operations, the temperature shall be measured at one or more points as required by attaching thermocouples and recorded on a continuous printing type recorder. All the recorded graphs for the heat treatment works carried out shall be got signed by BHEL Engineer prior to the commencement of each cycle and handed over to BHEL on completion. The graphs will be the property of BHEL. The contractor has to provide thermo chinks, temperature recorders, thermocouple attachment units, graph sheets, etc required for the job and maintain them in good condition.
- 6.5.8 All electrodes shall be baked and dried in an electric electrode drying oven to the required temperature and for the period specified by the Engineer before they are used in Erection work, and all welders including high pressure welders shall have a portable electrode drying oven at the work spot.
- 6.5.9 All butt joints of high pressure piping shall be carried out by TIG root run and subsequent runs by Arc welding. Full TIG welding, wherever necessary shall be carried out within the quoted rates. For oil system piping root run of all the butt joints shall be carried out by TIG welding only.
- 6.5.10 The technical particulars, specifications and other general details of works shall be in accordance with BHEL welding, Heat treatment and NDE manuals or equivalent as decided by the BHEL Engineer.
- 6.5.11 Contractor shall carryout Radiography as per Welding Manual Booklet applicable as per IBR. However, percentage radiography shown in the respective drawings shall be final and binding on the contractors.

The percentage given above are tentative, which may be increased depending upon the quality of joints at the discretion of BHEL.

- 6.5.12 Low speed high contrast fine grain films (D7 or equivalent) in 10cm width only should be used for weld joint radiography. Film density shall be between 1.5 to 2.00.
- 6.5.13 All radiographs shall be free from mechanical, chemical or process marks to the extent they shall not confuse the radiographic image and noticed.
- 6.5.14 Penetrometer as per ASME/ISO, shall be used for all exposures.
- 6.5.15 Lead numbers and letters (generally of 6 mm size) are to be used for identification of radiographic contract No., joints identification, sources used welders identification, SFD used are to be noted down in the paper cover of radiography. Lead identifying screens for front and back of the film shall be used as per the instruction of BHEL Engineer.
- 6.5.16 The weld joint is to be marked with permanent mark A, B, C 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 the multiple exposures on pipes, an overlap of about 25mm of film shall be provided.
- 6.5.17 The contractor shall be fully equipped with radiography equipments, films, chemicals and other dark room facilities. There must be a number of radiographic personnel with sufficient experience and certified by BARC for field radiographic inspection. Further the contractor must follow strictly the safety rules laid down by the BARC, from time to time; contractor's radiographers shall also be registered with BARC for film badge service.
- 6.5.18 Contractor shall provide all skilled, unskilled workmen required for the job, which will include Engineers, supervisors, operators, as required for timely and satisfactory execution of radiography work.
- 6.5.19 If the contractor does not carry out radiography work in time due to non-availability of film, chemical etc. BHEL shall get the work done through some other agency at the risk and cost of the contractor
- 6.5.20 All the radiographs shall be properly preserved in air-conditioned rooms and shall become the property of BHEL.
- 6.5.21 Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of high pressure welders. If the performance of the welder is unsatisfactory, he shall be replaced immediately.
- 6.5.22 The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of the Engineer and Re- radio graphed. The decision of the Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor.
- 6.5.23 Wherever radiographs are not accepted on account of poor exposure, joints shall be re-radio graphed and new film submitted for evaluation. Radiographs shall be taken again on joints after carrying out repairs. However, if the defect persists after the first repair as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable the same shall be cut, re-welded and re-radio graphed at contractor's cost.

- 6.5.24 The contractor shall also be equipped for carrying out other NDT like liquid penetration test, magnetic particle inspection etc., as and when required in the interest of work, within the quoted rates.
- 6.5.25 For carrying out ultrasonic testing of welded joints of large size tubes and pipes, it will be necessary to prepare the surface by grinding to a smooth finish and contour as described by BHEL Engineer. The contractor's scope of work include such preparation and no extra charges are payable for this.
- 6.5.26 The contractor has to make his own arrangements for air-conditioned dark room to process the radiographs.
- 6.5.27 It may also be necessary to adopt inter layer radiography / MPT / UT depending upon the site / technical requirements necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this in to account and quote the price inclusive of all such work and radiography.
- 6.5.28 The welded surface irrespective of place of welding shall be cleaned of slag and painted at the center with primer paint to prevent corrosion at no extra cost towards this. Paint for this purpose shall be provided by BHEL.

6.6.0 PROGRESS OF WORK

6.6.1 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 employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charge incurred on this account including all expenses together with BHEL overheads from contractor's bills.

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

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

6.6.3 The progress reports shall indicate that progress achieved against planned with reasons indicating delays if any, shall also furnish in details the reasons for the same and shall give remedial action which the contractor intends 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, in a format designed and approved by the BHEL site Engineer.

6.6.4 The contractor shall arrange for weekly progress review meetings with the "Engineer" at site during which actual progress during the week vis-a-vis schedule programme will be discussed for action to be taken for achieving targets. The programme for subsequent week shall also be presented by the contractor for discussions. The contractor shall constantly update / revise his work programme to meet the overall requirement and suite the material availability.

6.6.5 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site

premises. Without the entry Gate Pass these materials will not be allowed to be taken outside.

6.6.6 The contractor shall maintain a record in the form as prescribed by BHEL for all operations carried out on each weld and maintain a record indicating the number of welds, the name of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejects if any, percentage of rejection, etc. and submit copies of the same to the BHEL Engineer as required.

6.7.0 CONTRACTOR WILL SUPPLY LABOUR AND OTHER SERVICES FOR THE FOLLOWING ACTIVITIES.

6.7.1 Acid pickling / chemical cleaning which will involve the installation of acid / alkali cleaning pumps, temporary piping, valves, cutting of some of the existing valves, placing of rubber wedges in the valves, installation of temporary tanks for chemicals and for mixing. Raw materials required for temporary piping for the above test will be supplied by BHEL. Fabrication servicing, erection and dismantling of pumps, pipe lines etc., to be done by the contractors.

6.7.2 Removing (after successful completion of chemical / acid cleaning, steam blowing and other tests) all temporary pipings, checking all the valves for any collection, welding the valves which were cut etc., reconditioning the valves, restoration of piping and returning the temporary piping, valves, pumps, flanges etc. to BHEL stores then and there.

6.7.3 Preserving, reconservation of all erected components and the cleaned surfaces as per BHEL instructions / requirements and re-erection of all the pipe lines as per drawings on permanent hangers and supports.

6.7.4 Steam blowing of system pipings, if required will involve laying of temporary pipe lines and valves etc and dismantling and restoration of piping. Required steam shall be provided at a central point by BHEL.

6.7.5 All lubricants, oils and chemicals required for reconservation, chemical cleaning and lubricants for trial runs of the equipment will be made available by BHEL. Required manpower will be provided by the contractor for handling, filling, emptying and refilling 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 to work site and returning of empty barrels / drums to stores at their cost. Care should be taken to avoid any spillage / wastage.

6.7.6 Turbine oil for flushing and first filling, first fill of all lubricants will be supplied to the contractor free of cost. Contractor shall provide all manpower required for the above.

6.7.7 Turbine oil for flushing and first filling, first fill of all lubricants will be supplied to the contractor free of cost. Contractor shall provide all manpower required for the above.

6.7.8 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.

6.8.0 PRE-COMMISSIONING TESTS AND COMMISSIONING OF UNIT

- 6.8.1 Commissioning of the TG set will involve trial runs of all the equipment erected, blowing through the steam lines flushing of all the lines by air, alkaline, steam or flushing pickling with acid as the case may be. On completion of satisfactory pre-commissioning tests including oil flushing, steam rolling, synchronizing, the trial operation shall be considered successful if it is proved that the unit can be operated at commercial load continuously during the period of trial operation. Trial run of the TG set and any other works are incidental to commissioning. Contractor shall supply skilled labour and other services in shift for these without any extra cost under this contract.
- 6.8.2 The contractor shall carry out the pre-commissioning activities such as acid pickling of oil pipelines, oil flushing of lubrication, governing and seal oil systems and other oil systems, steam blowing of steam pipes, flushing of condenser and generator air tightness test and other cleaning, blowing and flushing operations required for making the system clean and ready for commissioning. The oil required for initial filling and chemicals required for acid cleaning / pickling shall be supplied by BHEL free of cost.
- 6.8.3 All temporary piping materials required for hydraulic test, chemical / acid cleaning, steam blowing etc. will be supplied by BHEL either received from manufacturing units or from any other source. Contractor shall draw temporary piping materials like pipes, tanks, Hangers / supports, valves, pumps, fittings and other materials from BHEL stores erect / lay them. Contractor has to clean all the pipes, cut as required, prepare new edges for welding. All these forms part of work. However payment will be made for the tonnage rate quoted /accepted. After these tests are completed, all the temporary piping materials are to be dismantled and return back to BHEL stores. For dismantling and returning, no separate payment will be made. Only for installation, payment on quoted / accepted rate will be made.
- 6.8.4 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, I R values of insulation shall be recorded and if found necessary, dry out by the contractor to improve the IR values at no extra cost.
- 6.8.5 In case any erection defect is detected during various test / 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.
- 6.8.6 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, oil system including main oil tank and coolers shall be completely drained, thoroughly cleaned and

refilled with fresh oil for putting the set on barring gear. Necessary manpower for transportation of fresh oil from stores to site and filling the same in the main oil tank and the system shall be provided in three shifts, requisite manpower like skilled / semi skilled workmen during oil flushing as a part of this contract without any extra charges. Before commissioning of oil systems the pipelines should be hydraulically tested using the special hydraulic test pump to the required pressure. During alkaline flushing of condensate / feed water system also, necessary skilled / semiskilled workmen shall be provided by the contractor in three shifts as part of this contract without any extra charges.

- 6.8.7 During this period, though the BHEL's / clients staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete manpower and other services required till such time the commissioned unit is taken over by the BHEL's customer.
- 6.8.8 It shall be noted that the employees of the contractor may have to work round the clock along with BHEL staff and hence, if any overtime payment is involved, the contractors quoted rate shall be inclusive of all such contingencies.
- 6.8.9 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.
- 6.8.10 In case, any rework is required because of contractor's faulty erection, which is noticed during commissioning, the same has to be rectified by the contractor at his cost.
- 6.8.11 The contractor shall also carryout the following tests in generator within the quoted value:
- a. High voltage test of bushings
 - b. Measurement of DC resistance of rotor and stator
 - c. Impedance test of rotor
 - d. Measurement of IR values of stator, rotor, RTD, Thermocouples etc.,

The required test kits / instruments shall be provided by BHEL free of hire charges.

6.9.0 **CLEANING OF EQUIPMENT (TG)**

- 6.9.1 The contractor shall take care to disposal of the chemicals used and the effluents from cleaning operation in a manner acceptable to the BHEL / Customer.
- 6.9.2 The contractor shall ensure that during the cleaning process the procedure adopted shall be such as to consume minimum Quantity of DM water.
- 6.9.3 The contractor shall clean inside of all tubes, pipes and fittings from dirt, sand and loose scales, mechanically and by air blowing before being erected. All pipelines be thoroughly blown and / or flushed. A system for recordings of all such operations shall be developed and maintained in a manner acceptable to BHEL engineer and to ensure that no obstructions are left inside the tubes and pipes and no tubes and pipes are left uncleaned and untested.

- 6.9.4 The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL engineer and to ensure that no valves and valve actuators are left unserviced. Wherever necessary as required by BHEL engineer, the contractor shall arrange to lap/grind valve seats.
- 6.9.5 The Contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.
- 6.9.6 After installation of the complete plant, all pressure parts and such other lines as may be directed by the Engineer shall be flushed with water, oil, Steam or air as necessary. Cleaning sequence and arrangements of temporary piping will be developed by the Engineer and Contractor shall execute the work under the direction of the Engineer. Raw materials for temporary piping and other connected materials will be supplied by BHEL free of cost on returnable basis.
- 6.9.7 After flushing with water, steam blowing or after chemical cleaning, as directed by the Engineer, all parts or equipment (viz. valves etc.) shall be dismantled, checked for accumulation of dust, wear or damage, cleaned, rectified / replaced if necessary and reassembled by the contractor without claiming any extra cost. However the parts to be replaced in such cases will be supplied by BHEL.
- 6.9.8 All the bearings, gear boxes, 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 bearings, gears, 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 for assembling back the dismantled parts. Lubricants will however be supplied free of cost by BHEL.
- 6.9.9 The contractor shall thoroughly clean all the components before installation. The components whose surfaces are coated with protective coating and sent to site are to be thoroughly cleaned by sand blasting or with steam mixed with caustic soda as per the instructions of the engineer before erecting the same.
- 6.9.10 The contractor shall provide all labour for execution of work including installation and dismantling of temporary piping, strainers, valves and instruments required for conducting cleaning work.
- 6.9.11 Chemicals required for acid cleaning shall be supplied by BHEL free of cost.

6.10.0 PAINTING

- 6.10.1 The scope of work shall also include supply and application of final painting as required and specified in the customer painting schedule for the components of TG and its auxiliaries and piping.
- 6.10.2 The scope of work includes supply and application of one coat of primer painting and two coats of finish painting and also final application of paints as per the approved colour code for the components of TG and its auxiliaries and piping.

- 6.10.3 Support tube plates, shell internals, dome internals, steam throw off device (steam side), air extraction piping etc., inside the condenser shall be painted with steam washable paints.
- 6.10.4 The interior surfaces of water boxes & water side surface of water chambers excluding tube plates are to be lined with Glass Fibre Reinforced Epoxy film coating of thickness 3 mm, with suitable corrosion resistance primer of 0.25 mm minimum thickness as per the procedure given by BHEL Engineer. Supply and application of this epoxy film coating with required consumables are in the scope of contractor and is to be carried out within the quoted rate.
- 6.10.5 All exposed metal parts of the equipment, including pipings, structures, hand rails etc. wherever applicable after installation unless otherwise surface protected, be first painted with at least one coat of suitable primer which matches the shop primer paint used after thoroughly cleaning all such parts dust, rust, scales, grease, oil and other foreign materials by wire brushing, scrapping and chemical cleaning the same being inspected and approved by BHEL / Customer engineers for painting. Afterwards the above parts shall be finished with 2 coats of finish paint of enamel paint as per the instructions of BHEL/Customer official. Before applying the subsequent coats, the thickness of each coat shall be measured and should be informed to BHEL. The instrument for checking the thickness of coat is to be procured by the contractor and should be calibrated after periodical intervals.
- 6.10.6 The quoted rate shall include supply of application of final painting also. The scope of painting includes application of colour bands, lettering the names of the systems, equipments, tag nos of valves, marking the directions of flow and other data required by Customer / BHEL within the quoted rates at the appropriate place as identified by BHEL / Customer.
- 6.10.7 The application of paints, which includes one coat of primer paint and two Nos of subsequent finish coat as per the direction of BHEL site engineer.
- 6.10.8 The quality of finish paint shall be as per the standards of ISI or equivalent and the colour is as approved by BHEL / Customer.
- 6.10.9 The paints are to be purchased from the BHEL / Customer approved agencies only. The Tenderer have to keep in mind that paints of reputed makes like BERGER, ASIAN, SHALIMAR, JENSON & NICHOLSON are only permitted. Before procurement of paint, the contractor has to obtain the clearance from BHEL authorities.

6.11.0 TIME SCHEDULE

- 6.11.1 The contractor has to commence the work within **15 days** from the date of issue of Fax / LOI.
- 6.11.2 The entire work of erection, testing and commissioning of as detailed in the Tender Specification shall be completed within **Fourteen (14)** months from the date of start of work.

Note: The date of start of work will be taken into account for this contract shall be the actual date of commencement of erection of STG and auxiliaries work at site.

- 6.11.3 During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL Engineer and as per the programme of events / targets fixed by BHEL / Customer.
- 6.11.4 For the above purpose, the erection work shall be commenced as may be stipulated in the letter of intent and shall be deemed to have been completed in all respects only when all the components / equipments are erected and trial runs, testing and commissioning of all the equipments are completed and the unit is operated successfully under full load condition and completion of trial operation. The decision of BHEL in this regard shall be final and binding of the contractor.
- 6.11.5 During the tenure of contract, if BHEL is not satisfied with the progress of work, BHEL have the right to withdraw any portion of work, balance work and get the same done either employing their own men or through other agency at your own risk and cost. You shall not be entitled for any compensation whatsoever in this regard.
- 6.11.6 BHEL, owing to its commitment to their customer, may ask contractor to compress the total completion schedule. Contractor shall plan his activities and mobilize additional resources accordingly to the satisfaction of BHEL engineer within the quoted rates.
- 6.11.7 The entire work of erection, testing and commissioning of Steam Turbine & Generator with associated auxiliaries, turbine integral piping as detailed under this tender specifications shall be carried out and completed as per erection and completion schedule as indicated below.

Tentative Time Schedule for Milestone Activities

	Milestone Events	Unit – 5
	Condenser Erection start	January 09
	Turbine Erection start	February 09
	Box Up	September 09
	Oil flushing completion	October 09
	Rolling	December 09
	Synchronization	December 09
	Trial Operation	February 10

6.12.0 TERMS OF PAYMENT – FOR ONE UNIT**TG & AUX. ERECTION WORKS UNIT**

A. CONDENSER – 13%		
1.	Preparation of Foundation for condenser erection	1%
2.	Assembly, Welding & Placement of bottom plates, sole plates, Hot well and Spring elements	1.5%
3.	Assembly, welding of side plates, water chambers and water boxes	1.5%
4.	Installation & Welding of tube support plates, air evacuation piping and internals	1.5%
5.	Assembly & welding of Dome walls, Extraction piping and stiffening structure	1.5%
6.	Installation, expansion, end milling and flaring of condenser tubes	3%
7.	U. V. Lamp test of steam space and hydraulic testing	1%
8.	Floating of condenser and welding of condenser with Turbine Exhaust hood	2%
(B) TURBINE – 14%		
1.	Matching , Leveling, Alignment of base plates and bearing pedestals and Longitudinal girders and grouting	2%
2.	Assembly of bottom half of LP cylinder, Leveling and alignment	2%
3.	Placing of HP, IP modules centering and leveling	2%
4.	Placement of LP Rotor, leveling and centering	1%
5.	Alignment of HP/IP/LP rotors, honing and coupling	2%
6.	Assembly, welding of LP outer casing and closing LP cylinder	3%
7.	Erection of ESV/By pass valves and Assembly of Regulation System	1%
8.	Fixing permanent keys, main oil pump alignment and Box up of front bearing pedestals	1%
C. GENERATOR - 12%		
1.	Preparation of foundation, blue matching embedded plates	1%
2.	Positioning and centering of stator	1%
3.	Threading of rotor after completion of all tests	2%

4.	Alignment of Rotor with turbine and coupling	2%
5.	Fixing of permanent packers and grouting	2%
6.	Excitation System	2%
7.	Gas tightness test of stator with total system	2%
D. PUMPS & Motors - 14%		
1.	Erection of vacuum pumps	2%
2.	BFP with motor, Hydraulic cooling and Booster pumps and lub oil piping	3%
3.	Erection of condensate pumps	2%
4.	Erection of other pumps(JOP,AOP EOP)	2%
5	Erection of Lub oil Pumps	1%
6	C.W pumps, ACW Pumps, & DMCW pumps	4%
E. PIPING & AUXILIARIES -37 %		
1.	Air evacuation and vacuum system piping	2%
2.	All Extraction Lines inside Condenser& steam throw device.	2%
3	Drain Lines	1%
4	LUB oil piping	2%
5.	Seal Steam system	2%
6.	Gen Lub oil piping	1%
7.	Turbine water drainage piping	1%
8.	Control Oil Piping	1%
9.	Cross around piping	2%
10.	Generator seal oil piping	1%
11.	Generator gas system	1%
12.	Ejector erection	1%
13.	HP/LP heaters erection	2%
14.	Deaerator, FST Erection	3%
15.	Erection of oil centrifuge	1%
16.	RE joints and bellows erection	1%
17.	CW piping from "A" row to condenser (both inlet & outlet) and erection of BF valve	3%
18.	Oil pumps, oil tanks, oil coolers erection	1%
19	Balance Misc. Piping	1%
20.	Balance Misc. equipment Erection	3%

21.	Painting	2%
22.	Completion of Hydraulic testing	1%
23.	Other Misc. FQA checks, submission of final bill and work completion certificate	2%
F. COMMISSIONING - 5%		
1.	Completion of TG Box up	1%
2.	Completion of Oil flushing	1%
3.	Barring gear	1%
4.	Rolling	1%
5.	Synchronization	1%
TOTAL		95%

6.12.1 The balance amount of 5% will be paid after the guarantee period of 12 months is over separately. The guarantee period shall commence from the date of completion of trial run of the set and handed over to customer or 6 months from the date of first synchronization of the set whichever is earlier. However, the above 5% payment can be released against submission of matching Bank Guarantee from a nationalized / scheduled Bank in the prescribed proforma of BHEL valid for one year from the date of commencement of guarantee period.

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

6.12.1.2 CONTRACTOR SHALL NOTE THAT THE FINAL BILL SHALL BE RELEASED ONLY ON PRODUCTION OF CERTIFICATE ISSUED BY SITE IN CHARGE THAT THE CONTRACTOR HAS FULLFILLED ALL THE CONTRACTURAL STATUTORY REQUIREMENTS.

6.13.0 PAYMENT FOR WORK COMPLETED

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

6.13.2 The measurement will be taken as per General Conditions of contract and certified by the BHEL Engineer for the actual work.

6.13.3 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor, shall based on the certificate of the BHEL Engineer at site, be entitled to payment as explained hereunder.

6.13.4 For erection, testing and commissioning of above Turbo set and auxiliaries as described in Rate Schedule, intermediate payments shall be made as per terms of payment clause 6.12.0 on the basis of percentage of total contract value of

work. (these percentages are only for the purpose of terms of payment and should not be construed as price for individual items)

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 is not due to contractor's faulty erection.
- b) 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. The decision of BHEL in this regard shall be final and binding on the contractor.

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.

6.16.0 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.

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

6.17.0 OVER RUN CHARGES

- 6.17.1 In case due to reasons not attributable to the contractor, the work gets delayed and completion time gets extended beyond **Fourteen (14) months** from the date of commencement of the work, the contractor shall be entitled for over run compensation. In case ORC arises the same will apply at **Rs.75,000/- (Rupees seventy five Thousand only)** per month for extended period beyond **14 months** as stated above duly taking into account the balance work at the end of that period.
- 6.17.2 The period of overrun will have to be ascertained before the commencement of grace period.
- 6.17.3 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.
- 6.17.4 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.

6.18.0 PRICE ESCALATION.

- 6.18.1 The following P.V.C. is applicable from the date of bid opening.

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

Applicable even if F1 is lesser than F0 (Price reduction as applicable)

F0 = New all India average consumer price index published by labour Bureau, Simla, Government of India for Industrial workers (Base 2001=100) applicable for the date of bid opening.

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 escalation formulae for the particular month of billing

P0 = Billing amount calculated on the accepted contract rate

- 6.18.2 Price escalation as per above formula will be calculated and paid (excluding payments towards extra works and over run, if any) on month to month basis. BHEL however reserves the right to freeze escalation for that such duration of delays, from time to time which are entirely attributable to the contractor.
- 6.18.3 With the provision of price escalation as per the above clauses 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 including extended period, if any.
- 6.18.4 Payment of PVC will be restricted to 10% of contract value

6.19.0 Taxes and Duties

6.19.1 Value Added Tax (VAT) for the works

Price quoted shall be inclusive of VAT 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., inter alia indicating the name of the supplier, address and VAT Registration No. and VAT paid for the purchases,etc

The bidder shall get registered with State VAT authorities and the registration certificate shall be forwarded to BHEL immediately after commencement of work. In case the bidder had already registered under respective State 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 documents for contract closure.

In case the Bidder decides to include any VAT element along with the quoted price, they shall specify (1) The value of VAT included in the quote, (2) the rate of VAT adopted and (3) On what value etc, as additional information, in the price bid. 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.

6.19.2 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.

6.19.3 Other Taxes & Levies

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.

6.19.4 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 actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract..

6.19.5 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 are to be suitably 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.

6.19.6 Direct Tax

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.

6.19.7 IMPORTANT CONDITIONS FOR PAYMENT

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

1. PF Regn. No.
2. Labour Licence No.
3. Workmen Insurance Policy No.
4. Un Qualified Acceptance for Detailed L.O.I.
5. Initial 50% Security Deposit.
6. Rs. 100/- Stamp Paper for Preparation of contract agreement

- 6.19.8 All payments due to the contractor shall be made only through “e-Payment” including return of EMD amount to unsuccessful tenderers. The tenderer has to furnish details of his Bank account as certified by the concerned Banker in the format furnished to enable e-payment.

FROM TO BE FILLED BY VENDORS FOR REGISTERING FOR E-PAYMENT

Details of Bank Account details of Contractor for remittance of e-Payment

1	NAME & ADDRESS OF THE CONTRACTOR / SUPPLIER	:
2	BANK A/C NO.	:
3	TYPE OF A/C (CC / CURRENT)	:
4	NAME OF THE BANK	:
5	NAME OF THE BRANCH	:
6	BRANCH CODE	:
7	BANKER'S ADDRESS (BRANCH)	:
8	MICR NO.	:
9	IFSC CODE	:

Note : THE ABOVE DETAILS ARE TO BE FURNISHED IN THEIR LETTER HEAD BY THE CONTRACTOR / SUPPLIER, DULY ATTESTED BY THEIR BANKERS.

6.20.0 PROVIDENT FUND & MINIMUM WAGES

6.20.1 You are required to extend 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. In case 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 therefor 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 payment 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.

6.20.4 OTHER STATUTORY REQUIREMENTS

1. The contractor shall submit a copy of labour licence obtained from the licencing Officer(FormVI) 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 along with the **first** running bill.
2. The contractor shall submit monthly running bills along with 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.
3. The contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of wages. In case of "Non compliance of Sec 21 or non – payment of wages" to the workmen before the expiry of wage period by the contractor, BHEL will reserve its right to pay the workmen under the orders of appropriate authority at the risk and cost of the Contractor.
4. The contractor shall submit copies of final settlement of disbursement of 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 Act 1948(if applicable) to BHEL along with the final bill.
5. In case 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.

6. In case 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
SITE FACILITIES**

PROJECT: RAYALASEEMA (TG Aux. Erection) RATING: 210 MW Unit

SI.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		Yes	
1.2.0	ELECTRICITY			
1.2.1	<u>Electricity For construction purposes</u> (to be specified whether chargeable or free)			Free of charge
1.2.1.1	Single point source	Yes		
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	

SI.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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		
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		Yes	
1.3.2.1	Making the water available at single point	Repeated Not applicable		
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	

SI.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

PROJECT: RAYALASEEMA (TG Aux. Erection) RATING: 210 MW

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.1.0	Engineering works for construction:	Yes		
2.1.1	Providing 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	
2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	
2.1.7	Weekly erection schedules based on SI No 2.1.5		Yes	
2.1.8	Daily erection / work plan based on SI 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 every two months.		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	
2.2.0	SUGGESTED LIST OF TOOLS AND PLANTS (BHEL should indicate the proposed number of items considered as free issue)			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks	
		BHEL	Bidder		
2.2.1	250 T crawler crane		A As required for work to be arranged by bidder		
2.2.2	250 T tyre mounted crane				
2.2.3	150 T crawler crane				
2.2.4	150T tyre mounted crane				
2.2.5	Crawler crane / Suitable crane as decided by BHEL Engineer.	1 no on sharable basis.			For F.S.T, DEAERATOR ERECTION .
2.2.6	100T tyre mounted crane				
2.2.7	75 T crawler crane				
2.2.8	75 T tyre mounted crane				
2.2.9	60T Kroll tower crane				
2.2.10	18 T crawler crane				
2.2.11	18/20 T tyre mounted crane one				
2.2.11 A	8T Escort crane One No (1)				
2.2.12	30T gantry crane				
2.2.13	15 T gantry crane				
2.2.14	10T gantry crane				
2.2.15	30T tractor trailer				
2.2.16	20T trailer				
2.2.17	10 T trailer / truck				
2.2.18	Electrical winches 15 T with / without wire ropes Drum lifting (2 Nos)				
2.2.19	Electrical winches 10T with / without wire ropes				
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				

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.28	Chain pulley block 10T		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
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 (As Required)			
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 block 20T			
2.2.42	Single heave shackle pulley block 10T			
2.2.43	Single sheave shackle pulley block 5 T			
2.2.44	25 V transformer with sufficient spare bulbs			
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			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.51	Portable drying oven for baked welding electrodes			
2.2.52	GQA grinding machine		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
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			
2.2.70	Wire rope sling 6x36 12mmx6m			
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			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks	
		BHEL	Bidder		
2.2.79	Loose wire rope 32mm		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK		
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 <ul style="list-style-type: none"> ◆ Main hook 125 T ◆ Aux hook 30 T 	Yes			One crane for erection and one more EOT crane with out operator will be provided by customer at the time of lifting / placement of Generator stator.
2.2.90	Sleepers both wooden and concrete for movement of cranes at site				
2.2.91	Concrete blocks for pre assembly works at site				
2.2.92	15 T snatch pulley blocks Drum lifting				
2.2.93	Hydro test pump 600 bar / 400 bar	yes		Of suitable capacity.	

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.94	Hydro test pump 250 bar		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
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	Yes		
2.2.101	Stress relieving / preheating equipments including transformers, controllers, heating pads and insulating materials and consumables			
2.2.102	Hydraulic 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			
2.2.106	Dumpy level			
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)			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.112	Moving platforms Sky Climber			
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			
2.2.128	Precision water level micrometer			
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			

TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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			
2.2.156	Auto transformers			
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 oscilloscope continuity tester			
2.2.163	Rheostats			
2.2.164	Milli seconds syn timer			

To be arranged by the bidder as required for work

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.165	Ultra violet recorder		To be arranged by the bidder as required for the work	
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	Vacuum 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 (soft &hard)			
2.2.183	Allen keys sets			
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 m/c (grouting and concreting)			
2.2.190	Tube expanding machine ie drives – hydraulic or pneumatic ()			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.191	Tube expanders (expansion and flaring)			
2.2.192	Mercury plumb bob		To be arranged by the bidder	
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	For grouting
	Sand, bricks etc		Yes	
	TIG wires		Yes	
	Electrodes		Yes	
	Brazing rod, flux etc		Yes	
	Soldering			
	DA, oxygen, argon		Yes	
	Nitrogen required for chemical cleaning	Yes		
	Nitrogen required for construction		--	
	Paints along with thinner, brushes, cleaning materials etc for preservation of components		Yes	
	Paints including thinner, brushes, cleaning materials etc for final painting, as per specifications		Yes	
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,			
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	

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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	

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.

SCOPE AT A GLANCE

PROJECT: RAYALASEEMA - (TG Aux. Erection) RATING: 210 MW

SI.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	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	
3.1.2	ERECTION TESTING & COMMISSIONING			
3.1.2.1	Erection drawings/documents/working instructions etc	Yes		
3.1.2.2	Welding schedules	Yes		
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	

SI.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.2.12	Assistance for P.G test	---	---	
3.1.3	CIVIL WORKS			
3.1.3.1	Taking over of foundations		Yes	
3.1.3.2	Checking, chipping and correcting final dimensions 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	
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	
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

LIST OF SAILENT COMPONENTS TO BE ERECTED

- 1.0 Steam Turbine unit consists of three cylinders (HP, IP, LP), broadly including following:
- 1.1 Bearing pedestals
- 1.2 Sole plates, foundation holding down bolts
- 1.3 Combined emergency stop and control valves 2 Nos.
- 1.4 Combined reheat stop and control valve 2 Nos.
- 1.5 Steam strainer and strainer housing
- 1.5.1 Steam strainer and strainer housing for HRH steam lines 2 Nos.
- 1.5.2 Steam strainer and strainer housing for main steam Lines 2 Nos
- 1.6 Cross around piping between IP and LP casings
- 1.7 Hydraulic turning gear along with hand barring
- 1.8 Electro hydraulic governing system backed up with hydro mechanically system.
- 1.9 Lubrication and governing oil system comprising of :
 - 1.9.1 Main oil tank with its internal 1 No.
 - 1.9.2 Turbine shaft driven main oil pump 1 no.
 - 1.9.3 Auxiliary oil pumps with drivest (2 X 100% AC)
 - 1.9.4 DC Emergency oil pump with starter (1 No)
 - 1.9.5 Jacking oil pump with drive (1 X 100% DC) with starter and resistor box and jacking oil pump with drive (1 X 100% AC)
 - 1.9.6 Oil cooler (2 X 100%)
 - 1.9.7 Oil vapour exhausters with drives (2 X 100 % AC).
 - 1.9.8 Dirty oil tank with pump, clean oil tank with pump, oil unloading tank with pipe etc.
 - 1.9.9 Duplex oil filter for lub oil system (common for all bearings) 1 No.
 - 1.9.10 Duplex oil filter for jacking oil system (common for all bearings) 1No.
 - 1.9.11 Temperature control valve for lub oil system 1 no.
 - 1.9.12 Lub oil and jacking oil system piping including necessary valves, hangers and supports
- 1.10 One unit oil purifier (centrifuge type)
- 1.11 Turbine gland sealing system including necessary piping and valves as per scheme

- 1.12 Condensate spray system including necessary piping, valve, hanger and supports.
- 1.13 Turbine drain system including necessary piping valve and hanger and supports.
- 1.14 LP Bypass valve 2 Nos.
- 1.15 H.P by pas valves, oil supply unit & oil piping. (Trichy Supply Under P.G 22)
- 1.16 Governing racks, L.P Bypass racks, solenoid, test valve racks, pressure transducer, instrument racks.
- 1.17 Water injection valves for LP bypass valve 4 Nos.
- 1.18 Non return valves in extraction / cold reheat lines as per schemes
- 1.17a One set of blanking fixtures for ESV, IV, LP Bypass valves and NRV in CRH line for steam blowing.
- 1.17b One set of blanking fixtures for ESV, IV for Hydraulic Test
- 1.18 Oil flushing
- 1.19 Vacuum breaker valve
- 1.20 Flash tanks with all necessary piping and valves as per scheme
- 1.21 All counter flanges at the terminal points

2.0 CONDENSER

- 2.1 One surface condenser spring supported, single pass, divided water box with integral air cooling section and inlet water boxes along with hot well.
- 2.2 Vacuum pump 1x100% with 2x100%SJAE & 1x100% starting SJAE
- 2.3 CW piping from A. row column to condenser and back- both supply and return lines, and pressure balance type RE joints at condenser CW inlet and outlet along with supports.

3.0 FEED HEATING SYSTEM

- 3.1 Low pressure heater No.1 along with fittings 1 No.
- 3.2 Drain cooler along with fittings 1 No.
- 3.3 Gland steam condenser with vent blower and Fittings 1 No.
- 3.4 Low pressure heater No.2 with fittings 1 No.
- 3.5 Low pressure heater No.3 with fittings 1 No.
- 3.6 High pressure heater No.5 and 6 with fittings 1 set
- 3.7 Deaerator with fittings and platforms 1 No.
- 3.8 Condensate extraction pumps vertical Canister type 2 X 100% with motors
- 3.9 Boiler feed pumps barrel type, with lub oil system & pipes etc 3 X 50% with motors
- 3.10 Booster pumps 3 X 50% with motors

3.11 Hydraulic coupling 3 nos with duplex coolers

3.12 GSC exhausters – 2 Nos.

3.13 Vacuum pumps

4.0 TURBO GENERATOR AND AUXILIARIES

4.1.0 Generator

4.1.1 Stator

4.1.2 Rotor

4.1.3 End shields with bearings

4.1.4 Four No. gas coolers

4.1.5 Six terminal bushings along with Terminal connectors

4.1.6 Shaft seals

4.1.7 Foundation plates and studs

4.1.8 One set of special Maintenance Tools

4.2.0 Excitor

4.2.1 Stator

4.2.2 Rotor

4.2.3 Bearing with pedestals

4.2.4 Foundation Frames & studs

4.2.5 Permanent magnet pilot excitor

4.2.6 One set of 2 no. Exciter Air cooler

4.2.7 Air baffles and sound proof lined exciter covers

4.2.8 Air dryers

4.2.9 Space Heaters

4.2.10 Necessary valves as per Schematic

4.3 SEAL OIL SYSTEM

4.3.1 Seal oil unit mounted on frame complete with following :

4.3.1.1 2 X 100 % seal oil coolers 2 Nos.

4.3.1.2 Duplex oil filter 1 No.

4.3.1.3 Differential pressure regulating valves 1 No.

4.3.1.4 Vacuum tank 1 No.

4.3.1.5 Intermediate oil tank 1 No.

4.3.1.6 Flow regulators 2 Nos.

4.3.1.7 Flow meters 4 Nos.

4.3.1.8 Necessary inter connecting pipe lines and valves in the unit as per relevant schematic 1 Set

4.3.1.9 Stainless steel valves 1 Set

4.3.2	Seal oil pumping unit with the following:	
4.3.2.1	Seal oil pump with AC motor	2 Nos
4.3.2.2	Seal oil pump with DC motor	1 No
4.3.2.3	2 Nos. Vaccum pump with AC motor and 2 Nos. oil seperator	1 set
4.3.2.4	Constant pressure, regulators	3 Nos
4.3.2.5	Seal oil storage tank	1 No
4.4	GAS SYSTEM	
4.4.1	Gas unit	1 No
4.4.2	Duplex Gas Dryer with control panel	1 No
4.4.3	Hydrogen distributor	1 No
4.4.4	CO2 distributor	1 No
4.4.5	CO2 vaporizer with cabinet	1 No
4.4.6	Necessary piping and valves as for scheme	1 set
4.5	GENERATOR SYSTEM	
4.5.1	Liquid Detector rack	1 No
4.5.2	Necessary valves as per schematic	1 set
4.6.1	Bearing vapour Exhauster with AC motor	2 Nos
4.6.2	Necessary valves as per schematic	1 set
4.7	WASTE GAS SYSTEM	
4.7.1	Bearing vapour Exhauster with AC motor	2 Nos
4.7.2	Necessary valves as per schematic	1 set
4.8.0	WASTE FLUID SYSTEM	
4.8.1	Necessary piping, and valves as per scheme	1 set
5.0	Brushless AVR system	1 set
6.0	Drains and vent piping and valves within the terminal points including specials like steam traps, metallic expansion bellows etc.	
7.0	C.W Pumps, ACW pumps, DMCW pumps with motors& all auxiliaries.	
8.0	Grouting, supply and application of final painting of all erected equipments by this contractor.	

- 9.0 Stair cases / platforms for valve / equipment operation and maintenance as required. Material by BHEL.
- 10.0 All valves including Root valves, Actuators and dampers integral to various systems described above are also included in this scope.
- 11.0 T.G integral piping.**
 - 11.1 Lb oil piping**
 - 11.2 Control oil piping**
 - 11.3 Seal oil piping**
 - 11.4 Gland steam piping**
 - 11.5 Cross around piping**
 - 11.6 Air & Gas system**
 - 11.7 Other misc system piping etc supplied for T.G package .**

SECTION VII APPENDIX - III

WEIGHT SCHEDULE – ERECTION

Condenser, Turbine, Generator	: 1350 MT
Pumps, Tanks, deaerator and HP/LP heaters	: 310 MT
LP piping , Valves RE Joints TG integral Piping and Misc items.	: 355 MT
CW piping between A row and condenser (inlet and outlet lines)	: 30 MT
C.W pumps , ACW pumps, DMCW pumps With motors & other auxiliaries.	: 150 MT
Platforms for the equipments	:55 MT
Total Erection Weight	: 2250 MT .

Note:

1. The information furnished in weight schedule 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 TG supplied by customer also are to be erected and commissioned by the contractor with in the quoted / accepted lumpsum value. But if the total weight so erected by the tenderer is within 2475 (2250 + 225) tons, rate as per schedule shall be applicable.
3. The above statement shows the approximate weight of the various sub assemblies of the turbo generator set, associated auxiliaries 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 O.D.C of few major components / equipments were furnished in appendix III of this specification, along with weight details of the components. The O.D.C. Details with weight of items for the piping work and misc. items are not indicated. However the contractor has to take the total erection weight furnished above for quoting / tendering purpose.

PACKING SIZE DETAILS FOR TURBINE PACKAGES

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
1	1190	EMBEDMENTS FOR ANCHOR POINTS	1250x 1000x 800
2	350	ANCHOR BOLTS FOR LP TURBINE	1120x 700x 700
3	345	ANCHOR BOLTS FOR LP TURBINE	1100x 700x 700
4	3340	COMPONENTS FOR BASE PLATE ASSY	4900x 1800x 800
5	2840	COMPONENTS OF BASE PLATE ASSLY	2500x 1400x 1000
6	2950	BASE PLATE LP CASING	2300x 2075x 980
7	5700	LP CASING UPPER PART (PARTIAL)	6600x 1400x 2550
8	5700	LP CASING UPPER PART (PARTIAL)	6600x 1400x 2550
9	2700	LP CASING UPPER PART (PARTIAL)	4250x 3040x 1400
10	2700	LP CASING UPPER PART (PARTIAL)	4250x 3040x 1400
11	360	LP CASING UPPER PART	3200x 300x 300
12	460	LP CASING UPPER PART	2000x 1100x 400
13	580	ASSEMBLY DEVICES	0x 0x 0
14	4250	INSPECTION SHAFT FOR IPC	0x 0x 0
15	690	VALVE SUPPORT FOR HP OVERHAUL	0x 0x 0
16	6394	COMPONENTS OF ASSY.FIXTURE FOR	3800x 2500x 1200
17	1511	COMPONENTS OF ASSY.FIXTURE FOR	2300x 2100x 900
18	2852	COMPONENTS OF ASSY.FIXTURE FOR	3300x 1800x 1210
19	2540	ASSEMBLY FIXTURE OF HPT	0x 0x 0
20	12080	HP/IP BEARING PEDESTAL ASSLY.	4400x 2025x 2475
21	300	HP/IP BRG.PED. ARRAGMNT.PARTS	1200x 650x 650
22	851	AUXILIARIES OF LP TURBINE]	2750x 1200x 1000
23	598	L.P. SHAFT SUPPORT BLOCK	1600x 800x 1105
24	598	L.P. SHAFT SUPPORT BLOCK	1600x 800x 1105
25	995	LP JOINT COVERING	2100x 1500x 800
26	545	TOOLS AND TACKLES	1900x 1000x 900

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
27	354	SUPPORT OF CAP	1100x 950x 650
28	354	SUPPORT OF CAP	1100x 950x 650
29	2498	CAP-COMPENSATOR ASSLY.	2950x 1650x 1575
30	2498	CAP-COMPENSATOR ASSLY.	2950x 1650x 1575
31	114	CAP-OBLIQUE REDUCER ASSLY.	2400x 1400x 650
32	308	CAP-MITRE BEND ASSLY.	1100x 1100x 850
33	2572	CAP-COMPENSATOR ASSLY.	2950x 1650x 1700
34	644	CAP-MANHOLE ASSLY.	1800x 1600x 1300
35	644	CAP-MANHOLE ASSLY.	1800x 1600x 1300
36	306	CAP-MITRE BEND ASSLY.	1230x 1230x 830
37	306	CAP-MITRE BEND ASSLY.	1230x 1230x 830
38	618	CAP-PIPE ASSLY.	2000x 1250x 1300
39	308	CAP-MITRE BEND ASSLY.	1100x 1100x 850
40	11350	LONGITUDIANL GIRDER (LEFT)	6560x 2000x 1980
41	11118	LONGITUDINAL GIRDER (RIGHT)	6560x 2000x 1980
42	8400	L.P. FRONT WALL (TS)	6350x 3600x 1000
43	8400	L.P. FRONT WALL (GS)	6350x 3600x 1000
44	1175	LP SHAFT SEALING (FRONT)	1440x 1420x 520
45	1351	LP SHAFT SEAL COMPENSATOR	1440x 1420x 520
46	1175	LP SHAFT SEALING (REAR)	1440x 1420x 520
47	1351	LP SHAFT SEAL COMPENSATOR	1440x 1420x 520
48	740	LP FRONT WALL EXTENSION PIPE	0x 0x 0
49	198	STIFFENING PLATE FOR FRONT WAL	0x 0x 0
50	2100	PARTS OF LP OUTER CASING ASSLY	1800x 1700x 740
51	4511	LP CASING ASSEMBLY (PARTS)	3760x 2060x 860
52	81	PARTS OF LP OUTER CASING ASSLY	0x 0x 0
53	460	EXTRACTION PIPE LINE A1	2200x 1000x 700

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
54	460	EXTRACTION PIPE LINE A1	2200x 1000x 700
55	285	EXTRACTION PIPE LINE A1	2300x 1300x 750
56	865	EXTRACTION PIPE LINE A1	1750x 1600x 700
57	460	EXTRACTION PIPE LINE A1	2200x 1000x 700
58	285	EXTRACTION PIPE LINE A1	2300x 1300x 750
59	210	EXTRACTION PIPE LINE A2	850x 850x 950
60	360	EXTRACTION PIPE LINE A2	1850x 1750x 950
61	363	EXTRACTION PIPE LINE A2	2500x 850x 950
62	380	EXTRACTION PIPE LINE A3	1550x 1450x 800
63	385	EXTRACTION PIPE LINE A3	1200x 650x 800
64	925	LP EXTRACTION PIPE SHEATHING	2600x 2000x 1400
65	640	INNER GUIDE PLATE OF DIFFUSER	2000x 1800x 825
66	3300	DIFFUSER (TS)	4350x 1550x 2000
67	3300	DIFFUSER (GS)	4350x 1550x 2000
68	320	AUXILIARIES OF I.P. TURBINE	1050x 480x 550
69	204	AUXILIARIES OF I.P. TURBINE	1100x 500x 650
70	204	AUXILIARIES OF I.P. TURBINE	1100x 500x 650
71	7490	LP REAR BEARING PEDESTAL ASSLY	2875x 1900x 2250
72	11000	LP FRONT BRG.PEDESTAL ASSLY.	3400x 1900x 2200
73	15500	LP INNER OUTER CASING (U/H)	7000x 3045x 2370
74	23890	LP INNER CASING (L/H)	6850x 2960x 2550
75	820	LP INNER CASING ASSLY.(L/H)	1650x 600x 500
76	6000	LP INNER CASING (U/H)	3390x 1600x 1930
77	1150	STEAM INLET PIPE (LPC)	2100x 2100x 800
78	44353	LP ROTOR	6410x 3100x 3150
79	850	BEARING PEDESTAL ARRGNMT.PARTS	1800x 900x 800
80	190	STUD HEATING AND BREECH NUT	2400x 1800x 250

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
81	160	GROMMET SLINGS AND LIFTING ARR	0x 0x 0
82	56000	I.P TURBINE	5750x 3800x 4070
83	54000	HP TURBINE	5000x 3400x 3200
84	20	HP INLET ASSEMBLY	1200x 850x 300
85	1532	H.P.EXHAUST ASSEMBLY	1400x 1200x 850
86	120	HPT RELATED PARTS	1000x 1000x 500
87	11760	FRONT BEARING PEDESTAL ASSLY.	3500x 3000x 2050
88	250	I.P TURBINE PARTS	1000x 800x 500
89	25	RATING, COLLABORATION AND	850x 550x 150
90	5560	I.P.INLET PIPE ASSEMBLY	3700x 3000x 1900
91	66	OIL FLUSHING & PRESSURE TEST	750x 400x 550
92	1931	STEAM BLOWING & HYD. TEST DEV.	2900x 2100x 1140
93	345	TOOLS AND PACKING DEVICES	0x 0x 0
94	1721	SUSPENSION OF VALVE (IV)	2800x 1100x 750
95	1721	SUSPENSION OF VALVE (IV)	2800x 1100x 750
96	320	FIRE PROTECTION VALVE ETC.	1900x 1000x 890
97	123	ASSEMBLY DEVICE FOR VALVES	920x 1000x 450
98	44.4	CHANGE OVER VALVE	500x 400x 400
99	76	ATT SOLENIOD VALVES	0x 0x 0
100	7625	ESV & CV CASING WITH VALVES	2850x 2600x 1900
101	7625	ESV & CV CASING WITH VALVES	2850x 2600x 1900
102	9433	IV & CV CASING WITH VALVES	3350x 3000x 2250
103	9433	IV & CV CASING WITH VALVES	3350x 3000x 2250
104	1382	ESV SERVOMOTOR WITH L.S. MTG.	2100x 1350x 1250
105	1382	ESV SERVOMOTOR WITH L.S. MTG.	2100x 1350x 1250
106	1185	IV SERVOMOTOR,LIMIT SWITCH MTG	1950x 1250x 950
107	1185	IV SERVOMOTOR,LIMIT SWITCH MTG	1950x 1250x 950

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
108	1466	CONTROL VALVE SERVOMOTOR	2000x 1500x 1500
109	1466	CONTROL VALVE SERVOMOTOR	2000x 1500x 1500
110	1023	I.P. CONTROL VALVE SERVOMOTOR	1600x 900x 1200
111	1023	I.P. CONTROL VALVE SERVOMOTOR	1600x 900x 1200
112	4645	CRH NRVS WITH SERVOMOTOR	3100x 3040x 2410
113	610	STEAM BLOWING DEVICE FOR CRH	0x 0x 0
114	2500	GOVERNING CONTROL RACK ASSLY.	4700x 1900x 3300
115	377	GLAND STEAM VALVE WITH ACT.	1750x 1400x 850
116	430	SUSPENSION OF LPBYPASS VALVE	2900x 1200x 300
117	323	FRAME FOR SUSPENSION FOR LPBV	1700x 1500x 360
118	323	FRAME FOR SUSPENSION FOR LPBV	1700x 1500x 360
119	40	FRAME FOR SUSPENSION FOR LPBV	300x 300x 300
120	1390	LP BYPASS CONTROL RACK,LIFTING	3600x 1300x 2900
121	716	WATER INJECTION VALVE ASSLY	1550x 1100x 1200
122	5115	LP BYPASS VALVE WITH SERVOMOTR	5040x 1590x 1610
123	5115	LP BYPASS VALVE WITH SERVOMOTR	5040x 1590x 1610
124	736	FRAME FOR SUSPENSION (IV)	0x 0x 0
125	736	FRAME FOR SUSPENSION (IV)	0x 0x 0
126	325	ITEMS OF FRAME FOR SUSPEN.(IV)	0x 0x 0
127	61	EMERGENCY GOVERNOR	0x 0x 0
128	378	INJECTOR FOR SUCTION PIPE	3300x 750x 750
129	499	INJECTOR NB300	3200x 1750x 1100
130	11800	MAIN OIL TANK & NOZZLE ARRGT.	6180x 3260x 2650
131	580	MAIN OIL TANK & NOZZEL ARRNG.A	4100x 1080x 600
132	83	OIL STRIPPER	600x 600x 850
133	166	OIL STRAINERS	2050x 800x 1410
134	100	VARIABLE ORIFICES THROTTLE VAL	0x 0x 0

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
135	2700	HOUSING FOR MS STRAINER	1700x 1025x 900
136	2700	HOUSING FOR MS STRAINER	1700x 1025x 900
137	551	STEAM STAINER ASSY DEV. M.S.&	2140x 1400x 500
138	3200	HOUSING FOR HRH STEAM STRAINER	2200x 1450x 1100
139	3200	HOUSING FOR HRH STEAM STRAINER	2200x 1450x 1100
140	184	STEAM STRAINER (MS)	1700x 700x 760
141	385	STEAM STRAINER HRH	1900x 1050x 890
142	1751	BLANKING ARRANGEMENT FOR MS &	1800x 1650x 1140
143	20	GASKETS FOR MS & HRH STRAINER	700x 700x 300
144	27.44	COMPENSATOR	600x 600x 900
145	24	PLATE TYPE FILTER ASSEMBLY	700x 400x 250
146	83	OIL STRAINERS	2050x 800x 1410
147	654	TURBINE INSTRUMENTS RACKS	2750x 1000x 800
148	550	TURBINE INSTRUMENTS RACKS	2300x 750x 750
149	1056	IMPULSE PIPES (CARBON STEEL)	5350x 650x 650
150	560	GAUGES AND SENSORS	2800x 1250x 1250
151	120	TRANSMITTERS & J.B.OF BEARINGS	1700x 750x 750
152	352	IMPULSE PIPES (ALLOY STEEL)	5350x 300x 300
153	1265	FLOW MEASUREMENT DEVICE	5340x 1240x 855

Note:

0 x 0 x 0 in the Package size column indicates, the drawings for package is yet to be finalized.

PACKING SIZE DETAILS FOR CONDENSER PACKAGE

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
1	5526	HOTWELL	9600x 1400x 1000
2	6940	BOTTOM PLATE	6750x 3400x 700
3	6940	BOTTOM PLATE	6750x 3400x 700
4	5333	BOTTOM PLATE	6750x 2485x 700
5	196	BOTTOM PLATE (LOOSE ITEMS)	1000x 800x 200
6	1302	CONDENSER SPRING ELEMENT	2000x 850x 850
7	1302	CONDENSER SPRING ELEMENT	2000x 850x 850
8	1302	CONDENSER SPRING ELEMENT	2000x 850x 850
9	1302	CONDENSER SPRING ELEMENT	2000x 850x 850
10	3541	CONDENSER SUPPORT (PACKERS FOR	900x 740x 695
11	4168	WATWR CHAMBER(R.S.)	3724x 3480x 360
12	6810	FRONT WATER BOX(R.S.)	3640x 3460x 2250
13	4168	WATER CHAMBER(L.S.)	3724x 3480x 360
14	6810	FRONT WATER BOX (L.S.)	3640x 3460x 2250
15	4168	WATER CHAMBER(L.S.)	3724x 3480x 360
16	6810	REAR WATER BOX (L.S.)	3640x 3460x 2250
17	4168	WATWR CHAMBER(R.S.)	3724x 3480x 360
18	6810	REAR WATER BOX (R.S.)	3640x 3460x 2250
19	4460	SIDE WALL(TUR.END)	3730x 2480x 64
20	4460	SIDE WALL(GEN.END)	3730x 2480x 64
21	914	LOOSE ITEM OF SIDE WALL(T/G)	5050x 150x 160
22	360	LOOSE ITEM OF SIDE WALL(T/G)	1000x 500x 500
23	2533	SHELL INTERNAL STIFFENING RODS	2500x 810x 665
24	2533	SHELL INTERNAL STIFFENING RODS	2500x 810x 665
25	2589	SHELL INTERNAL STIFFENING RODS	2500x 810x 665

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
26	557	SHELL INTERNAL STIFFENING RODS	600x 500x 400
27	1274	SHELL INTERNAL STIFFENING	2200x 540x 400
28	39	SHELL INTERNAL STIFFENING	300x 200x 200
29	838	AIR EXTRACTION PIPING	0x 0x 0
30	3600	TUBE SUPPORT PLATE	3350x 3170x 285
31	3600	TUBE SUPPORT PLATE	3350x 3170x 285
32	3600	TUBE SUPPORT PLATE	3350x 3170x 285
33	3600	TUBE SUPPORT PLATE	3350x 3170x 285
34	3600	TUBE SUPPORT PLATE	3350x 3170x 285
35	3600	TUBE SUPPORT PLATE	3350x 3170x 285
36	1796	SHELL INTERNAL GUIDE FLATES	3200x 500x 450
37	268	SHELL INTERNAL DETAIL	3100x 320x 80
38	1226	SHELL INTERNAL DETAIL	1020x 980x 500
39	1990	SHELL INTERNAL DETAIL	900x 810x 750
40	6990	LOWER DOME WALL(TUR.END)	9800x 3250x 990
41	206.45	LOWER DOME WALL (TUR.END)	16x 250x 6575
42	165.4	LOWER DOME WALL (TUR.END)	600x 600x 250
43	6583	LOWER DOME WALL (GEN.END)	9800x 3250x 990
44	206.45	LOWER DOME WALL (GEN.END)	16x 250x 6575
45	165.4	LOWER DOME WALL (GEN.END)	600x 600x 200
46	5925	LOWER DOME WALL (FWB.SIDE)	7200x 3705x 450
47	352	STIFFENERS OF LOWER DOME WALL	1200x 500x 300
48	6241	LOWER DOME WALL (RWB SIDE)	7200x 3625x 950
49	260	LOOSE ITEM OF LOWER DOME WALL	650x 550x 450
50	3879	DOMES INTERNAL STIFFENING	2400x 1250x 1100
51	4589	DOMES INTERNAL STIFFENING	2500x 1100x 1200

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
52	2488	DOME INTERNAL STIFFENING	1100x 850x 850
53	2318	DOME INTERNAL STIFFENING	1600x 1050x 1000
54	2435	UPPER DOME WALL (FWB SIDE)	5200x 1700x 350
55	2440	UPPER DOME WALL(RWB SIDE)	5200x 1700x 518
56	1818	WATER BOX HINGE ARRANGEMENT	1250x 750x 985
57	755	WATER BOX HINGE ARRANGEMENT(BE	850x 550x 500
58	674	WATER BOX HINGE ARRANGEMENT	0x 0x 0
59	674	WATER BOX HINGE ARRANGEMENT	0x 0x 0
60	1030	STEAM THROW DEVICE	1500x 950x 750
61	1030	STEAM THROW DEVICE	1500x 950x 750
62	766	CONDENSER LOOSE ITEMS	4900x 200x 280
63	386.2	LPH-3 STEM EXTRACTION PIPE	0x 0x 0
64	910	CONDENSER LOOSE ITEMS (GASKETS	1000x 750x 600
65	72	CONDENSER LOOSE ITEMS (FASTENE	800x 550x 350
66	571	CONDENSER LOOSE ITEMS (PLATES,	600x 320x 200
67	40	STAND PIPE NO.1	0x 0x 0
68	42	STAND PIPE NO.2	0x 0x 0
69	331	CONDENSER INSTRUMENTATION	1300x 250x 150
70	126.1	CONDENSER INSTRUMENTATION	2100x 500x 250
71	330	EJECTOR	1750x 410x 410
72	2815	MAIN EJECTOR	2660x 1430x 950
73	2815	MAIN EJECTOR	2660x 1430x 950
74	25	LOOSE ITEMS(EJECTOR & AIR	1350x 300x 300
75	50	LOOSE ITEMS (EJECTOR & AIR	1000x 500x 500
76	34	AIR MEASURING DEVICE	800x 500x 750
77	50	LOOSE ITEMS(EJECTOR & AIR	600x 300x 300

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
78	785	GLAND STEAM CONDENSER	1015x 1180x 1400
79	150	STAND PIPE/LOOSE ITEM (GSC)	2000x 400x 200
80	50	LOOSE ITEMS OF GSC (FRAGILE)	600x 800x 400
81	60	LOOSE ITEMS GSC(NON FRAGILE)	400x 300x 300
82	3300	DRAIN COOLER	4800x 1000x 1250
83	95	LOOSE ITEMS(DRAIN COOLER)	800x 500x 300
84	11000	LP HEATER NO. 1	11300x 1250x 1750
85	200	LOOSE ITEMS OF LPH-1	500x 400x 400
86	50	LPHEATER NO. 1 STAND PIPE	2200x 700x 500
87	67	LP HEATER NO.1 &STAND PIPE	850x 800x 700
88	277	LP HEATER NO.1 &STAND PIPE	1000x 800x 700
89	9950	LP HEATER NO. 2	10800x 1250x 1850
90	74	STAND PIPE NO.1&2 FOR LPH-2	1830x 690x 425
91	88	LP HEATER NO.2& STAND PIPES	2700x 500x 400
92	84	LP HEATER NO.2 ,(LOOSE ITEMS)	850x 800x 600
93	409	LP HEATER NO.2 & STAND PIPES	1000x 800x 700
94	10000	LP HEATER NO. 3	10800x 1200x 1850
95	74	STAND PIPE NO.1&2 FOR LPH-3	1830x 690x 425
96	88	LP HEATER NO.3 &STAND PIPES	2700x 500x 400
97	84	LP HEATER NO.3 &STAND PIPES	850x 800x 600
98	409	LP HEATER NO.3 &STAND PIPES	1000x 800x 700
99	7400	TUBRINE OIL COOLER	4650x 1650x 1980
100	7400	TUBRINE OIL COOLER	4650x 1650x 1980
101	62	TOC (LOOSE ITEMS)	750x 500x 200

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
102	40	TOC (LOOSE ITEMS)	800x 600x 600
103	3510	HYDROGEN COOLER	8000x 1000x 1100
104	3510	HYDROGEN COOLER	8000x 1000x 1100
105	210	LOOSE ITEMS OF HYDROGEN	0x 0x 0
106	567	EXCITER AIR COOLER	2700x 850x 550
107	567	EXCITER AIR COOLER	2700x 850x 550

Note :

0 x 0 x 0 indicates the package details drawings yet to be finalised.

PACKING DETAILS FOR GENERATOR PACKAGES

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
1	4060	FOUNDATION ITEMS OF GENERATOR	3100x 760x 840
2	2535	FOUNDATION ITEMS OF GENERATOR	2240x 940x 1220
3	5	CONSUMABLES FOR FOUNDATION	500x 500x 200
4	196000	GENERATOR STATOR	7410x 4200x 4770
5	42918	GENERATOR ROTOR	10220x 1560x 1660
6	5050	END SHIELD (TE) LOWER HALF	3800x 1155x 2100
7	5050	END SHIELD (EE) LOWER HALF	3800x 1155x 2100
8	480	H.V.BUSHING	2000x 950x 600
9	860	LOOSE ITEMS OF WOUND STATOR	1500x 1200x 1000
10	1046	GENERATOR ACCESSORIES	2140x 1240x 1040
11	3325	GENERATOR ACCESSORIES	3500x 1800x 1250
12	2388	GAS BAFFLE RING,INSERT COVER	3700x 3500x 1340
13	782	BEARING SHELLS	1100x 835x 950
14	4650	END SHIELD (EE) UPPER HALF	3800x 1155x 2100
15	4650	END SHIELD (TE) UPPER HALF	3800x 1155x 2100
16	48	SEAL RINGS	600x 600x 200
17	691	DEVICE FOR ROTOR INSERTION	2240x 940x 1220
18	535	ERECTION DEVICES	2550x 1180x 1140
19	102	WIRE ROPES	1800x 1450x 200
20	40	DRY AIR BLOWER	1350x 1250x 800
21	186	TERMINAL CONNECTORS	1840x 660x 400
22	30	CONSUMABLES	500x 600x 300
23	20047	BRUSHLESS EXCITER SET	5670x 2390x 2810
24	1487	EXCITER FRONT COVER	4310x 2950x 2950

SL NO	NET.WT (KG)	DESCRIPTION	PKG.SIZE(MM)
25	770	RR WHL.COVER & SEALING WALL DE	1800x 1600x 1600
26	1881	EXCITER REAR COVER	4330x 3050x 2950
27	2430	EXCITER BED PLATE ACCESSORIES	5500x 1050x 800
28	150	EXCITER ACCESSORIES	2400x 1100x 1400
29	801	COOLER RACK ASSEMBLY	3000x 1800x 1100
30	7660	SEAL OIL UNIT-I	3550x 2900x 3700
31	1025	SEAL OIL STORAGE TANK	3500x 1300x 1280
32	572	GAS UNIT	2550x 1790x 2560
33	150	HYDROGEN DISTRIBUTOR	3480x 1540x 440
34	116	CO2 DISTRIBUTOR	2770x 1240x 440
35	2263	SEAL OIL UNIT-II	3610x 2040x 1850
36	238	LIQUID DETECTOR RACK	1700x 900x 1800
37	759	LOOSE VALVES	2000x 1000x 1000
38	30	LOOSE INSTRUMENTS	1000x 1000x 500
39	145	CO2 VAPOURISER	1520x 640x 840
40	950	DUPLEX GAS DRIER	2350x 1000x 1900
41	6174	GENERATOR PIPING	6500x 1200x 1000
42	3068	GENERATOR PIPING	6500x 1500x 1200
43	1502	GENERATOR PIPING	0x 0x 0

Note:

0 x 0 x 0 indicates the package details drawings yet to be finalised

Note:

1. The above statement shows the approximate weight of the various sub assemblies of the turbo generator set, associated auxiliaries 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.
2. Any other systems / components which are integral to TG supplied by manufacturing unit also are to be erected and commissioned by the contractor within the quoted / accepted lumpsum value.

SECTION – VII APPENDIX – IV

Major ODC details for Few Equipments

SI No	Description of item	Qty	Shipping Dimensions in mm LxWxH
01	RE Joints with inlet assembly	2	4000x5000x2500
02	HP drain Flash tank	1	3200x3200x4500
	LP Drain flash tank	1	2400x2400x3700
	FW SV flash tank	1	1800x1800x3000
03	HP Heater – 5	1	10500x2100x2600
04	HP Heater – 6	1	11500x1900x1700
05	Butterfly valve	2	Max size 1600 dia 1850x2250x600

SECTION VII

APPENDIX - V

Note for Welding Process:

1. The welding process to be followed at site is final and binding on the contractor. The contractor's quoted lump sum value shall be inclusive of all such contingencies.
2. All the butt welds / sockets welds shall be carried out root run by TIG weldings 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 lumpsum value shall be inclusive of all such contingencies. Full TIG welding wherever necessary mentioned in the drawing / documents shall be carried out within the quoted / accepted value.
3. The welding process, welding joint details and joint configurations and material specification may change to suit the site design requirement. The contractors quoted rates shall be inclusive of such contingencies.
4. All welds involved in the erection of temporary pipe lines for hydraulic test, acid cleaning, alkali flushing and steam blowing etc are not included in the above mentioned lists. Contractor shall carryout all the temporary piping welding also with in the quoted value.
5. All the joints in piping upto 65 mm will be supplied mostly in running metres. The contractors should carryout the cutting of the pipes to the required size edge preparation / bend fabrication and welding at site as per the drawing within the quoted value. For these joints no extra payment will be made for any joints. The contractors quoted / accepted value shall be inclusive of this. No additional payment for extra welds shall be applicable.
6. All attachment welding required for supporting of the piping and instrument tapping points and all the attachment welds involved has to be carried out by the contractors within their quoted value.
7. Pre heating PWHT / stress relieving have to be carried out for headers higher thickness piece / tubes alloy steel tubes / pipes as per the welding schedule or as per the directions/ instructions of BHEL Engineer within the quoted value.
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 with in the quoted value.
9. Welding of hangers and supports stubs are not indicated in the weld joints indicated above. These weldings are to be carried out within the quoted lumpsum value as per drawing and specifications and as per BHEL Engineers instruction whose decision is final and binding on the contractor.
10. The welding of CW piping between A row column and condenser has to be carried out. However the buried pipes in TG raft is excluded, and the contractor has to do hydro test for the erected CW piping along with buried pipe also.

SECTION VII

APPENDIX - VI

List of consumable to be supplied / made available by BHEL free of cost.

1. Such gaskets pickings' shims which form part of equipment supplies.
2. Such special insulating vanishes which form part of equipment supplies.
3. All lubricants required for initial filling and start up.
4. Anti corrosive paints for condenser water box (water space) and steam washable paint (steam space)
5. Chemicals and acids for cleaning pipes.
6. Dummy plates for hydraulic test of condenser.

Note:

1. The above consumable are of special nature and the use of the same shall be regulated as per instruction of BHEL.
2. Any other wastage or Excessive consumption of above consumable above those considered reasonable by Engineer of BHEL shall have to be provided by the contractor.
3. Any other consumables required for the satisfactory completion of the work has to be provided by the contractor.
4. The consumable shall be issued to contractor from time to time in quantities as per the requirement.

SECTION – VII
APPENDIX – VII

List of Tools & Plants Provided by BHEL to contractor, free of Hire Charges on Sharing basis

SI No	Description of the T&P Items	Quantity
01	EOT crane capacity 125 T / 30 T as provided by customer will be made available to the contractor. Contractor has to arrange required experienced operator for the operation of EOT crane. (EOT crane for stator lifting, as provided by customer).	1
02	Crawler crane of Suitable capacity as decided by BHEL Engineer on share able basis For FST & Deaerator	1
03	Acid cleaning pump	As required
04	Sling beams for lifting rotor	As required
05	Special tools and tackles as supplied with equipments as per requirements at the discretion of BHEL Site in charge like test kits for Generator tests	As supplied by units

NOTE:

- 1) All the above T&Ps shall be given to contractor on sharable basis and the allotment is made by BHEL/Site in Charge, on need basis.
- 2) Incase of non-availability of these equipments, due to any reason ie., unavoidable breakdown, major overhaul or any other reason etc. the contractor should make arrangement at his own cost to meet the erection targets. 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.
- 3) At the time of Erection of Generator Stator, one more EOT crane will be provided as provided by customer. Operator to be arranged by Contractor.
- 4) Contractor has to arrange additional two number supporting man power required for trailing cable holding and assistance of crane movement.
- 5) Any loss / damage of T & P by contractor shall have to be replaced or otherwise the costs thereof shall be recovered from the contractor.
- 6) The day-to-day and routine maintenance including replacement of spares for the BHEL T&Ps will be carried out by the contractor at his own cost. However, BHEL shall supply spare parts free of charges for normal wear and tear only.

- 7) Hydro Filling pump and Hydraulic test pump for hydro test is to be arranged by the contractor at his cost other than the HP test pump provided by BHEL.
- 8) Apart from the above, any other tools and plants required for satisfactory completion of the work has to be arranged by the contractor.
- 9) This power House has one EOT crane for entire Turbine work including existing units. However EOT crane will be made available for this contract as provided by customer subject to the availability. The work shouldn't be held up for want of EOT crane. Contractor has to plan his activities after ensuring the availability of the EOT crane at site depending upon the work load at site at the particular time.

SECTION – VII

APPENDIX – VIII

The following is tentative list of T & Ps are to be arranged by the contractor for this scope of work at his cost.

SINo	Description of the T&P Items	Quantity
01	Hydraulic Jacks, winches, Chain pulley blocks, D-shackles	As required
02	Mobile Crane 10T/8T Capacity	01
03	Jeep with trolley	01
04	Trailer/truck 10T	01
05	Welding Machines(welding generator / welding rectifier)	As required
06	Electrode oven, welding torch, cables	As required
07	PC with printer for planning, erection billing works with EDP operator	01
08	Concrete blocks, steel beams , wooden sleepers, steel wire ropes for works, compressor, grinding machine	As required
09	All Personal protective equipments	As required
10	Condenser Tube expander(with torque controller) along with expanders, mandrills, rollers with all tools for chamfering, cutting and flaring to be arranged by contractor at his cost	04
11	Pipe bending m/c, sheet bending machine	01
12	Portable pipe cutting m/c	01
13	Drilling m/c	01
14	a)Precision Theodolite 1” accuracy, b) levelling instruments, water levels, spirit level	01 As Required
15	Crimping machine	01
16	Surface plates, Pressure gauges for water box leak testing	
17	Straight edge 1200 mm	01
18	UV lamp, DPT test kit, Radiography test kit	As Required

In addition to the above, any T&P's required for completion of work are also to be arranged by the contractor at his cost. Progress of work should not be held up for want of T&P.

SECTION VII

APPENDIX - IX

EXCLUSIONS

1. Application of complete thermal insulation
2. HT, LTC, AC and DC Power Sources
3. All cable connections and accessories there of beyond Terminal boxes of equipment or local junction boxes supplied by BHEL.
4. All piping beyond the Terminal points shown in BHEL piping layout / drawings. However, these terminal points are to be cleaned edge prepared, ground and welded, bolted and tightened etc.
5. Supply of oils for oil flushing and chemicals for Alkali / acid cleaning of piping systems.
6. Commissioning and trouble shooting of electrical, electronic, pneumatic and micro processor controlled processors and system.
7. Connections, Terminations, wiring, cabling, testing and commissioning of static excitation systems. However, placement on location is in the scope of this contract.

SECTION VII

APPENDIX – X

DECLARATION SHEET

I, _____ hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL: PSSR: SCT: 1327 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 – XI

TENDER SPECIFICATION NO BHEL: PSSR: SCT: 1327

**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

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

SECTION VII
APPENDIX - XII
CHECK LIST
TENDER SPECTFICATION NO, BHEL: PSSR: SCT: 1327

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
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

SIGNATURE OF THE TENDERER

- 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/supervisors and workers/labourers for satisfactory completion of work under this specification. : YES/NO
6. Whether the Tenderer is conversant with local labour laws & conditions : YES/NO
7. Whether the tenderer is aware of all safety rules and codes : YES/NO
8. Whether the Declaration sheet (as per appendix) enclosed : YES/NO
9. Time required for mobilization of site organization and start of work : YES/NO
10. Whether list of tools and Plants available with the contractor and proposed to be deployed for this work enclosed : YES/NO

SIGNATURE OF THE TENDERER

11. Whether all the Pages are read understood and signed. : YES/NO
12. Deviations, if any Pointed out : YES/NO
13. Whether PF exemption No. is allotted by RPFC of your area if so, indicate number : YES/NO

SIGNATURE OF THE TENDERER