

TENDER SPECIFICATION

BHEL: PSSR: SCT: 1322

**Handling at Site Stores / Storage yard,
Transportation to Site of Work, Erection,
Testing and Commissioning of Cooling
water And Auxiliary cooling water piping
for Unit 5 of 210 MW set**

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, AnnaSalai, Nandanam, Chennai-600035.**

INDEX SCT: 1322

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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: 1322

Messrs

Date:

Dear Sir,

SUB: Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Cooling water Piping and auxiliary cooling water piping for Unit 5 of 210 MW set at Rayalaseema Thermal Power Project (Muddanur) V.V.Reddy Nagar, Kalamalla Post, Cuddapah District, Andhra Pradesh.

Please find enclosed one set of non-transferable tender documents containing 90 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 9.)

The completed quotations shall reach the office of the under signed on or before 03.12.2008 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 with out 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.

14. QUALIFICATION REQUIREMENT

- a) The bidders should have executed LP or H.P piping work in a power plant of 60 MW or above, or large steel mills or fertilizer plants or refineries in the last seven years.
- b) The bidders should have a minimum average financial turn over of Rs.153 Lakhs 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 Tender or all the Tenders for reasons whatsoever beyond our control and the decision of BHEL is final.

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

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 booklet., out of which **one set** of each document shall be retained by them for their reference. Balance one set shall be submitted along with their offer as per procedure indicated above.

EMD amount for this Tender is Rs.2,00,000/- (Rupees Two Lakhs only). This EMD amount shall be submitted in the form of either pay order or demand draft only drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 35.

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

ANY REVISION OF RATES / PRICES 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: 1322

Description	EMD
Handling at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Cooling water Piping and Auxiliary cooling water Piping for Unit 5 of 210 MW sets at Rayalaseema Thermal Power Project (Muddanur) V.V.Reddy Nagar, Kalamalla Post, Cuddapah District, Andhra Pradesh.	Rs.2,00,000/- (Rupees Two Lakhs only).
Cost of Tender Documents : (Including all Taxes)	Rs.1040/-
Sale Starts on :	12.11.2008
Sale closes on :	02.12.2008
Due date and Time for Submission :	03.12.2008 15.00 Hrs.
Date and time for opening of Technical Bids:	03.12.2008 15.30 Hrs.

QUALIFICATION REQUIREMENT

- a) The bidders should have executed LP or H.P piping work in a power plant of 60 MW or above, or large steel mills or fertilizer plants or refineries in the last seven years.
- b) The bidders should have a minimum average financial turn over of Rs.153 Lakhs 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 Tender or all the Tenders for reasons whatsoever beyond our control and the decision of BHEL is final.

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

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

The Bharat Heavy Electricals Limited takes no responsibility for any delay, loss or non-receipt of tender documents sent by post and also reserves the right to reject any or all the tender without assigning any reason therefor.

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

ADDITIONAL GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION: BHEL: PSSR: SCT: 1322

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: 1322 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:

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
Stage .III (1 x 210 MW Unit),
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 : Up to 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 Airport : Hyderabad / Bangalore – 300 kms
- 11.0 Nearest Railway Station : Muddanur on Chennai –
Mumbai 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 **3.9.0.** (Preservation clause)

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:

BHEL will provide one 75T capacity crane or above capacity crane on shareable basis for the erection and all other tools and tackles including 1No. of 8T mobile crane required for the complete erection of components shall be arranged by the contractor and the quoted rate shall be inclusive of such requirements.

3.2.5 CONSUMABLES:

TIG welding wire for C.S, A.S., S.S. welding electrodes, gases, fuel, lubricants. and all consumables are to be arranged by the contractor at his 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 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 at least 2 to 4 diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderer. 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.

3.3.8 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.

3.3.9 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.

3.3.10 CIVIL WORKS

Civil works like earth work excavation, sand filling, concreting if any for encasement of pipe, back filling on completion of buried pipe is not in the scope. However in case the areas of pipe joints around the joint extra excavation to be done to facilitate for welding, testing etc the same to be carried out by the bidder. Bidder to take care while quoting and no charges on this account will be paid separately. If any water logging due to rain/land slide or water seepages in the erection area, the bidder has to arrange for dewatering the water to facilitate the Erection/welding.

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.
- 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 subjected 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 for welding, 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.

3.6 TOOLS & TACKLES

- 3.6.1 BHEL will provide only one 75T capacity crane or above capacity crane on shareable basis for this scope of work. The fuel, lubricants and operator for the crane is in the scope of contractor.

- 3.6.2 All other T & P required for the satisfactory execution of work shall be arranged by contractor at their cost.
- 3.6.3 Necessary electrical / water / air connection required for operation of any of their equipment shall be the Contractor's account.
- 3.6.4 All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.
- 3.6.5 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.
- 3.6.6 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.
- 3.6.7 Contractor shall take into consideration the above clause and quote the rates as called for in the Rate Schedule.
- 3.6.8 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. The transportation of crane and its accessories from BHEL stores and assembling, extension/reduction of boom is in the scope of contractor and the crane is to be returned to BHEL stores in fully working condition.
- 3.6.9 The list of major T&P required to be deployed by the contractor is indicated in APPENDIX-I. This 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 cost.
- 3.6.10 The contractor shall be responsible for proper use of the above equipment issued to him. Day to-day maintenance and operation of equipment shall be the contractor's responsibility and shall be as per instructions/standard practices of BHEL engineer.

- 3.6.11 Non availability 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.
- 3.6.12 Monthly utilization report & daily log sheet of the above equipment shall be furnished by contractor cost analysis purpose.
- 3.6.13 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 actual return and the amount so decided and arrived at, will be recovered from the contractor's bill.
- 3.6.14 Contractor shall make good any loss or damage to the equipments or Instruments issued to him from BHEL. In case of any lapses on the part of the contractor, BHEL at its own discretion will get the servicing / repair of equipment done at the risk and cost of the contractor.
- 3.6.15 Day to day maintenance and operations of the issued equipments and Instruments shall be borne by the contractor including all consumables like petrol, oil and air filters etc.

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, Sarangs, 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 are 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 SCOPE OF MATERIAL HANDLING AND SITE STORAGE AND OTHER RESPONSIBILITIES

3.8.1 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.

3.8.2 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.

3.8.3 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.

3.8.4 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.

3.8.5 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.

- 3.8.6 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.
- 3.8.7 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.
- 3.8.8 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.
- 3.8.9 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.
- 3.8.10 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.
- 3.8.11 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.
- 3.8.12 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.
- 3.8.13 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.

- 3.8.14 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.
- 3.8.15 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.
- 3.8.16 All the necessary certificates and licenses required to carry out this scope of work are to arranged by the contractor then and there at no extra cost.
- 3.8.17 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.
- 3.8.18 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.
- 3.8.19 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.

- 3.8.20 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.
- 3.8.21 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.

3.9.0 PRESERVATION OF COMPONENTS

- 3.9.1 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 preservative paint, cotton waste, cloth etc. for carrying out preservative painting. The quoted rate shall inclusive of above work.
- 3.9.2 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.
- 3.9.3 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.
- 3.9.4 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.

3.10.0 DRAWINGS AND DOCUMENTS

- 3.10.1 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.
- 3.10.2 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.
- 3.10.3 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.
- 3.10.4 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.
- 3.10.5 Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimensions/details without specific approval of BHEL.

3.11.0 SAFETY AND CLEANLINESS

- 3.11.1 Contractor shall strictly follow all safety regulations/conditions as per contract and its sub clauses of general conditions of contract booklet enclosed with this tender.
- 3.11.2 Non-conformity 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/-

3.11.3 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.

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

3.12.0 SPECIFIC REQUIREMENTS FOR ISO 9001 - 2000

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.

3.13.0 INSPECTION / QUALITY ASSURANCE / QUALITY CONTROL STATUTORY INSPECTION

3.13.1 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.

3.13.2 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.

3.13.3 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.

- 3.13.4 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.
- 3.13.5 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.
- 3.13.6 Approval Given by Customer/BHEL for welding, results tests etc. shall also be recorded in the log book.
- 3.13.7 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.
- 3.13.8 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.
- 3.13.9 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.
- 3.13.10 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.

- 3.13.11 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.
- 3.13.12 All the welders including the HP welders shall carry identity cards as per the Performa prescribed by BHEL only Welders Duly authorized by BHEL / Boiler Inspector / Consultant shall be engaged on the work.
- 3.13.13 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 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.

3.14.0 STAGE INSPECTION BY FES / QA ENGINEERS

- 3.14.1 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.
- 3.14.2 Any modifications suggested by FES and QA Engineers Team shall be carried out. Claims of Contractor, if any shall be dealt as applicable.
- 3.14.3 Any minor rectifications or minor repairs or defective work found out during stage Inspection shall be rectified free of cost, by the contractor.
- 3.14.4 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.

3.15.0 STATUTORY INSPECTION (if applicable)

- 3.15.1 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.
- 3.15.2 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 inspection have to be repeated due to default / fault of the contractor and fees have to be paid again, the contractor shall have to bear the charges. These would be deducted from his bills.

HSE SPECIFIC REQUIREMENT OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

3.16.1 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.

3.16.2 SUB CONTRACTOR TO ENSURE COMPLIANCE OF THE FOLLOWING SAFETY RELATED POINTS

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

Helmet

Safety goggles

Welding face shields

Safety belts for working at heights

Safety shoes

Ear plugs

Rubber gloves and mats for low tension (I.T) electrical works

Gum boots & aprons

Other items as required by BHEL site

02. Sub contractor to liase with nearest fire station and inform contact telephone number and contact person to meet any emergency.
03. To provide appropriate fire fighting equipment at designated work place and to provide fire fighting training to selected persons in his group of workmen to meet emergencies.
04. To provide adequate number of 24 V power supply points to work in a constrained and enclosed space.
05. All power tapping points / switch boards /power & control cabling 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 and 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 incharge, supervisors, and key workers to be submitted before commencement of work..
19. Sub-contractor should submit inspection / testing matrix of all T&Ps and to be approved by BHEL.
20. Sub-contractor to display safety slogan, safety board, caution boards wherever required in consultation with BHEL.
21. Sub-contractor to provide gas detectors of reputed make at desired locations.
22. Sub-contractor to conduct emergency mock drills. one drill per 6 month and submit report to BHEL.
23. Safe handling and storing of all equipment with adequate space to be ensured.
24. Sub contractor to deploy safety supervisor till the completion of the project.

25. Sub contractor to comply the safety reporting procedure of BHEL as practiced at present and also additional requirements that may arise out of future improvements in the safety management system. This includes computation of safety indices such as frequency rate, severity rate & incident rate.
26. Sub contractor to identify probable emergency situations such as electric shocks to workmen , caving in of shored earth , fall from height, collapse of scaffolding fire etc., and should have clear action plan to overcome them. Sub contractor to take required guidance from BHEL in this regard.
27. Sub contractor to identify hazardous activities which he may carryout and should train his workmen in those activities with the relevant operation control procedures. Sub contractor to take required guidance from BHEL in this regard.
28. Safe work permit system to be followed while working in confined space / near electric systems.

3.16.3 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 remnant 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

3.17 OTHER HSE REQUIREMENTS TO BE COMPLIED BY SUB CONTRACTOR

1. Sub contractor to clearly understand and accept the HSE policy of PSSR with a commitment to comply the requirements of the policy.
2. Sub contractors to arrange for daily meeting of their supervisors and work force before they disperse for their daily planned activities where in the relevant health , safety and environment aspects of the job and use of PPES are explained
3. Sub contractor to conduct monthly HSE meeting (internal) and submit the report to BHEL.
4. HSE slogans to be displayed in a proper board – hoarding at designated places in consultation with BHEL.
5. Sub contractor to submit a structured programme for training & occupational Health Screening of their work force at site after the Award of LOI.

SECTION - VI

SPECIAL CONDITIONS OF THE CONTRACT

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

6.1.0 Handling at store / yard, transportation to site, fabrication and welding

of support, branch pipes, man holes, instrument tapping, flanges etc, (wherever applicable), laying pipe line for supply line & return line of main cooling water and auxiliary cooling water piping along with valves, expansion joints, etc. alignment, welding and doing required NDT, Holiday test, completion of permanent hangers & supports wherever required, conducting air test & hydro-test, supply and application of **wrapping and coating and final painting**, assisting BHEL to carry out the required tests before the line is taken over by the customer of CW PIPING and ACW PIPING at Unit 5 of 210 MW at Rayalaseema Thermal Power Project is in the scope of this contract. The civil work is excluded from the scope of contractor.

6.1.1 The terminal points for CW & ACW piping decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals. However certain details are given below with respect to terminal points.

Terminal point for CW piping as indicated in the PEM drawing No.PE-DG-279-165-M003, which is enclosed with this tender.

Supply Lines: - From CW pump discharge to A row walls of units 5.
Return Lines: From A row wall to cooling tower

Note: Both terminals to be connected with the pipes if already erected by other agency.

The CW layout drawing No: PE-DG-279-165-M003 will be provided. However the lay out may vary as per final approval / site conditions and the final terminal point will be decided by the site engineer.

Terminal point for ACW piping:

Supply line is from ACW pump to TG & DMCW pump house and various equipments as per PEM layout drawing PE-DG-279-179-M001, SH01 and PE-DG-279-165 -M003.

Return line is from TG/DMCW /Equipments to main cooling water return line as per the above mentioned drawing.

The above mentioned two layout drawings are provided for tendering Purpose only.

6.1.2 The layout drawings of CW and ACW piping under this contract is enclosed with this tender. The drawings are for tendering purpose and indicative for estimation only. There may be variation in size, layout, materials, no. of joints etc. in the final erection drawing, which are to be carried out by the contractor with in the quoted rate.

6.1.3 All buried pipes are to be wrapped with coal tar tape on external surface including supply of materials like paint, coal tar tape etc.

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

6.2.0 TRANSPORTATION FROM STORES & COATING YARD

6.2.1 Loading at storage yard and transporting to site, unloading at site / pre assembly area or at working area, is in the scope of work. Required cranes for loading & unloading of materials, trailer shall be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, sandbags which are required for temporary supporting of the components at site.

- 6.2.2 Contractor shall take delivery of the components from the storage area after getting the approval of BHEL Engineer on standard indent forms to be specified by BHEL. Complete and detailed account of the materials erected as well as the progress shall be submitted to the Engineer as directed.
- 6.2.3 The individual CW pipe of maximum diameter 2540 mm x 20 mm (approx) will be supplied with maximum length of 10 meters with bevel cut edge preparation. The maximum diameter of ACW pipe is 610mmx8mm(approx)and the edge to be prepared at site during erection. Pre fabricated miter bends will be supplied.
- 6.2.4 All the pipes / components 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 pipes. The bare pipes shall be lifted with Teflon coated hooks with cranes then loaded / unloaded on / from trailers to avoid bevel damages. It is always safer for the pipes to be lifted at two points.
- 6.2.5 Pipes shall not be dropped to avoid impact or bump.
- 6.2.6 Bare pipes shall be stacked on a sand row / concrete sleepers. Like wise, coated pipes of different diameter and wall thickness shall be stacked in different sand rows. Between two layers of coated pipes, care should be taken to avoid contact between two pipes by putting sand dust bags.
- 6.2.7 The equipment from the storage yard shall be moved to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage /loss of such equipment at site.
- 6.2.8 Contractor shall plan and transport equipments, components from storage yard to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

6.3.0 ERECTION

- 6.3.1 Brief list of equipments / sub-assemblies to be erected by the contractor & approximate weight is given Section – VII weight schedule and is meant for giving general idea to the tenderer only about magnitude of the work involved. The components are sent in parts for convenient transportation. They are to be cleaned, assembled in stage by stage, welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.
- 6.3.2 The entire consumables, equipments / T & Ps required for successful completion of the work is in the scope of contractor and the quoted rate shall be inclusive of all these.
- 6.3.3 All the equipments / material to be taken inside the plant building, shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary as per instruction of BHEL Engineer during erection at the quoted rate.
- 6.3.4 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.
- 6.3.5 Carrying out piping as per the specification between equipments constituting terminal points, whether the terminal equipments fall with in the scope of work/specification, contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, fixing gaskets, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with in the quoted rate.
- 6.3.6 Contractor has to draw the material either from BHEL store yard or customer stores and transport to his working place.
- 6.3.7 Welders shall be qualified as per the welder qualification procedures of BHEL/ASME, applicable for this type of job. Only qualified welder shall be deployed for welding.

- 6.3.8 All dimensions / elevations refers to centerline of pipe unless otherwise specified, the pipe routing shall be carried out as per the drawing. Wherever the dimensions are not specified / shown as approximate the same may be routed as per site requirement / convenience as per site engineer's advice.
- 6.3.9 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 site conditions, which shall be done by the contractor at no extra cost.
- 6.3.10 Wherever pre-fabricated pipes/bends are supplied, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor's scope.
- 6.3.11 Certain adjustments in length may be necessary while erecting pipelines to suit site condition, for which an extra length of piping is provided on each line. Contractor should remove the extra lengths to suit the final layout and prepare edges afresh is in the scope of work. It may also required to add extra lengths of pipes to suit final layout for contractor to put spools after edge preparation. All these works are to be carried out by the contractor with in the quoted rate.
- 6.3.12 Box cutting and excavation of earth up to the required depth and width, concreting etc., shall be carried out by customer on phased manner as per the site requirement and decided by BHEL site in-charge. But the contractor shall make the width of the trench be sufficient for free working wherever necessary within thequoted rates. As and when the clearance for erectionof piping is given, contractor shall carry out erection work promptly with out any delay and release for further civil in a phased manner as instructed be site in-charge.
- 6.3.13 Once the clearance is given for erection contractor, he has to lay the pipes immediately with out any delay and complete erection, alignment, welding & NDT as per the drawing / welding schedule. Pipes are to be lifted and placed only by cranes and should strictly follow the lifting procedure / instruction of BHEL Engineers.

- 6.3.14 Minor adjustments like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified procedure to be carried out within the quoted rate.
- 6.3.15 Contractor shall arrange all the equipments, alignment bolts, tools, consumables like welding rods, etc. for welding of pipes and consumables like jute, cotton waste, hacksaw blades, petrol, Kerosene oil etc. are also in contractor's scope. All these shall be carried out with in the quoted rate.
- 6.3.16 Contractor shall use only bolted clamps for achieving alignment of piping, wherever "L" shaped stoppers and wedges are to be used for aligning piping and equipments, the same shall be subjected to the approval of BHEL Engineer. Contractor shall remove the bridge, stopper etc., and not by hammer. Any burrs left on the equipments / piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.
- 6.3.17 All the weld joints on equipments and piping shall be ground or filled on completion of welding as per instructions of BHEL Engineer so as to achieve smooth surface devoid of ripples, undulations etc.,
- 6.3.18 Pipelines shall be cleaned off welding slag and burrs by hand files, wire brushes and flexible grinders wherever required.
- 6.3.19 Temporary lugs / structures meant for transportation is to be removed by the contractor as and when instructed by BHEL Engineer.
- 6.3.20 Flame cutting of piping and other equipment shall be strictly done as per BHEL Engineer's instructions and in his presence only.
- 6.3.21 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping as per the instructions of BHEL Engineer.

- 6.3.22 On completion of bottom layer of pipes, contractor has to conduct hydraulic test. For conducting hydro – test both ends of each lines are to be blanked suitably. Raw materials for blanking such as plate / structural items will be given by BHEL on free of charges. Fabrication, welding of dummies and NDT and removal of dummies after successful completion of hydro – test and making edge preparation on the parent pipe is in the scope of contract. For hydro test to be conducted in stages or to be repeated the same plates shall be used for blanking by suitable grinding.
- 6.3.23 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks valves required for the hydraulic test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL free of charges. Temporary piping, pumps, valves, flanges, blanks etc shall be removed by him once the work is over and returned to BHEL.
- 6.3.24 The contractor has to arrange(low pressure) hydro-testing pump for conducting hydraulic test on his own with in the quoted rate. The servicing, installation, electrical connection, erection, testing and dismantling after completion of hydro-test shall be carried out by the contractor as part of this work without any extra charge.
- 6.3.25 Required water filling pump is to be arranged by the contractor.
- 6.3.26 All the above tests shall be repeated till all the equipment satisfy the requirement of BHEL to their customer. Any rectification required shall have to be redone by the contractor at his cost.
- 6.3.27 After completion of hydro test on bottom layer it is to be cleared for concrete to Civil agency, after de-watering and removing all temporary supports / scraps.
- 6.3.28 The valves will have to be checked, lapped or overhauled in full or in parts before / after erection. Contractor shall arrange experienced valve technician at his own cost. Any special tools required for lapping only will be arranged by BHEL.

- 6.3.29 For other agencies, such as Civil works, LP Piping, Cabling, instrumentation etc., to commence their work from/ on the equipments coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the over all project schedule.
- 6.3.30 All drains / vents/ relief line etc. from the stubs on the piping to be erected by the contractor, is completely covered in the scope of work.
- 6.3.31 Fixing / fitting / welding of thermo well stubs, tapping points, root valves and instruments etc is within the scope of work.
- 6.3.32 The contractor shall conduct non destructive tests like radiography ultrasonic test for weld defects etc., dye penetrant tests, magnetic particle test etc. on weld joints, castings, valve bodies and other equipments etc. as per BHEL Engineer's instructions/welding schedule.
- 6.3.33 Contractor shall arrange the necessary clearance from the statutory authorities (Labour commissioners etc.,) as required for installation of the plant and equipment and render all assistance, service required in this regard.
- 6.3.34 All Operating / Approach platforms, cross over, canopies, ladders etc. shall have to be fabricated from raw materials supplied by BHEL and erected within the quoted rate. No separate rate is payable on weight basis for supports, other than those indicated in PGMA or supplied by Units, which will be covered in the overall weight.
- 6.3.35 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts, then and there for their protection.
- 6.3.36 Any failure on the part contractor to carry out work according to above clauses will entitle BHEL to carryout the job through any other party and recover the cost from contractor.

6.3.37 Contractor shall cut / open works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning opening of valves changing of gaskets attending to leakages minor modification rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower with T & Ps in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning, the same has to be rectified by the contractor at his cost.

6.4.0 HYDRAULIC TEST AND OTHER TESTS

6.4.1 Hydraulic testing, as required shall be carried out by the contractor. The servicing, installation, electrical connection, erection, testing and dismantling of Hydraulic Test pump shall be carried out by the contractor as part of this work.

6.4.2 All cooling water and auxiliary cooling water piping systems shall be subjected to Hydraulic test as per the statutory requirements ,drawing and the Field quality Plan. The contractor shall supply necessary labour and other services to carry out the required tests as per the instructions and directions of the BHEL Engineers .

6.4.3 All the above tests shall be repeated till all the pipe lines satisfy the requirements / obligation of BHEL to their customer. As far as the hydraulic pressure test is concerned, the same shall be conducted to the satisfaction of BHEL / Customer Engineers. Any rectifications required shall have to be done / redone by the contractor at his cost.

6.4.4 All temporary piping materials necessary for conducting hydraulic test, will be supplied by BHEL. However servicing, erection and dismantling of the same is the responsibility of the contractor. Those items that are issued along with main equipments / components specified under dispatch unit for temporary piping etc. supplied by BHEL or others or any other agency alone will be paid at the quoted rates for erection. Charges for dismantling of temporary lines etc. should be included in the quoted rates.

6.5.0 PRESSURE TEST FOR PIPING

- 6.5.1 Soundness of the welds shall be tested hydraulically under the supervision of the BHEL Engineer and Customer, to the pressure indicated in the drawing for cooling water and auxiliary cooling water piping system. Prior to the test, the piping system shall be inspected by the BHEL Engineer to the extent necessary to ensure compliance with clearance for the test, which will be obtained by the contractor from the Engineer.
- 6.5.2 BHEL will supply the necessary temporary pipes, valves etc. or test. The erection of temporary pipes, valves pressure gauges and the subsequent removal after the successful completion of the test and returning the same to BHEL shall be done by the contractor at his own cost.
- 6.5.3 The test shall be repeated till the BHEL and Customer are satisfied as applicable.
- 6.5.4 As a rule, pressure tests shall be performed after all eventual pipe branches have been completed and valves installed. Should it be required to hasten erection work, pressure tests may be performed by sections. For this scope of work, the erected pipe lines shall be Hydraulically tested in segments. For conducting hydraulic test, both ends of pipe lines shall be blanked by welding of plates. Only one set of plates and structural materials for blanking required for one segment will be provided by BHEL free of charge. After completion of hydraulic test in one segment, the same plates are to be cut and removed and utilized / welded on the other segment of the pipe lines, to carry out the hydraulic test for the respective segments. No separate plates for blanking for each segments will be provided. After completion of Hydraulic test, the required edge preparations shall be carried out on the end of pipe lines and to be welded with the respective pipe lines. In such cases joint connection shall be checked during a final and additional test, if required. The Bidder shall note this aspect and quote accordingly.

6.5.5 The following specifications shall be completed with during hydrostatic test.

- a. Vent nozzles with valves shall be provided at the highest point of the runs, to eliminate air pockets. At the lowest point drain nozzles, with valves shall be provided to drain water from pipes. The nozzles and valves shall be of the same materials as the pipe.
- b. The lowest part of the pipe shall always be filled first with water.
- c. Pressure shall be slowly increased (without shocks) to the stipulated value and maintained as long as required to visually check all joints.
- d. Following the control specified above the pressure shall be slowly decreased to the design pressure after which the pipe shall be subjected to the peening test, applying knocks every 150 mm approx. especially in the welded joint areas, with a 0.5 – 1.5 kg. Hammer (depending on the pipe wall thickness). The hammer used shall be a round headed one.
- e. Following the peening test, the pressure shall be increased to the stipulated value and all welded joints shall be visually inspected.
- f. Following these test, the pipe shall be drained in the low points and flushed with air for all pipes where ever applicable..
- g. The pressure test is considered satisfactory if no cracks, unjustified pressure reductions, leakages, weepings etc., appear.
- h. Should defects be found, these shall be repaired in the same manner as these during radiographic examination. Hydraulic test shall be repeated after defects have been repaired.

6.5.6 During hydraulic test, the pipes being tested shall be isolated from the equipments to which they are connected.

6.5.7 Openings on piping for pressure / temperature impulse connections shall be fully closed during the test to prevent dust or foreign matter from being introduced into the instrument piping inadvertently.

6.5.8 Test records shall be made of pressure testing for above piping system. These records shall contain the following information:

- a. Date of test
- b. Identification of piping tested
- c. Test fluid
- d. Test pressure
- e. Approval of the Engineer

6.6.0 BURIED PIPING

6.6.1 The pipe in general shall be laid with the top of the pipe minimum 1 Mtr. below finished general ground level or as specified in the drawing. Anti corrosive treatment for all buried pipes suitable water application and supply & application of anti corrosive treatment, required consumables are in the scope of contractor and shall carry out as per drawing within the quoted rate.

6.6.2 The scope, quantity & sizes of buried piping are given below. The approximate quantum of buried pipe works will be around 700 MT in CW piping and 50MT in ACW piping. However the application of wrapping & coating on buried pipes (CW and ACW) area is approximately 5500sqm.

CW piping: Size of pipes - 2540 x 20 mm and 1626 x 16/14 mm

Refer erection welding schedule furnished in section VII.

6.6.3 The civil works for the buried pipings are excluded for this scope of work. However the contractor has to ensure that the width of the trench shall be sufficient to give free working space on each side of the pipe wherever necessary.

6.6.4 Free access shall be provided for the welding of the circumferential joints by increasing the width and depth of the trench at these points. There should be no obstruction to the welder from any side so that good welded joint is obtained. This type of incidental works are to be carried out by the contractor within quoted rates.

6.6.5 Prior to lowering and laying pipe in any trench, the contractor shall ensure for the backfill and compact the bottom of the trench or excavation in accordance with IS 5822 / as per drawing to provide an acceptable bed for placing the pipe.

6.7.0 COATING & WRAPPING shall be done as follows.

6.7.1 The pipe line shall be thoroughly cleaned of all rust, grease, dirt, weld scales and weld burrs etc., moisture or other foreign matters. Grease or heavy oil shall be removed by washing with a volatile solvent such as gasoline. Kerosene will not be permitted for cleaning. Priming shall immediately follow this cleaning operation with mechanical priming machine. Alternatively, with the concurrence of BHEL / customer the pipe line shall be adequately scrubbed manually with wire brush and scrapped wherever necessary.

- 6.7.2 All the pipes will be applied with coating, leaving the end about 100 mm for joints, which shall be coated manually at site after laying, welding and testing the pipe.
- 6.7.3 Coating & Wrapping shall be done after completion of welded and / or Flanged connections and after completion and approval of Hydro testing. Materials required for coating, wrapping and consumables required for cleaning operations as stated in para (1) above are to be arranged by the contractor within the quoted rate.
- 6.7.4 The materials used for coating and wrapping are
- a. Coating Primer (Coal Tar Primer)
 - b. Coating Enamel (Coal Tar Enamel)
 - c. Wrapping Materials

All primer / Coating / Wrapping materials and method of application shall conform to IS 10221 except asphalt / bitumen material.

However the scope of work for painting / coating for buried pipe only is indicated below.

For Underground piping:

Apply one coat of coal tar enamel (Lloyd T3 or equal)/ asphalt or suitable resin based primer. One layer of tape comprising of coal tar/ asphalt component supported on fabric of organic/inorganic fibre (as per appendix B of IS:10221) and the min. tape thickness shall be 4 mm.

All the pipes for erection will be supplied with enamel coating. The application of primer / enamel coating at site for C.W and ACW Pipes for buried pipes is not covered in this scope of work. The contractor has to carry out one coat of coal tar enamel (Lloyd T3 or Equal) / asphalt or suitable resin based primer, approximate DFT 25 microns, around welding area, 100 mm on each side of welding joint at pipe internal as well as external surface at both ends after completion of pipe to pipe welding joints, before coal tar taping in CW piping . Similarly apply one coat of coal tar enamel /asphalt or suitable resin based primer upto100mm on either side of the weld joint in the external surface of ACW piping.

- 6.7.5 Number of coats and wraps, minimum thickness for each layer of application shall be as per IS-10221 and shall be decided based on soil corrosivity / resistivity. However the total thickness of completed coal tar coating shall not be less than 4 mm.

6.7.6 Alternatively the anti-corrosive protection can consist of anti-corrosive protection tapes. These tapes shall be applied hot over the coal tar primer. The total thickness of the finished protective coating shall be 4 mm minimum. The required above mentioned tapes are to be provided by the contractor at his cost.

6.7.7 The tapes can be applied directly on to the primed pipe surface by means of mechanical coating / wrapping equipment manually or by machine. The minimum overlap shall be not less than 25 mm when a new roll of tape is started and the ends shall be overlapped at least 150 mm measured circumferentially. The overlap shall be smooth and shall be located to ensure the continuity of the inner layer coating.

6.7.8 Testing:

Thickness: The thickness of the pipe coating shall be measured by Elcho meter or coating thickness gauge.

Bond:

The test will be carried out by cutting 25mm square at three locations of the coating on a sample test specimen to qualify the procedure.

Coating will be pulled out by lifting one corner of the square. For a good coating, the section will not peel off easily.

Field Adhesion Test:

The adhesion test will be carried out to determine the bond between the tape and primed pipe. The temperature of the tape and pipe to be tested will be between 10 and 27 degree C. If the temperature is outside this range, hot or cold water will be poured over the test area until this temperature range is attained. A test area will be selected by the BHEL /customer engineer where the tape is smooth for 15cm in the longitudinal direction of the tape. Two knife cuts that are 15cm long and 5cm apart will be made through the tape. A flat blade will be used to pry up 5cm of the fabric. The 5cm flap of fabric will be grasped firmly in one hand and will be pulled with a quick motion in the direction of the remaining 10cm of the 15cm knife cut. The adhesion is satisfactory if the tape tears at the point of stripping or the fabric strips from the under lying coal tar component, leaving exposed not more than 10% of the primer or metal.

Holiday Test

On completion of coating / wrapping, the quality of coating will be tested using efficient high voltage holiday detectors, operating at a voltage high enough to jump an air gap, the length of which is equal to the thickness of the coating/wrapping. All holidays found will be repaired and the repairs will be retested with the holiday detector to ensure that adequate repairs have been made.

6.7.9 External Surface – Painting of Over Ground Piping

All the external surface of pipe shall be cleaned properly. After completion of cleaning, application of paints are to be carried out for over ground piping. This application of paints involves two coats of red oxide (zn chromate) primer, each coat will be around 25 microns and two coats of finish paint of synthetic enamel paint (smoke grey) of each coat will be of DFT 50 Microns and the total dry film thickness of 150 microns.

6.8.0 TIME SCHEDULE

- 6.8.1 The contractor has to mobilize in all respects within two weeks from the date of issue of fax letter of intent.
- 6.8.2 The entire work of erection, testing and commissioning of CW piping and ACW piping as detailed under this tender specifications for Unit -5 shall be carried out and completed within **12 months** from the date of actual commencement of erection work at site. In case BHEL desires to advance the commissioning as per customer requirement, contractor has to complete all the works within the quoted / accepted rate, to suit the advanced commissioning.
- 6.8.3 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 the system is successfully tested and accepted by BHEL/Customer. The decision of BHEL in this regard shall be final and binding on the contractor.
- 6.8.4 During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL so as to release the front for other works / other agencies.

6.9.0 TERMS OF PAYMENT FOR COOLING WATER AND AUXILIARY COOLING WATER PIPE LINES.

The tenderer shall quote rates for different items as per the Rate schedule appended. The contractor shall submit his running bills once in a month at the end of each month.

BHEL Engineer shall take measurement and certify regarding the actual work executed in the measurement book and bills for erection work.

Subject to any deduction which BHEL may be authorized to make under the contract, the contractor shall on the certificate of engineer at site be entitled for progressive payment upto 90% value on prorata basis against monthly running bills as described below.

6.9.1	On completion of erection and alignment for the items including pre-assy .	35%
	OR	
	On completion of erection & alignment for the items where pre-assy is not involved.	35%
6.9.2	Completion of welding.	35%
6.9.3	Completion of NDE/Testing as applicable (Radiography or MPI or LPI)	10%
6.9.4.	Completion of hydraulic testing & normalizing	5%
6.9.5	Submission of FQA Log sheets.	2%
6.9.6	Completion of final painting	3%
6.9.7. WRAPPING AND COATING (90%)		
6.9.7.1	Supply and Application (wrapping) of the anti corrosive tape leaving welding .	80%
6.9.7.2	Supply and Application of the Anti corrosive tape in the welded area	5%
6.9.7.3	Completion of Holiday Test	5%

6.10.0 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.

6.10.1 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 necessarily means 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.

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

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

6.10.4 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.

6.10.5 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.

6.11.0 EXTRA WORK DOES NOT INCLUDE

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

6.12.0 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.

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

6.13.0 OVER RUN CHARGES

6.13.1 Incase due to reasons not attributable to the contractor, the work gets delayed and completion time gets extended beyond Twelve (12) **months from the date of commencement of the work, the contractor** shall be entitled for any over run charges (ORC) after the expiry of **Twelve (12) months.**

6.13.2 Incase ORC arises the same will apply at **Rs.50,000/- (Rupees Fifty Thousand only) per month for extension of the completion** period beyond 12 months as stated above duly taking into account the balance work at the end of that period.

6.13.3 The period of overrun will have to be ascertained before the completion of contract period.

6.13.4 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.

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

6.14.0 PRICE ESCALATION

6.14.1 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
- 6.14.2 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.
- 6.14.3 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.
- 6.14.4 Payment of PVC will be restricted to 10% of contract value

6.15.0 Taxes and Duties

6.15.1 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.

6.15.2 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.

6.15.3 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.

6.15.4 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..

6.15.5 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.

6.15.6 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 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.

6.15.7 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

6.15.8 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.

6.16.0 PROVIDENT FUND & MINIMUM WAGES

- 6.16.1 The contractor is required to extend the benefit of Provident Fund to the labour employed by him 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 therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.
- 6.16.2 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.
- 6.16.3 The final bill amount would be released only on production of clearance certificate from PF/ESI and labour authorities as applicable.

6.17.1 OTHER STATUTORY REQUIREMENTS

1. The contractor shall submit a copy of labour licence obtained from the licencing Officer(Form VI) u/r 25 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 TPP
- 5

RATING: 210 MW

Units

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

SI.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	
1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.2.2.4	Living facilities for office use including charges		Yes	
1.2.2.5	Demobilization of the facilities after completion of works		Yes	
1.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	
1.3.0	WATER SUPPLY			
1.3.1	For construction purposes:			
1.3.1.1	Making the water available at single point	Yes		
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	Yes		
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	

SI.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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	
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
SITE FACILITIES**

PROJECT: RAYALASEEMA TPP
Units – 5

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 the erection drawings for all the equipments covered under this scope	Yes		
2.1.2	Drawings for construction methods		Yes	
2.1.3	As-built drawings - where ever deviations observed and executed and also based on the decisions taken at site- example - routing of small bore pipes		Yes	
2.1.4	Shipping lists etc for reference and planning the activities	Yes		
2.1.5	Preparation of site erection schedules and other input requirements		Yes	
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	

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.0	SUGGESTED LIST OF TOOLS AND PLANTS (BHEL should indicate the proposed number of items considered as free issue)			
2.2.1	75 T crawler crane or above capacity	1 No		For BHEL cranes operator/ fuel by bidder
2.2.2	18/20 T crane		To be Arranged by bidder If required	
2.2.3	8T Escort crane		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.4	30T gantry crane			
2.2.5	15 T gantry crane			
2.2.6	10T gantry crane			
2.2.7	30T tractor trailer			
2.2.8	20T trailer			
2.2.9	10 T trailer / truck			
2.2.10	Electrical winches 15 T with / wire ropes (2 Nos)			
2.2.11	Electrical winches 10T with / without wire ropes			
2.2.11 A	Electrical winches 5 T with / without wire ropes			
2.2.12	Electrical winch 3 T with wire rope			
2.2.13	Electrical winches with/without wire ropes			
2.2.14	Pneumatic winches 1 T			
2.2.15	Welding generators			
2.2.16	Welding rectifiers			
2.2.17	Welding transformers air cooled			
2.2.18	Welding transformers oil cooled			
2.2.19	Chain pulley block 10T			
2.2.20	Chain pulley block 5 T			
2.2.21	Chain pulley block 3T			
2.2.22	Chain pulley block 1T /2T			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.23	Pulling & lifting machines 5T		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.24	Pulling & lifting machine 3T			
2.2.25	Pulling and lifting machine 2T / 1T			
2.2.26	Multi sheave pulley block 50T			
2.2.27	Multi sheave pulley block 30T			
2.2.28	Multi sheave pulley block 20T			
2.2.29	Multi sheave pulley block 5T			
2.2.30	Single sheave shackle pulley block 20T			
2.2.31	Single sheave shackle pulley block 10T			
2.2.32	Single sheave shackle pulley block 5 T			
2.2.33	25Vtransformer with sufficient spare bulbs			
2.2.34	Gas cutting torches with regulators			
2.2.35	Torque wrench			
2.2.36	Pipe vice			
2.2.37	Bench vice			
2.2.38	Anvil			
2.2.39	Baking oven for welding electrodes			
2.2.40	Portable drying oven for baked welding electrodes			
2.2.41	GQA grinding machine			
2.2.42	FF2 grinding machine			
2.2.43	Angle grinders AG7			
2.2.44	TIG welding sets			
2.2.45	Air conditioners 1.5 T			
2.2.46	Sheet bending machine			
2.2.47	Sheet rolling m/c			
2.2.48	Sheet grooving m/c			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.49	Pedestal drilling m/c			
2.2.50	Drilling m/c 31 mm			
2.2.51	Drilling m/c 20mm			
2.2.52	Drilling m/c 10 mm		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.53	Hand drilling m/c 6 mm			
2.2.54	D shackles 30 T			
2.2.55	D shackles 20T			
2.2.56	D shackles 15 T Drum lifting			
2.2.57	D shackles 10T			
2.2.58	D shackles 5T/3T			
2.2.59	Wire rope sling 6x36 12mmx6m			
2.2.60	Wire rope slings 12mmx10m			
2.2.61	Wire rope slings 16mmx4m			
2.2.62	Wire rope slings 16mmx6m			
2.2.63	Wire rope slings 16mmx10m			
2.2.64	Wire rope sling 19mmx15 m			
2.2.65	Loose wire rope 16mm			
2.2.66	Loose wire rope 19 mm			
2.2.67	Loose wire rope 25mm			
2.2.68	Loose wire rope 32mm			
2.2.69	Wire rope clamps for the above sizes			
2.2.70	Manila ropes of sufficient quantity in different sizes			
2.2.71	Hydraulic jacks 25 T			
2.2.72	Hydraulic jacks 10T			
2.2.73	Concrete blocks for pre assembly at site			
2.2.74	Hydro test pump 250 bar -			
2.2.75	Hand operated hydro test pump			
2.2.76	Pressure gauges 100 bar			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.77	Hydraulic pipe bending machines to suit up to 80mm dia and 11 mm thick		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.78	Electric driven pipe chamfering machines up to 100 mm dia tubes with necessary cutting tools and other consumables			
2.2.79	Electric driven pipe chamfering m/c to suit pipes from dia 100 mm to 500/600 mm			
2.2.80	Radiographic equipments with suitable isotopes/ x ray machines			
2.2.81	MPI test kit			
2.2.82	Ultrasonic flaw detector			
2.2.83	Dye penetrant test kits (as required)			
2.2.84	Moving platforms Sky Climber			
2.2.85	Passenger cum goods lift (1)			
2.2.86	Dip Lorries			
2.2.87	Rails and sleepers for dip Lorries, both supply and installation			
2.2.88	Calibrated steel tapes of different sizes			
2.2.89	Plumb bobs			
2.2.90	Micro meters of different sizes both inside and out side			
2.2.91	Vernier calipers of different sizes			
2.2.92	Surface plate			
2.2.93	Straight edges of different lengths			
2.2.94	Feeler gauges of different lengths			
2.2.95	Inside and out side calipers			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.96	Bolt heating equipments including thermo couples		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.97	Dial gauges with magnetic base			
2.2.98	Magnifying glass			
2.2.99	Piano wires			
2.2.100	Precision water level micrometer			
2.2.101	Parallel blocks			
2.2.102	Taper wedges			
2.2.103	Micro jacks			
2.2.104	Lead wires			
2.2.105	Dial bore micro meter			
2.2.106	Thermo meters of different ranges			
2.2.107	Depth gauges			
2.2.108	"GO & "NO GO" gauges			
2.2.109	Drill sets			
2.2.110	Taps and die sets			
2.2.111	Spirit levels			
2.2.112	Master spirit level			
2.2.113	Spring balance			
2.2.114	Hg manometer			
2.2.115	Vibro meter			
2.2.116	Noise level meter			
2.2.117	Litmus paper			
2.2.118	Portable gas purity meter			
2.2.119	Dead weight tester			
2.2.120	Temp bath for calibration			
2.2.121	250V/500V megger			
2.2.122	Mano meters			
2.2.123	Elko meter to measure paint thickness			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.124	MIG welding machines			
2.2.125	Files of different sizes			
2.2.126	Socket wrenches			
2.2.127	Spanner and pipe wrenches sets			
2.2.128	Hammers of different sizes (soft & hard)			
2.2.129	Allen keys sets			
2.2.130	Fire proof tarpaulins			
2.2.131	Steel scaffolding materials			
2.2.132	Pipe cutters			
2.2.133	Magnetic base for drilling machines			
2.2.134	Vibrator for grouting			
2.2.135	Mixing m/c (grouting and concreting)			
2.2.136	Tube expanders (expansion and flaring)			
2.2.137	Mercury plumb bob			
2.2.138	Band saw machines			
2.2.139	Copper rods			
2.2.140	Needle vibrators			
2.2.141	All consumables including :			
2.2.142	Ordinary cement			
2.2.143	Grouting cement			
2.2.144	Any special cement			
2.2.145	Sand, bricks etc			
2.2.146	TIG wires			
2.2.147	Electrodes			
2.2.148	Brazing rod, flux etc			
2.2.149	Soldering			

SI.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.150	DA, oxygen, argon		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.151	Paints along with thinner, brushes, cleaning materials etc			
2.2.152	Paints including thinner, brushes, cleaning materials etc for final painting , as per specifications			
2.2.153	WELDING			
2.2.154	All welding works			
2.2.155	All radiography and other testing works like NDT			
2.2.156	All connected works like preheating, post heating, stress relieving,			
2.2.157	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.			
2.2.158	The accessories required for the welders to be arranged by the bidder			
2.2.159	Effluent disposal system			
2.2.160	Services for the effluent disposal			

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
SECTION VII – APPENDIX I
SITE FACILITIES**

PROJECT: RAYALASEEMA TPP
Units – 5

RATING: 210 MW

Sl.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.0	SCOPE OF WORK			
3.1.0.1	Handling at site stores/ storage yard		Yes	
3.1.0.2	Transportation within the site		Yes	
3.1.0.3	Erection testing & commissioning		Yes	
3.1.0.4	Final painting of erected materials including supply of paints, thinners etc		Yes	
3.1.0.5	Carrying out P.G.test			
3.1.1.0	HANDLING & TRANSPORTATION			
3.1.1.1	Stores/storage yard to pre- assy 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/workin g instructions etc	Yes		
3.1.2.2	Welding schedules	Yes		
3.1.2.3	Engineering drawings for construction methods		Yes	

Sl.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.2.4	Organizing the resources required for erection, testing & commissioning of the materials covered under the scope and executing the work as per instruction of BHEL engineer		Yes	
3.1.2.5	Final painting of all the materials erected		Yes	
3.1.2.6	Demobilization of the erection site		Yes	
3.1.2.7	Cleaning of / upkeep of erection / preassembly / storage areas		Yes	
3.1.2.8	Return of excess materials drawn to BHEL stores/ customer		Yes	
3.1.2.9	Reconciliation of all the consumables, T&P drawn from BHEL / customer's store		Yes	
3.1.2.10	Filling up quality log sheets		Yes	
3.1.2.11	Providing all temporary arrangements like platforms, scaffoldings etc for execution		Yes	
3.1.2.12	Assistance for P.G test		Yes	
3.1.3	CIVIL WORKS			
3.1.3.1	Taking over of foundations		Yes	
3.1.3.2	Checking, chipping and correcting final 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 embedment		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	

SI.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.4.3	Insurance whatever 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/VAT		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 PGMA DU 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	

NOTE:

- 1. The erection & dismantling of temporary piping , pumps, tanks, dummy plates & other misc equipments etc., for pre commissioning & commissioning activities like hydraulic test, chemical cleaning are covered in this contract and shall be carried out with in the quoted tonnage rate.**
2. The following is furnished only for information to give the idea of the size and length of pipes estimated for this work. Actual quantity during erection may vary as per drawings and materials to be supplied. Work will be done and regulated on agreed Tonnage Unit rates only
3. The information furnished in this section is only a description regarding items to be erected by the contractor. BHEL reserves the right of adding or excluding components /items / systems according to the site requirements / customer requirements to complete various system in all respects.
4. Any other systems / components which are integral to equipments supplied by the manufacturing units are also to be erected and commissioned by the contractor within the quoted / accepted rate/ lump sum.

**SECTION VII
APPENDIX – II
WEIGHT SCHEDULE**

1. Auxiliary Cooling water piping

RAYALASEEMA TPP ,UNIT-5,ACW PIPING					
PGMA	DU	DU DESC	DSN Qty	Unit	Design WT
80463	001	PIPE DIA 610X8 (EPAT SITE)	410	M	48708
80463	002	PIPE 508.0X6.0 STY-D:D1=496 EP A	150	M	11142
80463	003	PIPE 406.4X6.35STY-D;D1=394.4 EP	120	M	7575.6
80463	004	PIPE OD 323.9X6 IS3589FE410 PA	210	M	9870
80463	005	PIPE DIA 273.0 X 6.0 IS3589-410M	180	M	7110
80463	006	PIPENB15X3.2 STY-D,D1=15.9,EP A	60	M	87
80463	007	PIPENB25X4.0 STY-D,D1=26.5 EP AT	40	M	118.8
80463	008	PIPENB100X5.4 STY-D,D1=105.3 EP	10	M	144
80463	009	PIPENB150X5.4 STY-D,D1=156.8 EP	175	M	3710
80463	010	PIPE DIA457.0X6.STY-D,D1=445 EP	215	M	14344.8
80463	011	MITRE BEND 90 DEG NB600	15	NO	1758.24
80463	012	MITRE BEND 90 DEG NB500	20	NO	1221.16
80463	013	MITRE BEND 90 DEG NB450	16	NO	791.04
80463	014	MITRE BEND 45 DEG NB450	6	NO	226.584
80463	015	MITRE BEND 45 DEG NB600	2	NO	117.334
80463	016	REDUCER NB600/500	2	NO	141.66
80463	017	REDUCER NB500/400	2	NO	92.7
80463	018	REDUCER NB400/250	2	NO	49.344
80463	019	REDUCER NB300/250	14	NO	154
80463	020	REDUCER NB200/150	1	NO	4.9
80463	021	REDUCER NB700/600	2	NO	203.128
80463	022	REDUCER NB600/450	3	NO	166.476
80463	023	EQT 323.9 X 8.8 SA234WPB	4	NO	228
80463	024	UN EQ TEE NB500/300	14	NO	1095.136
80463	025	UN EQ TEE NB400/300	8	NO	463.344
80463	026	EQT 273 X 6.35 SA234WPB	6	NO	208.2
80463	027	EQT 219.1 X 6.35 SA234WPB	1	NO	23
80463	028	EQT NB600	3	NO	480.978
80463	029	UN EQ TEE NB600/300	1	NO	125.72
80463	030	BW LR 90DEG ELL 323.9 X 6.35 SA2	31	NO	1161.26
80463	031	BW LR 45DEG ELL 323.9 X 6.35 SA2	8	NO	149.6
80463	032	BW LR 90DEG ELL 273X 6.35 SA234W	16	NO	419.2
80463	033	BW LR 45DEG ELL 273X 6.35 SA234W	4	NO	52.4
80463	034	FLAT END CLOSURE OD610	2	NO	266.08
80463	035	BLANK FLANGE NB 150CL 150	3	NO	34.5
80463	036	FLAT FACED FLANGE NB 150 CL 150	3	NO	23.175
80463	037	HEX HD BOLT M20X90-6.8 IS:1364(P	26	NO	7.358
80463	038	HEX NUT M20,P.CL-6 IS:1364(P-3)	26	NO	1.69
80463	039	CAF JOINTING GR W/1-1.5 MM IS271	2	NO	1.624
80463	040	PIPE DIA 355.6 X 6.0 IS3589-410M	6	M	310.32
80463	041	PIPE DIA 219.1 X 6.0 IS3589-410M	90	M	2837.7
80463	042	BW UEQT 457.2X9.53 323.9X6.35 SA	12	NO	1620
80463	043	BWCONRED457.2X6.35/323.9X6.35 SA	3	NO	102
80463	044	MITRE BEND 90 DEG NB400	10	NO	392.76
80463	045	MITRE BEND 45 DEG NB400	2	NO	39.098
80463	046	BL. 90 DEG ELL NB150 IS1239 BLAC	12	NO	124.8
80463	047	BW CON RED 273X6.35/168.3X7.11 S	3	NO	20.7
80463	048	BW UEQT 273X6.35 168.3X7.11 SA23	6	NO	198
80463	049	BW UEQT 323.9X6.35 168.3X7.11 SA	2	NO	112
80463	050	RED NB450/400	1	NO	43.395
80463	051	RED NB350/200	2	NO	62.674
80463	052	U EQT NB450/400	2	NO	148.22
80463	053	RED NB450/350	2	NO	82
		TOTAL			118571.698

NOTE FOR WEIGHT SCHEDULE

1. The weights mentioned here are approximate and may vary between (-) or (+) 15% as per design consideration of the manufacturing unit. Tenderer may note that payments will be made to them at the quoted / accepted Tonnage rates for the items / equipments actually erected.
2. Besides product groups indicated above, there is likelihood of addition of any product groups by manufacturing units. Contractor's quoted rates shall be applicable for such product groups.

SECTION VII

2. Cooling water piping

RAYALASEEMA TPP UNIT-5

COOLING WATER PIPING WEIGHT SCHEDULE

PGMA	DU	DU DESC	DSN Qty	Unit	Des wt
80468	001	PIPE 2540X20 SP. L = 10 M (UG)	483.81	M	601369.615
80468	002	PIPE 1626X16 (OG) SP. L-10 MTRS	10	M	3990
80468	003	PIPE 1626X16 (UG) SP. L-10 MTRS	80	M	50800
80468	004	PIPE 1626X14 (OG) SP. L-10 MTRS	50	M	27825
80468	005	PIPE 1626X14 (UG) SP. L-10 MTRS	70	M	38955
80468	006	PLATE FRMD RED 2540X20/1626/16	3	NO	3432
80468	007	45 DEG ANGULAR PL FRMD UET NB250	2	NO	8572.962
80468	008	MITRE BEND 90 DEG 2540X20	5	NO	19012.62
80468	009	PLATE FRMD UET NB2500/NB1600 90	2	NO	13295.854
80468	010	MITRE BEND 90 DEG 1626X16	5	NO	6268.155
80468	011	MITRE BEND 45 DEG 2540X20	0	NO	0
80468	012	MITRE BEND 45 DEG 1626X14	5	NO	3606.335
80468	013	MITRE BEND 90 DEG 1626X16	6	NO	7535.748
80468	014	MITRE BEND 45 DEG 1626X16	1	NO	825.87
80468	015	MITRE BEND 60 DEG 1626X16	2	NO	1674.61
80468	016	MITRE BEND 90 DEG 1626X14(EXT LE	1	NO	1263.887
80468	017	PUDDLE FLANGE ASSY	2	NO	3252
80468	018	PLATE 16X2500X12500	0	NO	0
80468	019	PLATE 16 (2500 X 12500 - 8 NOS)	31400	KG	31400
80468	020	PIPE 508.0X6 STY-D,D1=496 EP AT	20	M	1485.6
80468	021	PIPE 406.4X6.35STY-D,D1=394.4 EP	97.15	M	6133.08
80468	022	PIPE 610X8 STY-D,D1=594 EP AT SI	150	M	17820
80468	023	PIPENB150X5.4 STY-D,D1=156.8 EP	115	M	2438

80468	024	PIPENB15X 3.2 STY-D, D1=15.9 EP A	90	M	130.5
80468	025	PIPE DIA 219.1 X 6.0 IS3589-410M	10	M	315.3
80468	026	PIPENB50X4.5 STY-D, D1=52.7 EP AT	100	M	617
80468	027	MITRE BEND 90DEG NB600	10	NO	1172.56
80468	028	MITRE BEND 90 DEG NB500	4	NO	244.232
80468	029	RED NB600/NB500	1	NO	95.456
80468	030	BW LR 90DEG ELL 406.4 X 6.35 SA2	6	NO	547.2
80468	031	BW LR 90DEG ELL 219.1 X 6.35 SA2	8	NO	133.6
80468	032	BL. 90 DEG ELL NB150 IS1239 BLAC	10	NO	104
80468	033	UN EQUAL TEE NB600/NB500	1	NO	159
80468	034	FLAT FACED FLANGE NB 600 CL 150	15	NO	1183.8
80468	035	BLANK FLANGE NB600 WITH NB150 ST	15	NO	3047.205
80468	036	FF FLANGE NB150:PN10	30	NO	214.5
80468	037	MAN HOLE ASSY NB600	4	NO	1134.408
80468	038	HEXHD BOLT M30X140,P.CL-6.8 IS:1	300	NO	290.4
80468	039	HEX NUT M30,P.CL-6 IS:1364(P-3)	300	NO	69
80468	040	CAF JOINTING OD720/ID615	15	NO	44.325
80468	041	HEX HD BOLT M20X90-6.8 IS:1364(P	120	NO	33.96
80468	042	HEX NUT M20,P.CL-6 IS:1364(P-3)	120	NO	7.8
80468	043	CAF JOINTING GR W/1-1.5 MM IS271	2	M2	0.288
80468	044	PRESSURE STUB NB15 CL3000	25	NO	4.5
80468	045	TEMP STUB M33X2 L=45	25	NO	27.575
80468	046	PACKING RING M33X2	25	NO	0.25
80468	047	SCREW PLUG M33X2	25	NO	21.95
80468	048	ROD DIA 25 - SA105(CERT)	125	M	481.25
80468	049	ISM 400 - IS2062GRA	15	M	751.5
80468	050	ISM 150 - IS2062GRA(CB)	10	M	168
		TOTAL			861955.895

**SECTION VII
APPENDIX – III
WELDING SCHEDULE**

Note: The joint details indicated in the welding schedule are only tentative and for estimation only.



ERECTION WELDING SCHEDULE

PROJECT : RAYALASEEMA TPP 1X210MW

PGMA : 80-468

CUST. No. : 6928

PGMA DESC : COOLING WATER SUPPLY & RETURN PIPING

ASSY. DRG. NO. : PE-DG-279-165-M001/Rev 00, PE-DG-279-165-M003/Rev 03

SL No.	MATERIAL SPECN.1	PIPE SIZE		TOTAL No. OF JOINTS	WELD SPECN.	TOTAL LENGTH OF WELD (in m)	RECOMMENDED ELECTRODE / WIRE				PRE HEAT °C	PWHT SOAKING		MIN. RECOMMENDED NDE	WPS NO.
	MATERIAL SPECN.2	OD (in mm)	THK (in mm)				SPECN.	ARC/GAS/TIG.	SIZE (mm)	QUANTITY		TEMP °C	TIME		
1	IS 3589	2540	20	80	$\frac{6\sqrt{V}}{14\Delta}$	---	E 7018	ARC	Ø2.50	16547 No's	---	---	---	RT 10%	---
	E 7018						ARC	Ø3.15	27285 No's						
	E 7018						ARC	Ø4.0	3580 No's						
2	IS 3589	1626	16	40	16 \sqrt{V}	---	E 7018	ARC	Ø2.50	4787 No's	---	---	---	RT 10%	---
	E 7018						ARC	Ø3.15	7936 No's						
	E 7018						ARC	Ø4.0	3024 No's						
3	IS 3589	1626	14	40	14 \sqrt{V}	---	E 7018	ARC	Ø2.50	4527 No's	---	---	---	RT 10%	---
	E 7018						ARC	Ø3.15	7552 No's						
	E 7018						ARC	Ø4.0	981 No's						

PREPARED <i>T. VENKATESAN</i>	CHECKED/APPROVED <i>V.B.K.RAO</i>	APPROVED BY QA <i>T.N.ELANGOVAN</i>	DATE <i>12-08-08</i>	DRAWING No.: <i>4-80-468-67630</i> SHEET: 1 of 1	REV. <i>00</i>
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ERECTION WELDING SCHEDULE

PROJECT : RAYALASEEMA TPP 1X210MW

PGMA : 80-463

CUST. No. : 6928

PGMA DESC : AUX. COOLING WATER

ASSY. DRG. NO. : PE-DG-279-179-M001/Rev 00,SH 01 TO 05

SL No.	MATERIAL SPECN.1	PIPE SIZE		TOTAL No. OF JOINTS	WELD SPECN.	TOTAL LENGTH OF WELD (in m)	RECOMMENDED ELECTRODE / WIRE				PRE HEAT °C	PWHT SOAKING		MIN. RECOMMENDED NDE	WPS NO.
	MATERIAL SPECN.2	OD (in mm)	THK (in mm)				SPECN.	ARC/GAS/TIG.	SIZE (mm)	QUANTITY		TEMP °C	TIME		
1	IS 3589	610	8	119	8√	--	E 7018	ARC	Ø2.50	5355 No's	---	--	--	RT 10%	---
	IS 3589 SA 234 WPB						E 7018	ARC	Ø3.15	8568 No's					
2	IS 3589	508	6	83	6√	--	E 7018	ARC	Ø2.50	3154 No's	---	--	--	RT 10%	---
	IS 3589						E 7018	ARC	Ø3.15	2490 No's					
3	IS 3589	457	6	117	6√	--	E 7018	ARC	Ø2.50	3978 No's	---	--	--	RT 10%	---
	IS 3589 SA 234WPB						E 7018	ARC	Ø3.15	2574 No's					
4	IS 3589	406.4	6	67	6√		E 7018	ARC	Ø2.50	2010 No's					
	IS 3589 SA 234WPB						E 7018	ARC	Ø3.15	1407 No's					
5	IS 3589	355.6	6	5	6√		E 7018	ARC	Ø2.50	135 No's					
	IS 3589						E 7018	ARC	Ø3.15	85 No's					

PREPARED

T. VENKATESAN

CHECKED/APPROVED

V.B.K.RAO

APPROVED BY QA

T.N.ELANGOVAN

DATE

17-10-08

DRAWING No.:

4-80-463-68036

SHEET: 1 of 2

REV.

00



ERECTION WELDING SCHEDULE

PROJECT : RAYALASEEMA TPP 1X210MW

PGMA : 80-463

CUST. No. : 6928

PGMA DESC : AUX. COOLING WATER

ASSY. DRG. NO. : PE-DG-279-179-M001/Rev 00,SH 01 TO 05

SL No.	MATERIAL SPECN.1	PIPE SIZE		TOTAL No. OF JOINTS	WELD SPECN.	TOTAL LENGTH OF WELD (in m)	RECOMMENDED ELECTRODE / WIRE				PRE HEAT °C	PWHT SOAKING		MIN. RECOMMENDED NDE	WPS NO.
	MATERIAL SPECN.2	OD (in mm)	THK (in mm)				SPECN.	ARC/GAS/TIG.	SIZE (mm)	QUANTITY		TEMP °C	TIME		
6	IS 3589	323.9	6	181	6√	--	E 7018	ARC	Ø2.50	4320 No's	---	--	--	RT 10%	---
	IS 3589						E 7018	ARC	Ø3.15	2715 No's					
7	IS 3589	273	6	119	6√	--	E 7018	ARC	Ø2.50	2380 No's	---	--	--	RT 10%	---
	IS 3589						E 7018	ARC	Ø3.15	1071 No's					
8	IS 3589	219.1	6	21	6√	--	E 7018	ARC	Ø2.50	777 No's	---	--	--	RT 10%	---
	API5L GR.B														

PREPARED <i>T. VENKATESAN</i>	CHECKED/APPROVED <i>V.B.K.RAO</i>	APPROVED BY QA <i>T.N.ELANGOVAN</i>	DATE <i>17-10-08</i>	DRAWING No.: <i>4-80-463-68036</i> SHEET: 2 of 2	REV. <i>00</i>
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SECTION VII

APPENDIX – IV

DECLARATION SHEET

I, _____ hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL: PSSR: SCT: 1322 are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations in detail and agree to comply with the requirements and intent specifications.

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

TENDERER'S NAME & ADDRESS

**AUTHORISED REPRESENTATIVE'S
SIGNATURE WITH NAME & ADDRESS**

SECTION VII

APPENDIX – V

TENDER SPECIFICATION NO BHEL: PSSR: SCT: 1322

**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 - V I
CHECK LIST
TENDER SPECIFICATION NO, BHEL: PSSR: SCT: 1322

Tenderers are required to fill in the following details:

1. a) Name of the Tenderer with address : YES/NO
- b) Telegraphic/Telex address : YES/NO
- c) Phone (Office/Residence) : YES/NO
- d) Management Structure of firm (Pvt. Ltd/Public Ltd./Partnership/Sole Proprietorship) Documentary proof For the same enclosed) : YES/NO
2. Whether EMD submitted as per Tender specifications terms and Conditions : YES/NO
3. Validity of offer (offer shall be kept open for acceptance for minimum six months) : YES/NO
4. Whether tenderer visited the erection site and acquainted with the site conditions before quoting : YES/NO

SIGNATURE OF THE TENDERER

5. Whether the following details are furnished : YES/NO
- a) Previous Experience : YES/NO
 - b) Present assignments : YES/NO
 - c) organization chart of the company : YES/NO
 - d) Company financial status : YES/NO
 - e) Incase of company, proof of Registration of the company : YES/NO
 - f) Memorandum & Articles of Association of company/copy of Partnership deed : YES/NO
 - g) Profit & Loss account for the Last 3 years : YES/NO
 - h) Audited Balance sheet for the Last 3 years : YES/NO
 - i) Income Tax clearance certificate (latest) : YES/NO
 - j) Solvency Certificate from a Nationalised Bank : YES/NO
 - k) Power of Attorney of the person Signing the tender duly attested By a Notary Public : YES/NO
 - l) Manpower organization chart With deployment plan at site For posting of Engineers/super Visitors and workers/labourers For satisfactory completion of Work under this specification : YES/NO

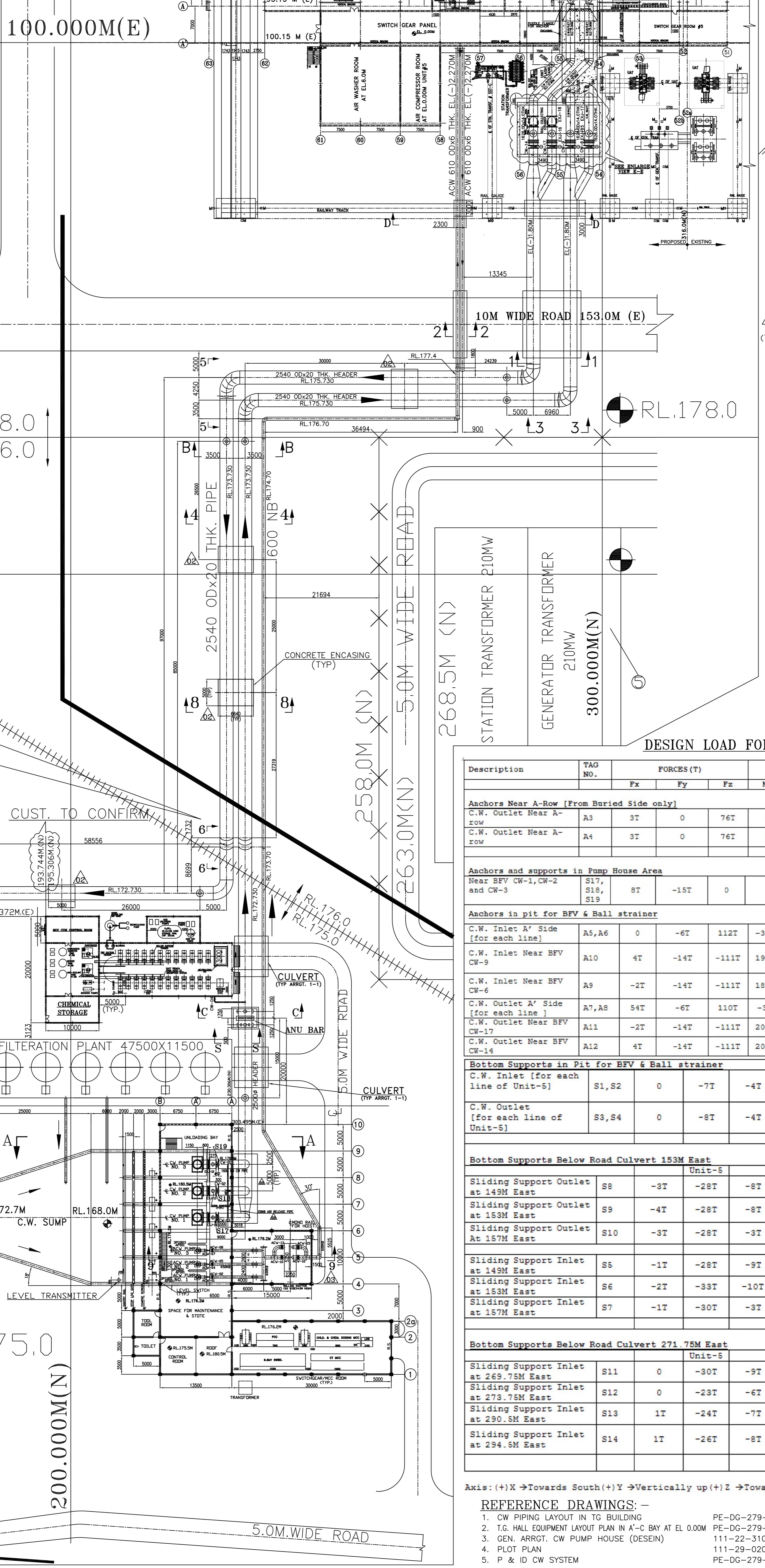
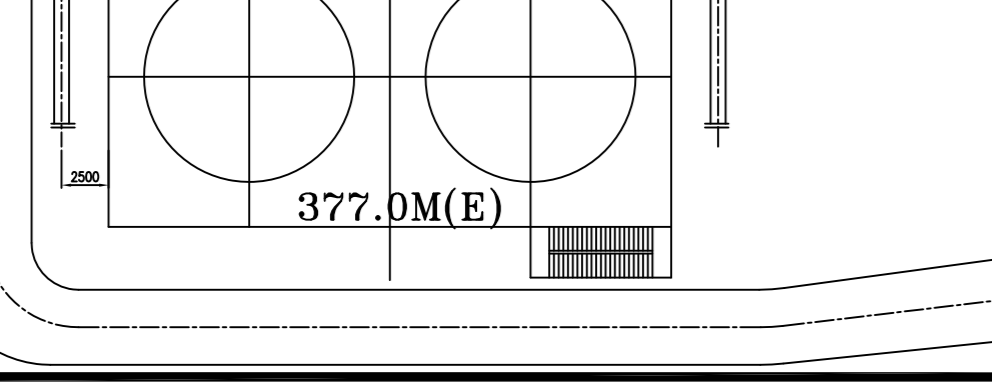
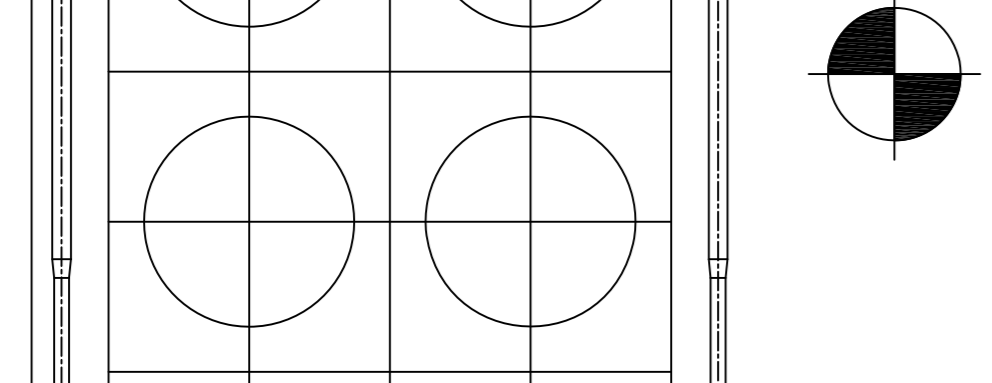
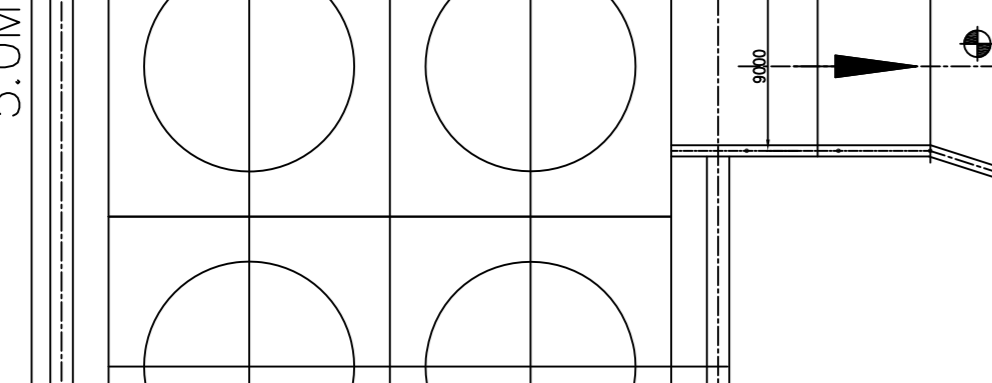
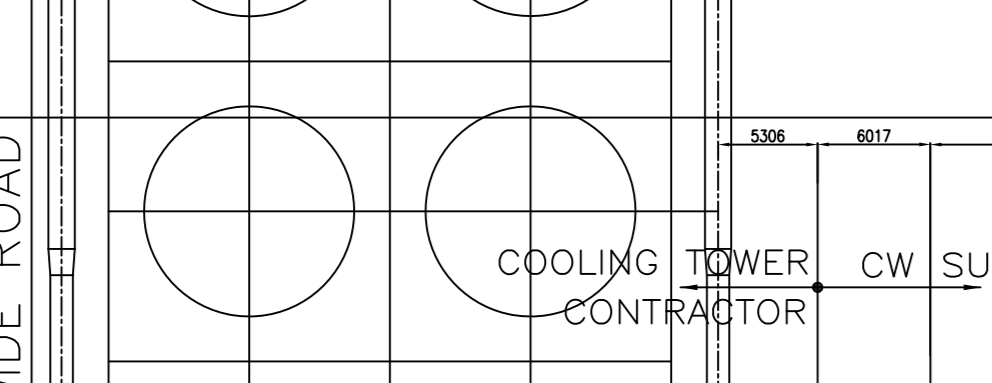
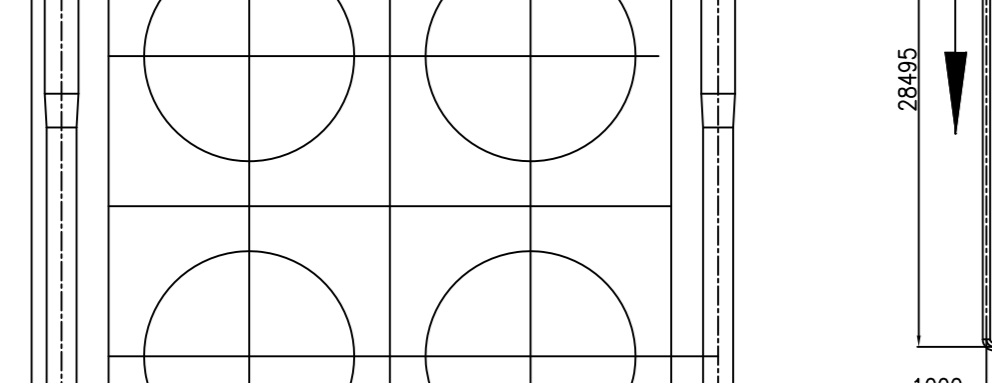
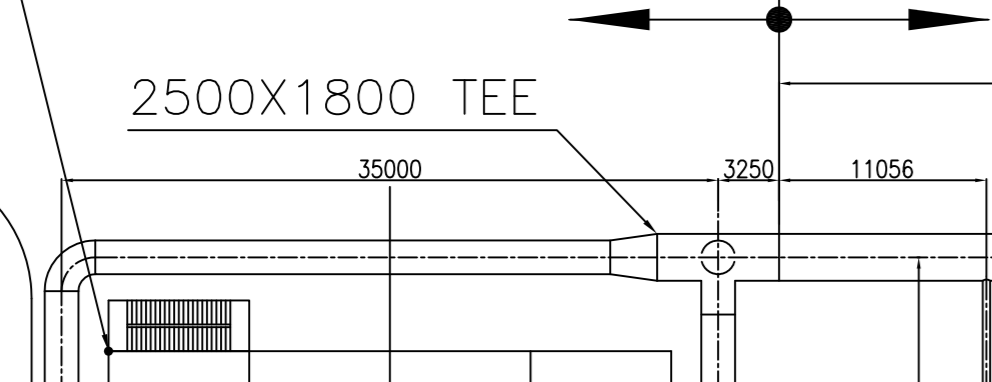
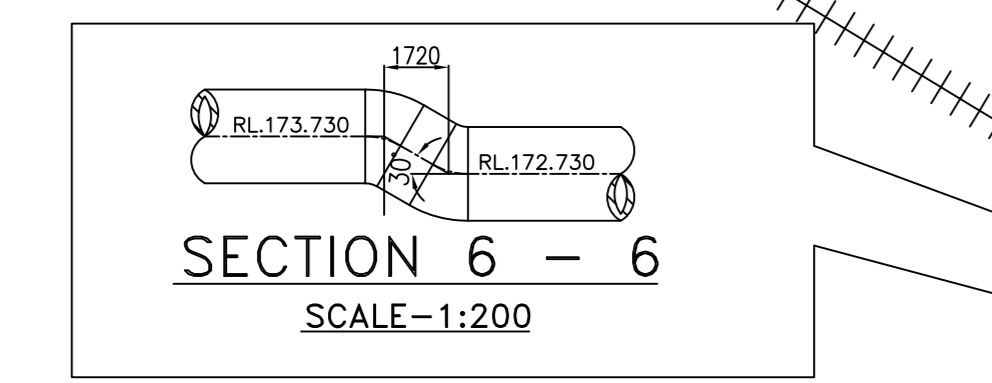
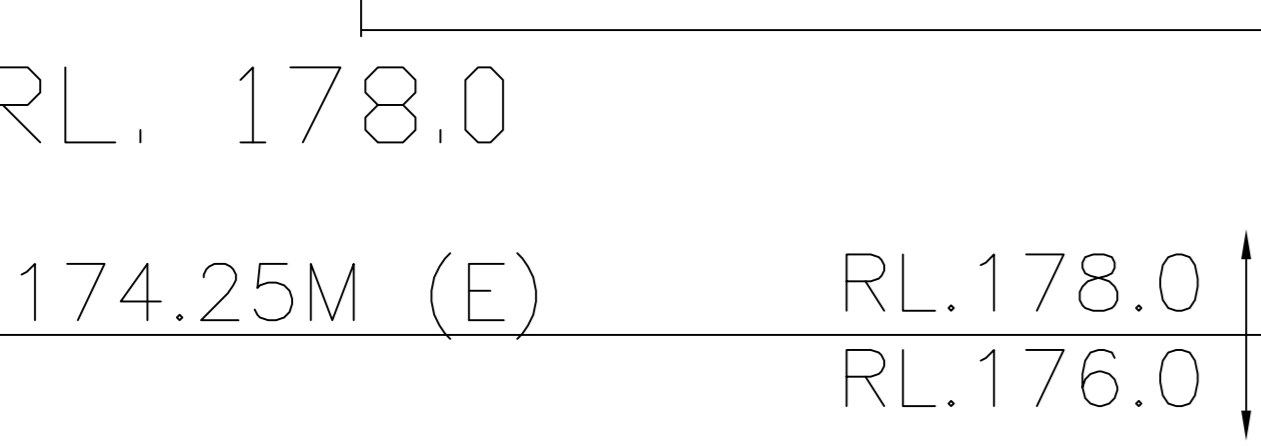
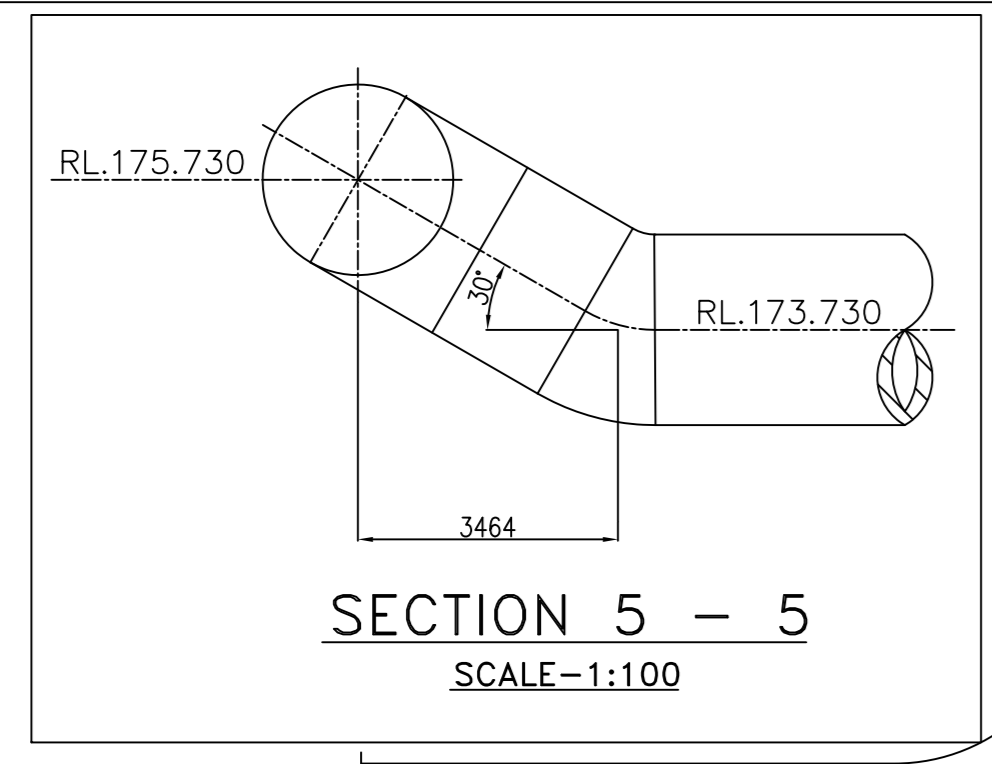
SIGNATURE OF THE TENDERER

6. Whether the Tenderer is conversant with local labour laws & conditions : YES/NO
7. Whether the tenderer is aware of all safety rules and codes : YES/NO
8. Whether the Declaration sheet (as per appendix) enclosed : YES/NO
9. Time required for mobilization of of site organization and start of work : YES/NO
10. Whether list of tools and Plants available with the contractor and proposed to be deployed for this work enclosed : YES/NO
11. Whether all the Pages are read understood and signed. : YES/NO
12. Deviations, if any Pointed out :
13. Whether PF exemption No. is allotted by RPFC of your area if so, indicate number : YES/NO

SIGNATURE OF THE TENDERER



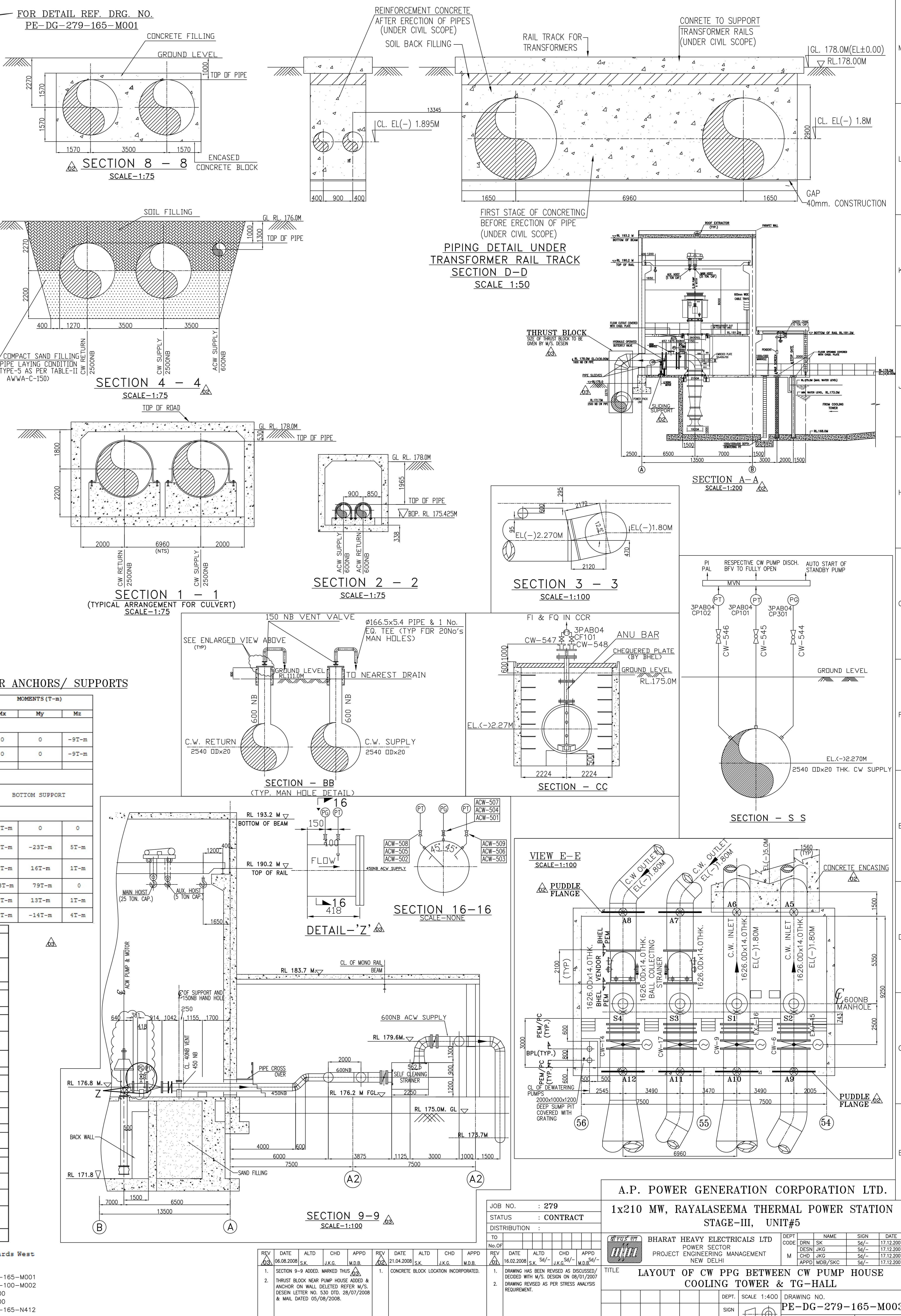
- NOTES**
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
 2. ALL GRID LOCATION AND AREA GRADE ARE IN METRES.
 3. POWER HOUSE GROUND FLOOR LEVEL +0.00M CORRESPONDS TO 178.0M ABOVE MSL.
 4. THIS DRAWING HAS TO BE READ IN CONJUNCTION WITH FOLLOWING DRAWINGS FOR COMPLETE C.W. PIPE ROUTING.
(a) DWG. NO. PE-DG-279-165-M001
 5. FOR C.W. PUMP HOUSE DETAIL REFER TO DRAWING NO. PE-DG-279-165-M441
 6. EXACT LOCATION OF AIR RELEASE VALVE OF C.W. PIPES SHALL BE DECIDED AFTER SURGE ANALYSIS
 7. FORCES & MOMENTS ON ANCHOR POINTS & BOTTOM SUPPORTS REFER IN TABLE-1 OF DWG. NO. PE-DG-279-165-M001
 8. ALL PIPES ARE TO BE CLAMPED WITH RCC OR STRUCTURE FOR WHICH BHEL FC TO SUPPLY ADEQUATE NO. OF AUX. STRUCTURES, CLAMPS FASTENERS ETC.



DESIGN LOAD FOR ANCHORS/ SUPPORTS

Description	TAG NO.	FORCES (T)	MOMENTS (T-m)				
		Fx	Fy	Fz	Mx	My	Mz
Anchors Near A-Row (From Buried Side only)							
C.W. Outlet Near A-Row	A3	3T	0	76T	0	0	-9T-m
C.W. Outlet Near A-Row	A4	3T	0	76T	0	0	-9T-m
Anchors and supports in Pump House Area							
Near BFV CW-1, CW-2 and CW-3	S17, S18, S19	3T	-15T	0	0	0	BOTTOM SUPPORT
Anchors in pit for BFV & Ball strainer							
C.W. Inlet A' Side (for each line)	A5, A6	0	-6T	112T	-3T-m	0	0
C.W. Inlet Near BFV CW-9	A10	4T	-14T	-111T	19T-m	-23T-m	5T-m
C.W. Inlet Near BFV CW-6	A9	-2T	-14T	-111T	18T-m	16T-m	1T-m
C.W. Outlet A' Side (for each line)	A7, A8	54T	-6T	110T	-3T-m	79T-m	0
C.W. Outlet Near BFV CW-17	A11	-2T	-14T	-111T	20T-m	13T-m	1T-m
C.W. Outlet Near BFV CW-14	A12	4T	-14T	-111T	20T-m	-14T-m	4T-m
Bottom Supports in Pit for BFV & Ball strainer							
C.W. Inlet (for each line of Unit-5)	S1, S2	0	-7T	-4T	0	0	0
C.W. Outlet (for each line of Unit-5)	S3, S4	0	-8T	-4T	0	0	0
Bottom Supports Below Road Culvert 153M East							
Sliding Support Outlet at 149M East	S8	-3T	-28T	-8T	0	0	0
Sliding Support Outlet at 153M East	S9	-4T	-28T	-8T	0	0	0
Sliding Support Outlet at 157M East	S10	-3T	-28T	-3T	0	0	0
Sliding Support Inlet at 149M East	S5	-1T	-28T	-9T	0	0	0
Sliding Support Inlet at 153M East	S6	-2T	-33T	-10T	0	0	0
Sliding Support Inlet at 157M East	S7	-1T	-30T	-3T	0	0	0
Bottom Supports Below Road Culvert 271.75M East							
Sliding Support Inlet at 269.75M East	S11	0	-30T	-9T	0	0	0
Sliding Support Inlet at 273.75M East	S12	0	-23T	-6T	0	0	0
Sliding Support Inlet at 280.5M East	S13	1T	-24T	-7T	0	0	0
Sliding Support Inlet at 294.5M East	S14	1T	-26T	-8T	0	0	0

- Axis: (+)X → Towards South (+)Y → Vertically up (+)Z → Towards West
- REFERENCE DRAWINGS:-**
1. C.W. PIPING LAYOUT IN TO BUILDING PE-DG-279-165-M001
 2. T.G. HALL EQUIPMENT LAYOUT PLAN IN A-C-BAY AT EL. 0.00M PE-DG-279-100-M002
 3. GEN. ARRGT. CW PUMP HOUSE (DESEIN) 111-22-3100
 4. PLOT PLAN 111-29-0200
 5. P & ID CW SYSTEM PE-DG-279-165-M412



A.P. POWER GENERATION CORPORATION LTD.
1x210 MW, RAYALASEMA THERMAL POWER STATION
STAGE-III, UNIT#5

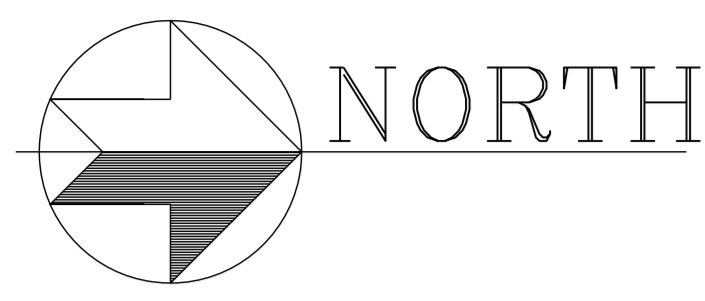
BHARAT HEAVY ELECTRICALS LTD.
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

LAYOUT OF CW PPG BETWEEN CW PUMP HOUSE COOLING TOWER & TG-HALL
PE-DG-279-165-M003

JOB NO. : 279
STATUS : CONTRACT
DISTRIBUTION :
TO :
BY :
DATE :
REV. NO. :
REV. DATE :
ALTD. :
CHKD. :
APPRO. :
REV. NO. :
REV. DATE :
ALTD. :
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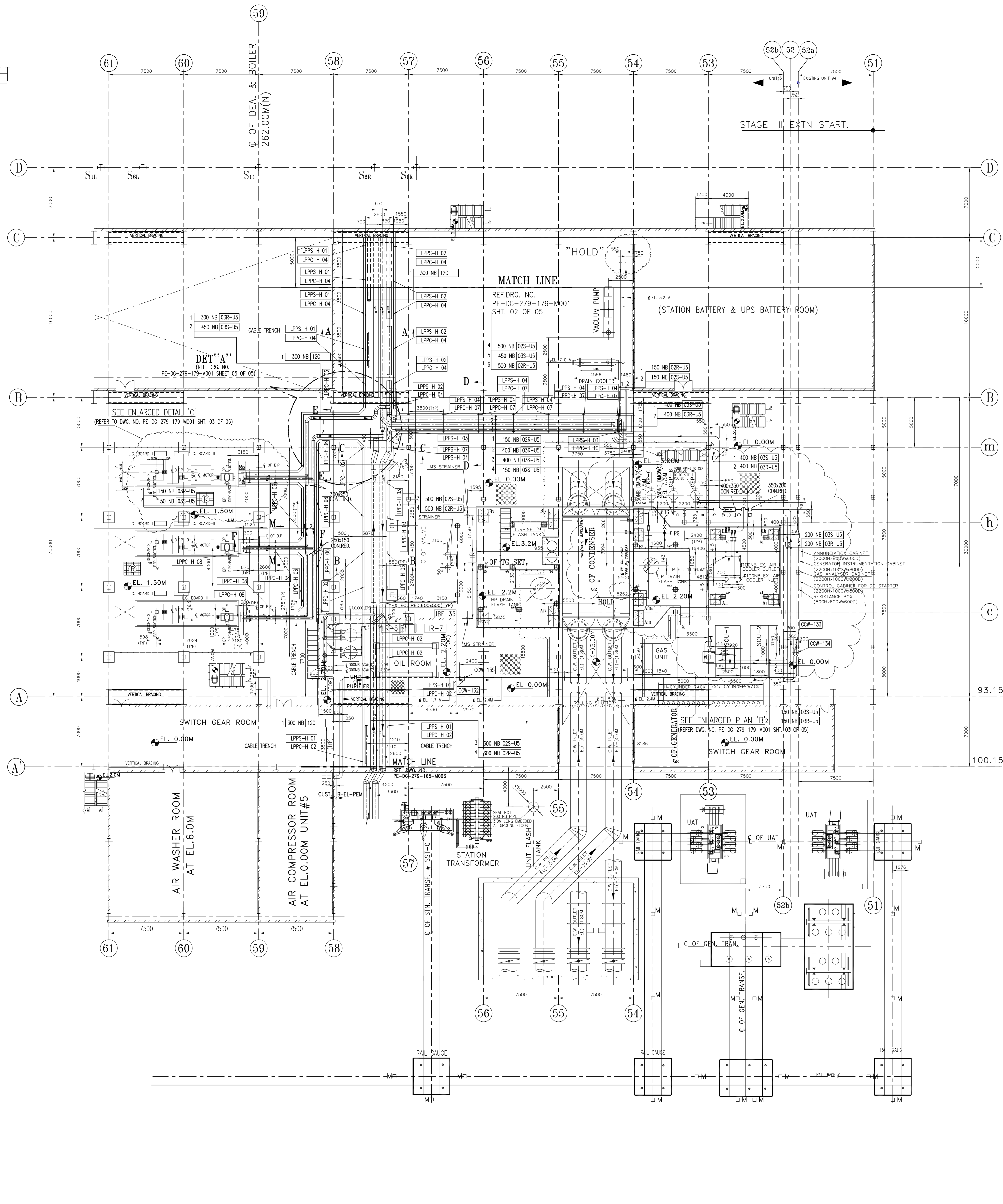
DEPT. : SCALE : 1:400
SIGN :
DATE : SHEET : 01 OF 01 REV. : 03

FORMAT SIZE A0



PE-DG-279-179-M001

ALL DIMENSIONS ARE IN MM



PIPE TABLE

PIPE IDEN. NO.	DESCRIPTION	LINE SIZE (NB)	MATERIAL	REMARKS
02S-US	ACW SUPPLY	600	CS (S.2062)	
02R-US	ACW RETURN	600	CS (S.2062)	
02S-US	ACW SUPPLY TO DMCW PUMP HOUSE	500	CS (S.2062)	
02R-US	ACW RETURN FROM DMCW PUMP HOUSE	500	CS (S.2062)	
02S-US	ACW SUPPLY	150	CS (S.2062)	
02R-US	ACW RETURN	150	CS (S.2062)	
03S-US	DMCW SUPPLY TO TG FROM DMCW PUMP HOUSE	450	CS (S.2062)	
03R-US	DMCW RETURN FROM TG TO PUMP	450	CS (S.2062)	
03S-US	DMCW SUPPLY	350	CS (S.2062)	
03R-US	DMCW RETURN	350	CS (S.2062)	
03S-US	DMCW SUPPLY HDR TO BFP	300	CS (S.2062)	
03R-US	DMCW RETURN HDR FROM BFP	300	CS (S.2062)	
03S-US	DMCW SUPPLY TO BFP	250	CS (S.2062)	
03R-US	DMCW RETURN FROM BFP	250	CS (S.2062)	
03S-US	DMCW SUPPLY TO BFP	150	CS (S.1238)	HEAVY DRAIN
03R-US	DMCW RETURN FROM BFP	150	CS (S.1238)	HEAVY DRAIN
12C	FIRE WATER (SPRAY)	300	CS (S.2062)	

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. ALL GRID LOCATION AND AREA GRADE ARE IN METRES.
3. POWER HOUSE GROUND FLOOR LEVEL +0.00M CORRESPONDS TO 178.0M ABOVE MSL.
4. THIS DRAWING HAS TO BE READ IN CONJUNCTION WITH DRG. NO. a) PE-DG-279-179-M001 SHT. 02 OF 05. b) PE-DG-279-179-M001 SHT. 03 OF 05. c) PE-DG-279-179-M001 SHT. 05 OF 05.
5. PAINTING/PROTECTION - PIPES, SAME AS DWG. NO. PE-DG-279-165-N417 NOTE NO. 9.1(a) & (b)
6. ALL INSERT PLATES AS SHOWN ARE IN SCOPE OF CUSTOMER WHERE AS SUPPORTING STRUCTURES SUPPLIED BY BHEL (PC) WILL BE SUITABLY BOLTED/WELDED AS REQUESTED.
7. PIPES ARE TO BE SUPPORTED ON ALL AUX. STRUCTURES AS SHOWN WITH 'U' CLAMPS, NUTS & LOCK NUTS AS REQUIRED.
- 8.(a) SIZE OF EP FOR PIPE SUPPORTS ARE TO BE CONSIDERED AS 500HGTx230WIDEX12 THK. PLATE AGAINST SUPPORT MEMBER SIZES ISMC-250,200,150 ONLY WHERE AS 300HGTx230WIDEX12 THK. PLATE IS USED FOR SUPPORT MEMBER SIZE ISMC 100 AS SHOWN IN THE DRAWING.
(b) SIZE OF AUXILIARY STRUCTURE FOR PIPE SUPPORT TO BE CONSIDERED AS ISMC 250/200/150/100 AS INDICATED IN THE DRAWING.
9. FOR SECTIONS REFER TO DWG. NO. PE-DG-279-179-M001 SHT. 05 OF 05.
10. FIRE PIPES LAYOUT SHOWN IN DOTTED LINES ARE TENTATIVE. LAYOUT TO BE FINALISED AFTER RECEIVING VENDOR DATA.
11. ERECTOR TO NOTE THAT PIPES (WHEREVER THE SUPPORTING ARRANGEMENTS NOT SHOWN) ARE TO BE SUITABLY ERECTED WITH PIPE CLAMPS, BOTTOM SHOE/SADDLE SUPPORTS, HANGER WITH THE RODS, TURN BUCKLE, ETC. FROM THE NEAREST FLOOR BEAMS/COLUMNS AS AVAILABLE WITHIN NEAREST VICINITY.
TO MEET THIS REQUIREMENTS BHEL/PC TO SUPPLY AUX. STRUCTURES, PIPE CLAMPS, FASTNERS, TIE RODS, TURN BUCKLES, ETC. BASED ON THE EXISTING (RAYALASEEMA UNIT-3 & 4) OR ANY 210MM BTG PROJECTS EXECUTED EARLIER.

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OWNER: ANHRA PRADESH POWER GENERATION CORP. LTD. HYDERABAD
CONSULTANT: DESEIN PRIVATE LIMITED NEW DELHI
1x210 MW, RAYALASEEMA THERMAL POWER STATION STAGE-III, UNIT-5

DEPT. CODE: SK VERMA
DESIGN: SK VERMA
CHECK: LKS
APPROV: MGB

DATE: 14.04.08
DATE: 14.04.08
DATE: 14.04.08

TITLE: ACW & DMCW PIPING LAYOUT INSIDE TG HALL - PLAN
DEPT. SCALE: 1:150
DRAWING NO. PE-DG-279-179-M001
SHEET 01 OF 05
REV. NO. 01

REV	DATE	ALTD	CHD	APPD	REV	DATE	ALTD	CHD	APPD

ELECTRONIC FILE NAME: PE-DG-279-179-M001-R051