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TENDER SPECIFICATION

BHEL:PSSR:SCT: 1208

FOR

Handing at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Structures, Pressure Parts, Non Pressure Parts, Air Pre Heaters, Fans, Bunkers, Bunker Liners, Dampers Ducts including Supply and Application of Final Painting of CFBC Boiler, for Unit –1 of 2 x 250 MW CFBC Boiler

at

Neyveli Thermal Power Station II

EXPANSION

Neyveli, Cuddalore Dist.

Tamil Nadu.

PART – I TECHNICAL BID

BOOK NO :

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035.

INDEX SCT : 1208

General Conditions of Contract Section I, II, IV & V
(Separate Booklet)

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: 1208

Messrs Date:

Dear Sir,

SUB: Handing at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Structures, Pressure Parts, Non Pressure Parts, Air Pre Heaters, Fans, Bunkers, Bunker Liners, Dampers Ducts including Supply and Application of Final Painting of CFBC Boiler, for Unit –1 of 2 x 250 MW CFBC Boiler at Neyveli Thermal Power Station II Expansion, Neyveli, Cuddalore Dist. Tamil Nadu.

Please find enclosed one set of non-transferable tender documents containing - 125 - pages along with general conditions of contract Booklet Guide line for welding & Heat Treatment and for the above work.

You are requested to go through the tender documents, GCC Booklet and offer your most competetitive rate and submit the tender documents duly filled in as per procedure indicated in the tender specification along with requisite EMD of Rs.2,00,000/- (Rupees Two lakhs only) in the form Demand Draft drawn in favour of M/s.Bharat Heavy Electrical Limited Chennai - 35. Bids with Deviations from the tender conditions will be rejected.

A SEPARATE LETTER SHALL BE FURNISHED INDICATING THAT THERE ARE NO DEVIATIONS FROM THE TENDER CONDITIONS (As in Page 8.)

The completed quotations shall reach the office of the under signed on or before at 28.12.2006 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 WHATSOEVER AFTER THE TIME AND DATE MENTIONED IN TENDER SPECIFICATION FOR SUBMISSION OF COMPLETED QUOTATIONS SHALL NOT BE ENTERTAINED UNLESS CALLED FOR SPECIFICALLY BY BHEL.

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

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

Thanking you,

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

SENIOR DEPUTY GENERAL MANAGER / CONTRACTS

This Tender document is not transferable.

Place : Chennai -35

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

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 superscribing the Tender Specification number, due date and time of submission as mentioned in the TENDER NOTICE.

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

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

02. Organisation structure of the Company as per GCC.

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

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

05. Latest Income Tax clearance certificate.

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

07. Declaration sheets as per Appendix of Tender Specification.

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

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

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

11. Other relevant details as per GCC and checklist.

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

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

14. QUALIFICATION REQUIREMENT

a) The bidders should have executed erection work in minimum one unit of 200 MW or above capacity Boiler in Thermal Power Plant in the last seven years

b) The bidders should have a minimum average financial turnover of Rs.690 Lakhs per year in the preceding three years ending 31.03.2006

The Bidder must have earned profit in any one of the last three financial years ending 31.03.2006 and should have positive networth as on 31.03.2006.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending 31.03.2006 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.

d) Approval of the agency by customer.

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

15. A DECLARATION SHEET INDICATING THAT THERE IS NO DEVIATION IN TENDER DOCUMENTS (AS IN PAGE 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.

The Purchase preference to CPSE's shall be applicable as per Central Govt. Guidelines on the date of Tender Opening.

The Tenders not accompanied by the prescribed Earnest Money Deposit are liable to be summarily rejected.

16. SAFETY PLAN

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

Sr. Dy General Manager /Contracts

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 superscribed as Part I "Technical Bid" and Part II "Price Bid" and also indicating on each of the covers the tender specification number and due date and time as mentioned in the Tender Notice.

Part I (Technical Bid) Cover I

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

Part II (Price Bid) Cover II

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

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

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

NOTE:

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

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

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

ANY REVISION OF RATES / PRICES 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.

Sr. Deputy 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: 1208

Description	EMD
Handing at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Structures, Pressure Parts, Non Pressure Parts, Air Pre Heaters, Fans, Bunkers, Bunker Liners, Dampers Ducts including Supply and Application of Final Painting of CFBC Boiler, for Unit –1 of 2 x 250 MW CFBC Boiler at Neyveli Thermal Power Station II Expansion, Neyveli, Cuddalore Dist. Tamil Nadu.	Rs.2,00,000/- (Rupees Two Lakhs only)

Cost of Tender Documents (Including all Taxes)	:	Rs.1105/-	
Sale Starts on	:	8.12.2006	
Sale closes on	:	27.12.2006	
Due date and Time for Submission	:	28.12.2006	15.00 Hrs.
Date and time for opening Of Technical Bids	:	28.12.2006	15.30 Hrs.

QUALIFICATION REQUIREMENT

a) The bidders should have executed erection work in minimum one unit of 200 MW or above capacity Boiler in Thermal Power Plant in the last seven years

b) The bidders should have a minimum average financial turnover of Rs.690 Lakhs per year in the preceding three years ending 31.03.2006

The Bidder must have earned profit in any one of the last three financial years ending 31.03.2006 and should have positive networth as on 31.03.2006.

Bidder should submit audited balance sheet and profit & loss account of the company for last three years ending 31.03.2006 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.

b) Approval of the agency by customer.

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

Interested parties can get the Tender documents from the office of the Senior Deputy General Manager / Contracts on all working days by remitting the cost of tender documents either by Cash or A/c Payee Demand Draft drawn in favour of M/s. Bharat Heavy Electricals Limited, Chennai – 600 035. Money order, Cheques and Postal Orders will not be accepted.

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.

SENIOR DEPUTY GENERAL MANAGER/CONTRACTS

TENDER SPECIFICATION : BHEL:PSSR:SCT:1208

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

Senior Deputy 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:1208 issued by Bharat Heavy Electricals Limited, Power Sector : Southern Region, in accordance with the terms and conditions thereof.

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

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

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

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

DATE: CONTRACTOR:

PLACE: ADDRESS:

Witness with their address

Signature Name Address

PROJECT INFORMATION

1.	OWNER/PURCHASER	:	Neyveli Lignite Corporation Limited
2.	Consultant	:	TCE Consulting Engineers Limited Sheriff Centre 73/1 St Mark's Road Bangalore - 560001
3.	Project Title	:	2 x 250 MW TS-II Expansion.
4.	Location	:	Neyveli in the state of Tamilnadu in India, located at 200 km from Chennai
5.	Nearest Railway station	:	Neyveli on Vridhachalam-Cuddalore broad gauge link of Southern Railway of India.
6.	Site elevation	:	34.0 to 42.0 m above mean sea level.
7.	Access Road	:	5.0 km from Vridhachalam- Cuddalore road and 15.0 km from Chennai - Tanjore State Highway.
8.	Nearest Airport	:	Chennai
9.	Nearest Sea port	:	Chennai
10.	Latitude of site	:	11 deg 32 minutes and 30 seconds
11	Longitude of site	:	79 deg 26 minutes and 30 seconds
12	Metrological data	:	Weather data of Neyveli from the period 1982 to 2001 indicates the following :

a)	**Temperature**		:	
i)	Average Max . Temp		:	39.4 deg. C
ii)	Average Minimum temp		:	18.9 deg. C
iii)	Highest Maximum temp		:	42.8 deg. C
iv)	Lowest Minimum temp		:	15.6 deg. C
v)	Temperature to be considered for design of electrical equipment/devices		:	50 deg C
b)	Relative humidity			
i)	Maximum		:	100%
ii)	Minimum		:	14 %
iii)	Average		:	63 %

c) Rainfall

i) Annual variation : 676.2 mm to 1856.3 mm

ii) Average annual RF : 1203.90 mm

d) Wind Data

Basic wind speed : 50 m/sec as per IS 875(Parts) - 1987

i) K_1 : 1.08

ii) K_2 : As per terrain Category -3

iii) K_3 : 1.0

13) Languages Spoken in the Region : English, Tamil

14) Official language for the bidder to deal with : English

15) Tropicalisation : All equipment supplied against this specification shall be given tropical and fungicidal treatment in view of climatic conditions prevailing at site.

16) Cooling water temperature

a) Design temperature for condenser inlet : 36^0C

b) Maximum temperature at condenser inlet : 41^0C

c) Design temperature for heat exchanger : 40^0C

17) Seismic data : As per IS: 1893 - 2002

a) Zone : II

b) Zone factor-Z : 0.04

c) Importance factor (I) : 1.50

18.0	Auxiliary power supply		:	Auxiliary electrical equipment to be supplied against this specification shall be suitable for operation on the following supply system.
	(a)	For motors rated above 160 kW	:	6600V, 3 phase, 3 wire, 50Hz (Medium resistance earthed)
	(b)	For motor rated below 160 kW	:	415V, 3 phase, 4 wire solidly earthed AC
	(c)	DC. motor starters, DC solenoids, DC alarm, control and protections	:	220 V DC, 2 wire, unearthed DC
	(d)	AC control & protective devices	:	110 V, 1 phase, 50Hz, 2 wire AC supply. The single-phase 110V AC supply shall be derived by CONTRACTOR BY PROVIDING 415V/ 110V control transformers of adequate rating with MCCB /MCB on both the primary and secondary sides.
	(e)	Uninterrupted power supply	:	110 V, 1 phase, 50Hz, 2 wire AC supply
	(f)	AC solenoids, space heaters (for motors rated 30KW and above)	:	240V, 1 phase, 2 wire, 50Hz AC system with effectively earthed neutral. The power supply shall be derived by CONTRACTOR by providing 415V/ 240V transformer of adequate rating with MCCB/MCB on primary/secondary sides.
	(g)	Solid state controls (including solenoid valves)	:	24 V DC, 2 wire, supply from (24V DC supply derived from 110 V AC UPS supply)
	(h)	Lighting fixtures	:	240 V, 1 phase, 2 wire, 50Hz earthed AC system.
	(i)	Lighting fixtures and space heaters in panels	:	240 V, AC 1 phase, 2 wire, 50Hz earthed AC system.

(j) The above voltages may vary as follows :

All devices shall be suitable for continuous operation over the entire range of voltage and frequency indicated below without any change in their performance.

i.	AC supply	:	Voltage variation ±10% Frequency variation ± 5% **Combined voltage & frequency variation ± 10**
ii.	DC supply	:	Voltage variation +10% -15%

19.0 WRITEUP ON METEOROLOGICAL DATA FOR NEYVELI

(I) Meteorological Data

The study of the weather data available for the last 20 years for Neyveli (1982 to 2001) indicates the following:

a. **Temperature:**

The monthly average maximum and minimum temperatures have generally a cyclic fluctuation depending on the seasons, with a progressive rise between December and May and a similar from May to December. The average maximum temperature was 39.4 °C. and the average minimum 18.9 °C. The highest recorded temperature was 42.8 °C in April 1985 and May 1989 and the lowest minimum temperature was 15.6 degree C. in February 1989.

b. **Evaporation Rate and Relative Humidity:**

The Evaporation Rate is high during summer months (May) and low in December. During the period the maximum, minimum and annual evaporation rates are 2576.4mm (1982), 1150.6mm(2000) and 1693.3mm respectively. The relative humidity is 14% to 96% during summer and 23% to 100% during winter. The maximum and minimum relative humidity recorded are 100% and 14%.

c. **Wind Velocity**:

The monthly average Wind velocity varies generally from 1.7 to 11.8Km/Hr. The maximum velocity is 118.8 Km/Hr as recorded in December 1993 (04.12.1993). Cyclonic weather is encountered almost every year during monsoon periods.

d. **Rainfall**:

The area gets rainfall both due to southwest monsoon (July - September) and North East monsoon (October - December). The per day intensity of rainfall due to northeast monsoon is generally higher than that of the southwest monsoon.

The annual rainfall for the period varies from 676.2 mm (1982) to 1856.3 mm (1996) and the average for the period is 1203.9 mm. The total number of rainy days varies from 37 to 67days in a year. Average number of rainy days 56 days per year. 75% of the rainy days are less

than 25mm, 16% of the rainy days are 25mm to 50mm, 8% of the rainy days are 50mm to 100mm and only 1% of the rainy days are above 100mm. The maximum rainfall of 341mm was recorded on 23.12.1983. The precipitation due to South West and North East monsoons is of cyclonic nature and attributable to series of depressions, which develop in the Bay of Bengal and Indian Ocean.

SECTION III
COMMON CONDITIONS OF CONTRACT
FOR ERECTION WORK

3.1 SCOPE OF CONTRACT

3.1.1 The Intent of this specification is to provide erection and commissioning services for execution of projects according to most modern and proven techniques and codes. The omission of specific reference to any method and equipment or material necessary for the proper and efficient services towards installation of the Plant shall not relieve the contractor of the responsibility of providing such services, facilities to complete the project or portion of project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies.

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

3.1.3 Provision of all types of labour, Supervisors, Engineers watch and ward as required, tools and tackles as required, consumables as required under various clauses of tender specification for handling transportation, erection, testing and commissioning.

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

3.1.5 Completion of work in time.

3.1.6 Good quality and accurate workmanship for proper performance of equipment / systems.

3.1.7 Preservation of all components at all stages of pre-assembly/erection/ till unit is handed over, as specified in detail in clause 3.10.0

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.

3.2.3 WATER:

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

3.2.4 TOOLS & TACKLES:

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

3.2.5 CONSUMABLES:

Only TIG welding wire as supplied in the shipping list / by manufacture for C.S, A.S., S.S. welding will be supplied by BHEL free of cost. All other electrodes, gases and consumables are to be arranged by the contractor at his cost. However Paint and thinner for preservative painting and nitrogen for chemical cleaning work will be supplied by BHEL free of cost.

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

3.3.1 CIVIL CONSTRUCTION:

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

3.3.2 WATER DISTRIBUTION:

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

3.3.3 ELECTRICITY DISTRIBUTION:

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

3.3.4 POSSESSION OF GENERATORS :

As there are bound to be interruptions in regular power supply, power cut / load shedding in any construction sites, due to inherent power shortage in State on this account, suitable extension of time, if found necessary only be given and contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be the responsibility of the contractor to have atleast (2 to 4) diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderers. This may also be noted while quoting.

3.3.5 LIGHTING FACILITY:

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

3.3.6 POWER DISTRIBUTION:

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

3.3.7 CONTRACTOR'S OBLIGATION ON COMPLETION :

On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

3.4 GASES :

3.4.1 All required gases like Oxygen/ acetylene/ LPG/ 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 subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

3.5.2 The TIG welding wires as supplied in the shipping list / by manufacture for CS, AS and SS welding will be supplied by BHEL free of cost. All other electrodes including stainless steel electrodes required for shall be arranged by the contractor at his cost. The utilization of the TIG welding wires shall be duly accounted for exercising maximum care and ensuring economical usage for minimum wastage. If during erection, it is found that the consumption of filler wire is more than the actual requirement by improper usage, the cost for the additional quantity so consumed shall be recovered from the contractor.

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 free of hire charges on sharing basis the tools and plants indicated in Appendix III only. It may be noted that distribution of these equipments will be done by BHEL Engineers and the decision of the Engineer shall be final in this regard.

3.6.2 The Contractor shall be responsible for the safe and proper use of the above equipments issued to him. Day-to-day maintenance and operation of the equipments shall be the contractor's responsibility and shall be as per instructions/standard practice of BHEL Engineer.

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

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

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

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

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

3.6.8 All other T & P required for the satisfactory execution of work shall be arranged by contractor.

3.6.9 All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.

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

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

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

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

3.6.14 All the T & P would be issued only at BHEL stores and it shall be the responsibility of the contractor to take delivery from BHEL stores, transport the same to site and return the same to BHEL stores in good condition after use.

3.6.15 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.

3.6.16 The list of major T & P required to be deployed by the contractor is indicated in APPENDIX – I The list is minimum and not exhaustive but anything required over and above these to suit the site condition / rate of progress / nature of work shall be arranged by contractor at his own cost.

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

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

3.6.19 For the movement of cranes, etc., it may become necessary to lay sleeper bed for obtaining leveled safe approach for use of equipment. It shall be the contractor's responsibility to lay necessary sleepers. The required sleepers are to be arranged by the contractor at his cost. BHEL will not supply any sleepers for this activity.

3.6.20 Contractor shall make good any loss or damage to the equipments supplied to him and day to day maintenance and operations of equipments shall be borne by the contractor including all consumables like petrol, diesel, oil and air filters etc.

3.6.21 BHEL will provide Suitable Heavy Duty Crane for this scope of work, (To Lift Heaviest Ceiling Girder) and this crane will be provided as per site requirement BHEL will provide operator for this crane and the contractor has to arrange 2 helpers to assist BHEL operator.

3.6.22 As the cranes available with BHEL are likely to be deployed for various contractor, the decision of BHEL Engineers will be final with regard to allotment of cranes for day to day use.

3.6.23 The availability of cranes are likely to be hampered from time to time due to routine preventive maintenance or breakdown maintenance. Contractor has to make alternative arrangements or plan / amend / alter his activities with the consent of BHEL Engineer to suit the above conditions and the contractor will not be liable for any compensation due to this.

3.6.24 The contractor has to keep and maintain a log book every day which will be provided by BHEL and this has to be countersigned by BHEL Engineer every day.

3.7 SUPERVISORY STAFF AND WORKMEN

3.7.1 The Contractor shall deploy experienced Engineers, Supervisors all the skilled workmen like High Pressure Welders (gas, TIG and arc) Carbon, alloy steel welders, Gas cutters, electricians, Riggers, Serangs, Erectors, carpenters, fitters etc. in addition to other skilled, semi-skilled and unskilled workmen required for all the works of handling and transportation from site storage to erection site, transportation, erection, testing and commissioning comtemplated 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 CIVIL WORKS

3.8.1 Column foundation and foundation of other plants and necessary civil works shall be provided by BHEL. The dimension of the foundation and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall

be checked with respect to bench mark etc. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipments plants shall be carried out by the contractor.

3.8.2 The contractor at his cost shall arrange for grouting of foundation bolt holes of column and equipment as specified in the drawings / specification or as advised by the Engineer of BHEL after preparing the foundation top surface for grouting, All the materials for grouting (sand, gravel & cement including spl. Cement) shall be arranged by the contractor. The grouting has to be done upto basement level. The required consumables like portlant cement, gravel, sand etc., have to be provided by the contractor at his cost. Special cement like combextra, GP1/ shrinkomp or its equivalent and as approved by BHEL, shall be arranged by the contractor at his cost.

3.8.3 The contractor at his cost shall arrange for grouting of anchor points of T & P issued to him and also grouting of winches or any other supports required for T & Ps. Necessary grout materials are to be arranged by the contractor at his cost.

3.9 SCOPE OF MATERIAL HANDLING AND SITE STORAGE AND OTHER RESPONSIBILITIES

3.9.1 While BHEL will endeavor to store/stack/identify materials properly in their open/closed storage yard/shed it shall be contractor's responsibility to assist BHEL in identifying materials well in time for erection, taking delivery of the same in time following the procedure indicated by BHEL and transport the material safely to pre-assembly yard/erection site in time according to programme.

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

3.9.3 It shall be contractor's responsibility to arrange necessary cranes/tractors, trailor or trucks/slings/tools and tackles/labour including operators for loading the materials/Equipments from stores/storage yard, move it to erection site/pre-assembly yard and unload the same at pre-assembly yard/ erection site and the quoted rate shall include the same.

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

3.9.5 Any loss/damage to materials issued to contractor shall be made good by him or BHEL will arrange for replacement at cost recovery basis and decision of BHEL shall be final.

3.9.6 All welding filler wires if issued to the contractor shall be preserved by him carefully to prevent detorioration of their properties. Special care shall be taken to preserve alloy steel and other special electrodes / filler wires. Contractors shall exercise maximum care in using these electrodes, filler wires to minimize wastage by maintaining a record of all usages.

3.9.7 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.

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

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

3.9.10 The contractor shall submit monthly plan for erection and the same will be mutually agreed upon after discussion. The contractor shall arrange for Engineers, Supervisors and labour force and tools and plants and consumables to suit the above plan and execute the work accordingly.

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

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

3.9.13 The contractor shall ensure that the packing materials and protection devices used for the various equipments during transit and storage are removed before these equipments are installed.

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

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

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

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

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

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

3.9.20 The contractor shall take delivery of equipment from storage yard/stores/sheds. He shall also make arrangements for verification of equipment, maintain records and keep safe custody watch and ward of equipment after it has been handed over to him till these are fully erected, tested and commissioned and taken over by BHEL's client. The stolen/lost/damaged goods shall have to be made good by the contractor at his own cost.

3.9.21 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

3.10.0 PRESERVATION OF COMPONENTS

3.10.1 It shall be the responsibility of the contractor to apply touch up painting on all equipment before erection. It shall be contractor's responsibility to arrange for required labour, brush and other consumables like cotton waste, cloth etc. for carrying out preservative painting. The quoted rate shall inclusive of above work. The required paint (red oxide) and thinner shall be arranged by BHEL at free of cost.

3.10.2 The contractor shall effectively protect the finished work from action of weather and from damage or defacement and shall cover the finished parts, then and there for their protection.

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

3.10.4 Due to atmospheric conditions erected materials are likely to get rusted more frequently. It is the responsibility of the contractor to preserve the erection materials drawn from stores for erection till these are commissioned and handed over to customer. The required

paint (Red oxide) and thinner shall be arranged by BHEL free of cost. All other consumables like painting brush, emergy paper, cotton waste, cloth etc. have to be procured by the contractor at his cost. The contractor should ensure that the materials are not rusted on any account till they are handed over to customer. The decision of the BHEL Engineer is final with regard to frequency of application of paint.

3.11.0 DRAWINGS AND DOCUMENTS

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

3.11.2 One set of necessary drawings to carry out the erection work will be furnished to the contractor by BHEL on loan which shall be returned to BHEL Engineer at site after completion of work. Contractor's personnel shall take care of these documents given to them.

3.11.3 The data furnished in various appendices and the drawings enclosed with this Tender Specification, describes the equipment to be installed, tested and commissioned under this specification briefly. However, the changes in the design and in the quantity may be expected to occur as is usual in any such large scales of work.

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

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

3.12.1 SAFETY AND CLEANLINESS

3.12.1 Contractor shall strictly follow all safety regulations/conditions as per clause 2.15 and its subclauses of general conditions of contract booklet enclosed with this tender.

3.12.2 Non-confirmity of safety rules and safety appliances will be viewed seriously and the BHEL has right to impose fines on the contractor as under:

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

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

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

SPECIFIC REQUIREMENTS FOR ISO 9001 - 2000

3.13.0 IMPORTANT NOTE

Contractors shall ensure that all their Staff/Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9001 – 2000 Standards.

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

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

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

3.14.0 INSPECTION / QUALITY ASSURANCE / QUALITY CONTROL STATUTORY INSPECTION

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

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

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

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

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

3.14.6 Approval Given by Customer/BHEL for welding, results tests etc. shall also be recorded in the log book.

3.14.7 Welding Details like number of joints, welder's Name, Date of welding, Details of Repair, Heat Treatment, Etc. will be documented in welding Logs as per BHEL Engineer's Instructions.

3.14.8 Heat Treatment details of HP Welds indicating minimum Temperature Recorded, Heating Rate, Cooling Rate, soaking Time, Etc., shall also be Recorded and documented by contractor as per BHEL Engineer's Instructions. High pressure Welder's performance Record shall be furnished every month. The performance Report of Welders shall indicate the percentage of Repair for each welder.

3.14.9 All the Electrical/Technical Measuring and Testing Instruments/Guages, Feeler Guages, Height Guages, Dial Guages, Micrometers, Levels, Spirit Levels, Surface plates, straight Edges, vernier calipers and all measuring instruments shall be provided by the contractor for checking, leveling, Alignment, Centering etc of Erected Equipments at various stages. The Instruments/gauges/Tools etc. provided should be of Brand, Quality and Accuracy, Specified by BHEL Engineer and should have necessary calibration and other certificates as per the Requirements of BHEL Engineer.

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

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

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

3.14.13 Contractor shall ensure speedy alignment and welding of all Enquipment erected by him after placement. Also all alignments, Welding, NDT Tests required for stage Inspection shall be completed as per Quality Assurance Procedures. All the Quality Assurance procedures have to be complied with before effecting column erection, Ceiling Beams erection, drum lifting, further structural work, Hydraulic Test, Trial Run of Equipment, Pre-commissioning and Post commissioning and any other tests required to be conducted for completing erection and commissioning.

3.15.0 STAGE INSPECTION BY FES / QA ENGINEERS

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

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

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

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

3.16.0 STATUTORY INSPECTION

3.16.1 The scope includes Getting the Approvals from the statutory authorities (Like Boiler Inspector and labour officers). This includes arranging for inspection visits of Boiler Inspector periodically as per BHEL Engineer's instructions, submitting documents, radiograph, etc. and following up the matter with them.

3.16.2 All fees connected with the contractors for testing his welders / men / workers and testing, inspection calibrating of his instruments and equipments, shall be paid by the contractor. It shall be the contractor's responsibility to obtain approval of statutory authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities. Any cost arising from this shall be the contractor's account. In case these inspection have to be repeated due to defaut / fault of the contractor and fees have to be paid again, the contractor shall have to bear the charges. These would be deducted from his bills.

HSE SPECIFIC REQUIREMENT

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

SUB CONTRACTOR TO ENSURE COMPLAINCE OF THE FOLLOWING **HEALTH** RELATED POINTS

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

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

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

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

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

SUB CONTRACTOR TO ENSURE COMPLAINCE OF THE FOLLOWING **SAFETY** RELATED POINTS

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

.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

16. All 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 months 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 elcetric shocks to workmen , caving in of shored earth , fall from height, collapse of scaffolding fire etc., and should have clear action plan to overcome them. Sub contractor to take required guidance from BHEL in this regard.

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

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

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

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

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

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

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

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

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

OTHER HSE REQUIREMENTS TO BE COMPLIED BY SUB CONTRACTOR

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

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

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

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

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

SECTION – VI

SPECIAL CONDITIONS OF CONTRACT

6.1 SCOPE OF WORK

6.1.1 The work to be carried out at quoted/accepted rates by the contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or pre-assembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipments at the pre-assembly yard, inspection, minor rectification, preservation, erection, leveling, grouting and other adjustments, cutting, edge/surface preparation, welding, grinding, radiography, LPI/MPI/UTI testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, steam /air blowing light up, chemical cleaning, passivation, steam blowing and safety valve floating including inter connection all the termination points, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs of the CFBC boiler & Aux. Bunker Structure & Bunker and supply and application of final painting covered under the tender specifications and providing adequate assistance during entire commissioning and unit trial operations and final painting of Unit 1 of 2 x 250 MW NEYVELI TS II Expansion Project in Tamil Nadu State.

6.1.2 The brief list of equipment to be erected, but not limited to

1. Circulating Fluidised Bed Combustion Boiler with water circulation system, SH/RH system with complete supporting structure & platforms, Boiler mountings, Trim piping etc., Roof sheeting, cladding etc.,
2. Fludised Bed Heat Exchangers
3. Interconnecting platform & Lift structures
4. Bunker Bay Structures & Bunkers (Lignite, Lime Stone & Bed Materials), feeders, conveyors etc.,
5. Fuel oil System – Supply & return from PH/terminals at TS II with Warm-up, oil burners, igniters etc.,
6. ID/SA/PA Fans
7. Air Pre Heaters (RAPH & TUBLER)
8. Air & Flue Gas system (Ducts, dampers, gates etc.,) up to BOF
9. Bed ash System

10. Soot Blowing System
11. Chemical dosing system
12. Equipment Handling System
13. Pressure Parts attachments.

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

6.1.4 Contractor shall submit a copy of license to undertake construction/repair of boilers issued by Boiler inspectorate before commencement of Pressure Parts Erection.

6.1.5 Contractor shall provide exclusive two computers system with the following minimum configurations for with qualified computer operators for maintaining erection / material records.

S. No.	Features	Minimum Requirements
1	Processor	Intel Pentium 4 2 GHz or above
2	Chipset	Intel 845 or higher Intel Chipset
3	RAM	256 MB DDR SDRAM
4	HDD	40 GB
5	FDD	1.44 MB
6	Optical Drive	48x or above CDD
7	Monitor	15" VGA Colour
8	Keyboard	Minimum 104 keys Windows keyboard
9	Mouse	2 Button Scroll mouse
10	Ethernet	Integrated 10/100 Mbps NIC for LAN
11	Ports	Minimum 1 Parallel, 1 Serial, 2 USB
12	Software	Windows 2000 or XP Professional
13	Accessories	Mousepad & Dustcovers
14	UPS	1 kVA UPS with 1 hr. backup
15	Printer	A4 size Laser Printer - 20 ppm or above (with all consumables, cartridges & stationery)

6.1.6 Field quality assurance formats

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

6.2 FOUNDATION DRESSING AND GROUTING

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

6.2.2 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipment/equipments base on the foundations.

6.2.3 All equipment bases and structural steel bases and foundations pockets shall be grouted and finished as per grouting specifications unless otherwise recommended by the equipment manufacturers.

6.2.4 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. The contractor shall ensure perfect matching of the packer plates with foundations by dressing the foundation and between the packer plates and base plates of structural columns to the satisfaction of BHEL Engineer.

6.2.5 PROCEDURE FOR GROUTING

Contractor has to carryout the grouting as per the work instructions for grouting of equipments columns etc available at site.

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

6.3 ERECTION

6.3.1 Details regarding boiler components, sub-assemblies auxiliaries etc. to be erected, tested and commissioned under the scope of this tender is given in appendix. The schedule of weights given in the appendices are only approximate and meant for giving a general idea to the tenderer, about the magnitude of the work involved. This should not be taken for billing or any other claims. All weights for such purposes will have to be taken from design documents only (Shipping list).

6.3.2 All the works such as cleaning, checking, leveling blue matching, aligning, assembling, temporary erection for alignment, opening, dismantling of certain equipments for checking and cleaning, surface preparation, edge preparation, fabrication of tubes and pipes as per general engineering practices at site, cutting, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, shaping, fitting-up bolting, welding etc, as may be applicable in such operation and are necessary to complete the work satisfactorily are to be treated as incidental and the same shall be carried by the contractor as part of the work .

6.3.3 For drum lifting contractor shall use hydraulically Operated Strand Jack method for which contractor shall have a necessary tie-up with established vendor who has executed similar job. The credential of the vendor & the procedure for lifting the drum shall be submitted to BHEL for review and approval with in a month of award of work. Any additional arrangement/structures required for the same including material shall be arranged by the contractor with in the quoted rate.

Boiler Drum Tentative Weight = 180MT (Approx)

Length - 14 Mtrs ID - 1778 mm Drum EL – 54.00 Mtrs

6.3.4 Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like 'T' pieces, weld neck

flanges, reducers etc. shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection, after chemical cleaning and during commissioning. Edge preparation becomes the part of erection work. However, payment for new edge preparation reconditioning beyond reasonable limits will be considered as per man day rates.

6.3.5 Adjustments like removal of ovalites in pipes and opening or closing the fabricated bends of high pressure piping to suit the layout shall be considered part of work and the contractor is required to carryout such work free of cost, as per instructions of BHEL, which shall include specific heat treatment procedures etc. Quality correction beyond reasonable limits will be paid us per man day rates.

6.3.6 Certain adjustments in length of steel members may be necessary while erecting high pressure pipelines of boiler and piping (pre fabricated lines) and the contractor should remove the extra lengths / and extra lengths to suit the final layout after preparing edges afresh and adopting specified heat treatment procedures at no extra cost, wherever indicated.

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

6.3.8 Ducts / expansion pieces are dispatched to site in loose walls / plates and these are to be assembled at site before erection. All field connection duct / expansion pieces and dampers shall be seal welded on inside as well as outside.

6.3.9 Fabricated pipes are sent in standard length and will be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends up to NB 65mm will have to be fabricated at site adopting specified heat treatment procedures, wherever required at no extra cost.

6.3.10 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over. Daily welding reports in the pro-forma suggested by BHEL should be submitted by next morning without fail.

6.3.11 All the dampers, valves, lifting equipments, power cylinders, etc. shall be serviced and lubricated to the satisfaction of BHEL Engineer before erecting the same and also during pre-commissioning. The bearings of

dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost Even after commissioning in the equipments, if there are problems in the operation they have be attended to by the contractor during the tenure of the contract.

6.3.12 In case of any class of work for which there is no such specification as laid down in the contract such as blue matching, welding of stainless steel parts etc. the work shall be carried out in accordance with the instructions and requirements of the BHEL Engineer at the quoted rates only.

6.3.13 In the case of structural members / ducts, in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connect the joints at no extra cost. Normally, the machine profile will be cut out for the structural members but the contractor will have to carry out suitable alteration / adjustments at site, without any extra payment, in case it becomes necessary.

6.3.14 Attachment, welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and control valves etc. both for regular measurements and performance testing to be provided on boiler / its auxiliaries or pipelines covered within scope of this tender, will also be the responsibility of the contractor and the same will be done as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor's responsibility, even if:

a. Product groups under which these items are released are not covered in the scope of this tender.

b. Items are supplied by an agency other than BHEL.

6.3.15 Spring suspensions / constant load hangers have to be pre - assembled and adjusted for the required loading and erected as per the instructions, of BHEL Engineer. Any adjustments, removal of temporary arrestors / lockers, etc. have to be carried out as and when required.

6.3.16 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.

Contractor shall carry out necessary preservative painting, periodic application of preservations on pressure parts and other equipments during erection / after erection until completion of work. Necessary preservatives / paints, thinner only will be provided by BHEL free of cost.

Contractor shall provide necessary crew with all items like wire brushes, paint brushes, emery paper, cotton waste, scaffolding materials etc at his cost.

6.3.17 The contractor shall fabricate piping, install lube oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lube oil system; carry out the hydraulic test of oil coolers, etc.

6.3.18 All tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Sponge ball test shall be carried out for all tubes before erecting the same. Bigger size pipes should be cleaned with flexible wire brush, wherever necessary. After cleaning is over, the end caps shall be put back in tube openings till such time they are welded to other tubes. Required compressors and other materials shall be arranged by the contractor at his cost.

6.3.19 All attachment welding including those for insulation and refractory work coming on the pressure parts shall have to be done by the contractor. The hooks are suitable for stud welding machines. Contractor's quoted rate shall include all these contingencies. Manual attachment welding on pressure parts shall be done by qualified and certified welders only.

6.3.20 It is the responsibility of the contractor to do the alignment checking, etc., if necessary, repeatedly to satisfy BHEL Engineer / customer Engineers with all the necessary tools and tackles manpower, etc., without any extra cost. The alignment will be complete only when jointly certified so, by the BHEL Engineer & customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

6.3.21 Burner tilt mechanism will be checked for freeness, serviced and adjusted, if necessary to obtain optimum tilt before and after installation.

6.3.22 It may be necessary to do the alignment, checking, etc., repeatedly to satisfy BHEL Engineer / customer Engineers with all the necessary tools and tackles manpower, etc., which shall be carried out without any extra cost. The alignment will be complete only when jointly certified so, by the BHEL Engineer & customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

6.3.23 Fine fittings, boiler trim piping, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position. As such, layout of small bore piping in boiler and oil system shall be done as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.

6.3.24 Additional platforms for approaching different equipments as per the site requirement, which may not be indicated in drawings, shall be assembled and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate for erection. The steel materials required for these works shall be supplied by BHEL free of cost and the contractor will have to install them to suit the requirement. Works of major nature not covered under this clause.

6.3.25 Complete penetration of water wall (Panel to panel) fins welding shall be achieved either by single side or double side welding. The decision of BHEL Engineer is final.

6.3.26 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.

6.3.27 The column erection has to be done tier by tier with all bracings, beams to be erected, welded / bolted. Second tier of erection can be carried out only after grouting of column base. Sequence of erection shall be as per the instructions of site Engineers.

6.3.28 Certain extra lengths of various tubes/pipes and fabricated ducts are provided as erection allowance and the same have to be cut/adjusted to suit the site conditions and layouts or certain small lengths may have to be added for adjustments to suit the site conditions. For any mismatch while matching the joints in tubes, the cutting, adjusting, re-welding, addition spool pieces should be done by the contractor to match site conditions without any extra payment.

6.3.29 No temporary supports shall be welded on the pressure parts & piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alternation of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer.

6.3.30 Contractor shall engage separate gangs throughout the contract period, exclusively for proper house keeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from, all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity.

6.3.31 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing to obtain reliable and complete pipe installation as per instructions of BHEL Engineer. Normally supports (components) are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost. (Any machining or threading is involved will only be done by BHEL)

6.3.32 Some platform materials in PG 36 and 48 approach ladders, suspension materials etc. will be supplied in running meters. The contractor has to cut/join these materials to the required lengths and erect them within the quoted rates.

6.3.33 The materials for boiler roofing and side cladding etc. will be supplied by BHEL and contractor has to erect the same at the quoted / accepted tonnage rate.

6.3.34 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should not be welded on the column and should be fabricated clamping type ladders. No temporary welding on any structural members is permitted except under special circumstances with the approval of BHEL.

6.3.35 Assistance for calibrating / testing the power cylinders / valves, gauges, instruments, etc. and setting to actuators coming under various groups shall be provided by contractor within the quoted rates.

6.3.36 Hanger rods are shown in the pressure parts arrangement drawing for boiler. Any cutting / welding and required heat treatment and necessary NDT of such hanger rods will be done by the contractor. The hangers for pressure parts will be tested for even distribution of load with the help of torque wrench.

6.3.37 Skin casing sheet for covering the boiler roof panels, and other areas will be supplied as fabricated items. Any cutting and re-fabrication to suit the site conditions shall be carried out within the quoted rates.

6.3.38 It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the desired progress and target set by BHEL. The contractor's quoted rate shall include all these contingencies.

6.3.39 The contractor is strictly prohibited in using any of the boiler components like angles, channels, hand-rails for any temporary supporting or scaffolding work. In case of such misuse, a sum as determined by BHEL shall be recovered from contractor's bills. Also the contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.

6.3.40 For all the site routed piping under PG-21, 24 & 42 as built drawings are to be submitted by the contractor on completion of work with the approval of Boiler inspectorate (TN).

6.3.41 The contractor has to remove the scrap/debris periodically as and when required and returned to BHEL stores or the location shown inside the plant area after segregation (Wooden, Ferrous, Non-Ferrous, inflammable etc). In case the contractor fails to remove the scrap / debris, the same shall be done by BHEL at the cost of contractor. The temporary structures / item welded either to structures or pressure parts are to be cut and removed without any damage to the equipments erected.

6.3.42 The contractor has to erect the passenger cum goods lift, as per instruction of BHEL Engineer, including transport of materials from BHEL Stores. The dismantling of the erected lift. Transport / Handling over to BHEL Stores are also covered in this scope of work. The contractor has to arrange operators, Technicians for round the clock operation and maintenance is to be carried out by the contractor at his cost.

6.3.43 EACH CEILING GIRDER WILL BE SUPPLIED IN MAXIMUM 3 PIECES AND CEILING GIRDERS ARE TO BE PRE-ASSEMBLED AT SITE AND WELDING & NDT TESTS ARE TO BE CARRIED OUT, INCLUDING 100% RADIOGRAPHY FOR THE WELDED JOINTS IN CEILING GIRDERS. THE HEAVIEST ASSEMBLED CEILING GIRDER WEIGHT WILL BE AROUND 50 MTS AND MAXIMUM ELEVATION OF CEILING GIRDER IS 67 M AND HEIGHT OF CEILING GIRDER IS 3.8M"

6.4.0 DRUM LIFTING

6.4.1 BHEL shall arrange to unload boiler drum in a convenient location as near as possible to Boiler Foundation. Transportation of the same to erection site for erection shall be within the scope of work of the contractor.

6.4.2 **For drum lifting contractor shall use hydraulically Operated Strand Jack method for which contractor shall have a necessary tie-up with established vendor who has executed similar job. The credential of the vendor & the procedure for lifting the drum shall be submitted to BHEL for review and approval with in a month of award of work. Any additional arrangement/structures required for the same shall be arranged by the contractor with in the quoted rate.**

Boiler Drum Tentative Weight = 180MT (Approx)

Length - 14 Mtrs ID - 1778 mm Drum EL – 54.00 Mtrs

6.4.3 HSFG bolts of boiler supporting structure are to be tightened, by turn of nut method / Torque Wrench, as per the instructions of BHEL Engineer. The bolted Joints should be jointly checked by the BHEL/customer and contractor's personnel for the required tightness and retightened wherever necessary. The tightened bolts should be identified by colour paints. Facility for checking with calibrated torque wrenches shall also be provided by contractor.

6.5.0 AIR LEAK TEST:

6.5.1 Air leak test is to be conducted for the cold & hot secondary air ducts. Also gas tightness test is to be done for the flue gas ducts. In addition to this, leak tests are to be done for the furnace, skin casing works carried out in the boiler roof, furnace bottom etc to the satisfaction of BHEL / Customer.

6.6.0 WELDING, HEAT TREATMENT & RADIOGRAPHY

6.6.1 The pressure parts shall be erected in conformity with the provisions of Indian Boiler Regulations and as may be directed, as per other standard/specification in practice in BHEL. The method of welding (viz) ARC, TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions. All the prepared/patched edges will have to be suitably protected to prevent rusting or foreign material ingression.

6.6.2 Welding of high tensile structural steel and pressure parts shall be done by using certified welders who possess requisite certificate (Issued by CIB/TN) and who are approved by BHEL Engineer.

6.6.3 All Welders shall be tested and approved by BHEL Engineer before they are actually engaged on the work even though they may possess the requisite certificate. The welder identification code as approved by the BHEL Engineer shall be stamped by the welder on each joint done by them. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL statutory requirements. BHEL reserves the right to reject any welder without assigning any reason.

6.6.4 BHEL Engineer is entitled to stop any contractor's welders from his work if his work is unsatisfactory for any technical reasons or there is a high percentage of rejection of joints welded by him in the opinion of BHEL Engineer, will adversely affect the quality of welding. Even though the welders has earlier passed the tests it does not relieve the contractor from his contractual obligations, to check the performance of the welders.

6.6.5 All charges for testing of welders (pre production test) including destructive and non-destructive tests at site shall have to be borne by the contractor. Necessary pipe material will be arranged by BHEL and all testing facility will be made available by the contractor (In case of P91, welding electrode will be provided as provided in the document.)

6.6.6 All welded joints shall be subjected to acceptance by BHEL Engineer & CIB(TN) in case of HP/IBR Joints.

6.6.7 Pre-heating/post heating and stress relieving after welding are part of erection work and shall be performed by the contractor in accordance with the instructions of BHEL Engineer. Contractor shall arrange to supply heating equipment with automatic recording devices. Also the contractor shall have to arrange for the labour, all heating elements, thermocouples, compensating cables, insulation materials like mineral wool, asbestos cloth, ceramic beeds, asbestos rope, etc required for the heat treatment and stress relieving works. During the heat/stress relieving operations, the temperature shall be measured at one or more points as required by attaching thermocouples and recorded on a continuous printing type recorders. All the recorded graphs for the heat treatment works carried out shall be got signed by BHEL Engineer prior to the commencement of each cycle and handed over to BHEL on completion. The graphs will be the property of BHEL. The contractor has to provided thermo chalks, temperature recorders, thermocouple attachment units, graph sheets, etc required for the job and maintain them in good condition.

6.6.8 All electrodes shall be baked and dried in an electric electrode drying oven to the required temperature and for the period specified by the Engineer and manufactures inspections before they are used in Erection work, and all welders including high pressure welders shall have a portable electrode drying oven at the work spot.

6.6.9 All butt joints of high pressure tubular system of boiler and piping shall be carried out by TIG root run and subsequent runs by Arc welding. Full TIG welding, wherever necessary shall be carried out within the quoted rates. For oil system piping root run of all the butt joints shall be carried out by TIG welding only.

6.6.10 The technical particulars, specifications and other general details of works shall be in accordance with BHEL welding, Heat treatment and NDE manuals or equivalent as decided by the BHEL Engineer.

6.6.11 Contractor shall carryout Radiography as per Welding Manual Booklet applicable as per IBR, enclosed. However, percentage radiography shown in the respective drawings welding schedule / welding manual shall be final and binding on the contractors.

The field joints in the ceiling girders are to be radio graphed and preheating and post weld heat treatment to be done as per BHEL procedures and manuals.

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

6.6.12 Low speed high contrast fine grain films (D7 or equivalent) in 10cm width only should be used for weld joint radiography. Film density shall be between 1.5 to 2.00.

6.6.13 All radiographs shall be free from mechanical, chemical or process marks to the extent they shall not confuse the radiographic image and noticed.

6.6.14 Penetrometer as per ASME/ISO, shall be used for all exposures.

6.6.15 Lead numbers and letters (generally or 6 mm size) are to be used for identification of radiographic contract No., joints identification, sources used welders identification, SFD used are to be noted down in the paper cover of radiography. Load identifying screens for front and back of the film shall be used as per the instruction of BHEL Engineer.

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

6.6.17 The contractor shall be fully equipped with radiography equipments, films, chemicals and other dark room facilities. There must be a number of radiographic personnel with sufficient experiences and certified by BARC for field radiographic inspection. Further the contractor must follow strictly the safe rules laid down by the BARC, from time to time; contractor's radiographers shall also be registered with BARC for film badge service.

6.6.18 Contractor shall provide all skilled, unskilled workmen required for the job, which will include Engineers, supervisors, operators, as required for timely and satisfactory execution of radiography work.

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

6.6.20 All the radiographs shall be properly preserved in air-conditioned rooms and shall become the property of BHEL.

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

6.6.22 The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of the Engineer and Re- radio graphed. The decision of the Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor.

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

6.6.24 The contractor shall also be equipped for carrying out other NDT like liquid penetrant inspection, magnetic particle inspection etc., as and when required in the interest of work, within the quoted rates.

6.6.25 For carrying out ultrasonic testing of welded joints of large size tubes and pipes, it will be necessary to prepare the surface by grinding to a smooth finish and contour as described by BHEL Engineer. The contractor's scope of work include such preparation and no extra charges are payable for this.

6.6.26 The contractor has to make his own arrangements for air-conditioned dark room to process the radiographs.

6.6.27 It may also be necessary to adopt inter layer radiography / MPT / UT depending upon the site / technical requirements necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this in to account and quote the price inclusive of all such work and radiography.

6.6.28 The welded surface irrespective of place of welding shall be cleaned of slag and painted at the center with primer paint to prevent corrosion at no extra cost towards this. Paint for this purpose shall be provided by BHEL.

6.7.0 PROGRESS OF WORK

6.7.1 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charge incurred on this account including all expenses together with BHEL overheads from contractor's bills.

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

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

6.7.3 The progress reports shall indicate that progress achieved against planned with reasons indicating delays if any, shall also furnish in details the reasons for the same and shall give remedial action which the contractor intends to make good the slippage or lost time, so that further works can proceed as per the original programme and the slippage do not accumulate and affect the overall programme, in a format designed and approved by the BHEL site Engineer.

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

6.7.5 The contractor shall follow the procedures in vigor with regards to security and must obtain the signature / permission of the security personnel of the customer to bring any of their materials inside the site premises. Without the entry Gate Pass these materials will not be allowed to be taken outside.

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

6.8.0 TESTING, PRE-COMMISSIONING, COMMISSIONING & POST COMMISSIONING

6.8.1 The contractor shall carry out the required test on the boiler and pipelines such as gas tightness test for ducts by kerosene / soap solution test or any other method, hydraulic test of boiler, with his own consumables, labour, scaffolding and other items, if any. Necessary hydro test pump will be provided by BHEL.

Air leak test on pressure parts preliminary to hydraulic test by compressed air shall also be carried out to check and rectify the various leakages / defects etc. Required compressors shall be arranged by the contractor

Hydraulic test may be carried out in different stages, HT pumps necessary blanks / valves will be supplied by BHEL free of charges. However the welding and removing it after hydro test, repeating the edges if required, it is to be done by the contractor within the quoted rates.

6.8.2 All the above tests shall be repeated till all the equipments satisfy the requirement / obligations of BHEL to their customer. As far as the hydraulic test is concerned, the same shall be conducted to the satisfaction of BHEL and Boiler Inspectorate, if required at various stages. All the repairs arising out of the failures during testing shall be done by the contractor as part of the work.

6.8.3 The contractor has to provide manpower with requisite T & P and carry out the chemical cleaning, Alkali Boil out, Steam blowing etc. as per BHEL instructions. Contractor shall lay out all necessary temporary piping, install the pumps, valves, pressure gauges, cables, switches, cutting of some of existing valves, placing of rubber wedges in the valves, installation of temporary tanks for chemical storage and for mixing, temporary access platforms to mixing tanks etc., all arrangements for nitrogen capping etc. required for hydro-test,

chemical cleaning and steam blow off or for any other tests as the case may be. After the test is over all the temporary piping, pumps etc. will be removed. All these form part of the scope of work. All chemicals and alkalis shall be arranged by BHEL free of cost.

6.8.4 All temporary piping materials necessary for conducting hydraulic test, steam blowing etc. 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 boiler components specified under despatchable unit for temporary piping including tanks, pumps, valves fittings, hangers and supports etc. supplied by BHEL alone will be paid at the quoted rates for erection. Charges for dismantling of temporary lines etc should be included in the quoted rates. The boiler drum internals shall be removed during chemical cleaning and will be refitted after completion of acid cleaning within the quoted rates.

6.8.5 The materials like acid circulation pumps with starters mixing tanks, valves piping etc. required for chemical cleaning are to be drawn by the contractor from BHEL / Customer stores. Payment will be made at the quoted rates for the weight assessed whenever, tonnage details are not available.

6.8.6 The pumps, pipes, tanks required for chemical cleaning shall be spared at BHEL stores on "as is where is basis" condition. All necessary repairs / overhauls alone are in he scope of the contractor at no extra cost. All the materials shall be returned to stores after use in good condition. Necessary spares will be given by BHEL.

6.8.7 All temporary pipe work and alterations carried out in the normal circulation system shall be tested, prior to commencement of chemical cleaning to a pressure of 1 ½ times the pressure at which cleaning / flushing processes will be carried out. On completion of chemical cleaning, an inspection shall be carried out in the presence of the Engineer to ascertain the effectiveness of the cleaning process. Satisfactory completion of acid cleaning is subject to the Engineer's approval.

6.8.8 The valves, dampers, actuators etc. will have to be checked cleaned and overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as maybe necessary.

6.8.9 Commissioning of the boiler will involve trial runs of all the equipments, erected, lighting up of the boiler of the refractory, drying, blowing of the steam lines, floating of safety vales, flushing of all the lines by air, oil or steam as the case may be, trial run of the boiler, servicing of all equipments like dampers, actuators, valves etc. and any other works incidental to commissioning. Contractor shall provide required workers along with supervisors with all the requisite tools round the clock and material for all these works, which shall form part of the work to be done.

6.8.10 In case any defect is noticed during tests, trial runs such as loose components, undue noise or vibration, strain on connected equipment etc. the contractor shall immediately attend to these defects and take necessary corrective measures. If any adjustments and realignment are necessary the same shall be done as per the instructions of the Engineer. If any part of the equipment needs repair, rectification and replacement due to faulty erection or damage caused due to poor workmanship the same shall be done by the contractor at his cost and the parts to be replaced shall be provided by BHEL at the cost of the contractor.

6.8.11 During this period though the BHEL's/Clients staff will also be associated in the work, the contractor's responsibility will be to arrange required tools, man and plants till such time the commissioned units are taken over by BHEL's client.

6.8.12 After floating of safety valves, the commissioning activities and trail operations will continue upto six months or up to handing over, whichever is earlier. It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers as per the work requirement along with supervisors including necessary consumable tools etc., during this period. The rate quoted shall indicate all these contingencies also. The various categories of workers required for pre-commissioning, commissioning and post-commissioning activities are as follows:

a. Pipe fitters

b. Millwright Fitters

c. HP& structural welders

d. Riggers

e. Unskilled workers

f. Supervisors

g. Electricians

h. Any other category of workers as may be required.

Further in addition to the above contractor has to arrange the following manpower exclusively for assisting BHEL commissioning engineers during stabilization and trial operation period. These manpower will be directly controlled by BHEL commissioning engineers only.

1. One supervisor per shift for three shifts

2. One fitter per shift for three shifts

3. Two helpers per shift for three shifts

6.8.13 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL commissioning Engineers and hence, overtime, may be involved. The contractor 's quoted rate shall be inclusive of all these factors also.

6.8.14 During commissioning, opening of valves, removal of certain gaskets, and re-erection in order to suit the commissioning requirement, changing of gaskets and attending to leakages, filling of oils to the meters/equipment, minor adjustments may arise. The quoted rate shall include the above work.

6.8.15 In case, any re-work is required because of contractor's faulty erection which is noted during commissioning, the same has to be rectified by the contractor at his cost, if any equipment/part is required to be inspected during commissioning, the contractor will dismantle/open up the equipment/part and re-assembler/redo the work without any extra claim.

6.8.16 During commissioning any improvement or rectification due to design requirement is involved and if the contractor is asked to carry out the job, they shall be paid at man-day rates. For this purpose, daily labour report indicating therein nature of work carried out, consumables used, etc. shall be maintained by contractor, and got signed by BHEL Engineer every day. It is not obligatory on the part of BHEL to get the

works done by the contractor. They can employ any other agency if they so desire at that time.

6.9.0 TIME SCHEDULE

6.9.1 The contractor shall have to mobilise in all respects within two weeks from the date of issue of telegraphic/telex Letter of Intent to commence the work.

6.9.2 The entire work of erection testing and commissioning of Unit - 1 as detailed in the Tender specification shall be completed within **22(Twenty two)** months from the date of start of work.

6.9.3 During the total period of contract the contractor has to carryout the activities in a phased manner as required by BHEL Engineer and as per the programme of events/targets fixed by BHEL/customer.

6.9.4 The work under this scope of contract is deemed to be completed in all respects only when all the components/ equipments are erected and trial run, testing and commissioning of all the equipments are completed including safety valves floating. The decision of BHEL in this respect shall be final and binding with contractor.

6.9.5 During the tenure of contract, if BHEL is not satisfied with the progress of BHEL have the right to with draw any portion of work.

6.10.0 PAYMENTS FOR WORK COMPLETED

6.10.1 The Tenderer shall quote separate rates as per the Rate schedule appended. The contractor shall submit his running bills once in a month at the end of each month.

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

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

6.10.4 PAYMENT TERMS

6.10.4.1 Structures – PG 35

a. **20%** on pro-rata basis wherever pre-assembly is involved.

b. **20%** on pro-rata basis after erection and alignment.

or

a.b**. 40%** on pro-rata basis on erection and alignment wherever pre-assembly is not involved.

c. **35%** on prorata basis on completion on welding & NDT.

d. **5%** on prorata basis for completed tonnage on completion of Pass alignment & bolt tightening.

e. **5%** on prorata basis for completion of area cleaning, cutting / removal and return of scraps.

f. **3%** on submission of all protocols of respective area duly certified by all concerned.

6.10.4.2 BUNKER STRUCTURE & BUNKERS PG 34, 66

a. 20% on pro-rata basis wherever pre-assembly is involved.

b. 20% on pro-rata basis after erection and alignment.

or

a.b**. 40%** on pro-rata basis on erection and alignment wherever pre-assembly is not involved.

c. **35 %** on prorata basis on completion on welding & NDT.

d. **5%** on prorata basis for completed tonnage on completion of Bunker Bay box-up & fixing of fasteners, supports/supporting structures if any, clearance for bunker erection, area cleaning, cutting / removal and return of scraps.

e. **5%** on prorata basis for completed tonnage on completion of bunker lining

f. **3%** on submission of all protocols of respective areas duly certified by all concerned.

6.10.4.3 Structures – PG 36 & 38

a. 20% on pro-rata basis wherever pre-assembly is involved.

b. 20% on pro-rata basis after erection and alignment.

or

a.b. 40% on pro-rata basis on erection and alignment wherever pre-assembly is not involved.

c. 35% on prorata basis on completion on welding & NDT.

d. 5% on prorata basis for completed tonnage on completion of approach & landing platforms

e. 5% on prorata basis for completed tonnage on completion of floor grills & toe plates

f. 5% on prorata basis for completion of area cleaning, cutting / removal and return of scraps.

g. 3% on submission of all protocols of respective area duly certified by all concerned.

6.10.4.4 DUCTS 48 (P) & 19 (Tubular APH)

a. **20%** on pro-rata basis on completion of pre-assembly.

b. **20%** on pro-rata basis on erection and alignment and completion of welding.

c. **35%** on pro-rata basis on completion of supports in all respects in the respective zones as per drawings.

d. **5%** on pro-rata basis for the completed tonnage on completion of all above PGMAs, area cleaning, cutting / removal and return of scraps.

e. **5%** on completion of kerosene / lpi / AIR LEAK TEST of individual ducts

f. **3%** on submission of all protocols of respective areas duly certified by all concerned.

6.10.4.5 PR PARTS UNDER PGs 04 to 18, 19(P), 20 TO 28, 30, 31(P), 41,42,43, & 97

a. **20%** on pro-rata basis on completion of pre-assembly

b. **20%** on pro-rata basis on completion of erection and alignment.

or

a.b **40%** on pro-rata basis on erection and alignment wherever pre-assembly is not involved.

c. **15%** on pro-rata basis on completion of welding.

d. **10%** on pro-rata basis on completion of Radiography.

e. **10%** on pro-rata basis on completion of stress relieving.

f. **5%** on pro-rata basis on completion of supports, fin welding and other attachment welding in all respects, area cleaning, cutting / removal and return of scraps.

g. **5%** on pro-rata basis on completion of welding of PG 18 items / components.

h. **3%** on submission of all protocols of respective areas duly certified by all concerned.

6.10.4.6 APH PG 52

From the amount payable for the total PGMA weight at tonnage rates payment will be released as follows.

a) **20%** on placement of pedestals, Housing centre section rotor post.

b) **20%** on alignment of rotor, erection of module / loading of heating element.

c) **35%** on APH alignment & seal setting.

d) **5%** Erection of Lub oil system, cleaning device,fire sensing device, deluge lines, water washing system, CW lines, basket removal doors, observation port and lighting and other accessories.

e) **5%** will be paid on completion of the PGMA.

f) **3%** on submission of all protocols of respective duly certified by all concerned.

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6.10.4.7 FOR ROTATING MACHINE : PG 56, 47 & 44

a. **15%** pro-rata basis on checking of foundation, chipping and placement of packers.

b. **30%** of the contract rate on pro-rata basis on placement of equipments on the foundations.

c. **33%** of the contract rate on pro-rata basis on completion of alignment, welding & grouting.

d. **5%** of the contract rate on pro-rata basis on PGMA completion as certified by BHEL.

e. **5%** of the contract rate on pro-rata basis on readiness for the trial run.

6.10.4.8 FOR HANDLING EQUIPMENTS: PG 99

a. 37% of the contract rate on pro-rata basis on completion of pre-assembly and erection

b. 45% of the contract rate on pro-rata basis on completion of alignment and welding

c. 6% of the contract rate on pro-rata basis on PGMA completion as certified by BHEL.

6.10.4.9 Further **7%** payment on pro-rata basis common to all PG shall be released on achievement of the following milestones events for the tonnage erected.

i. **1%** will be released after completion of hydraulic test for the erected tonnage./ Completion of air / gas tightness test.

ii. **1%** after CFBC light up, ABO & Chemical cleaning

iii. **1%** will be released on completion of steam blowing operation.

iv. **3%** will be released on completion of final painting.

v. **1%** will be paid on submission and settlement of final bill.

6.10.4.10 The balance amount of 5% of the contract value (arrived – the actual quantity erected multiplied by unit rate accepted) shall be paid after the guarantee period of 12 months. The guarantee period will commence from the date of handing over of unit to customer or six months after date of successful completion of safety valve floating, whichever is earlier, provided all erection, testing and commissioning works are completed in all respects. However, this 5% amount can be released against Bank Guarantee valid for twelve months as aforesaid in the prescribed proforma of BHEL.

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

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

6.11.0 EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK

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

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

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

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

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

6.11.4 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.

6.11.5 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.

6.12.0 EXTRA WORK DOES NOT INCLUDE

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

6.12.2 Extra works are broadly defined as below:

Design changes which will be intimated to the contractor after the start of erection and same refers to dismantling of erected components rectification of components which have been received in damaged conditions during transit, rectification of components wrongly manufactured at work, any other works which do not fall in the scope of this contract.

6.12.3 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 **Twenty two (22)** months from the date of commencement of the work the contractor shall not be entitled for any over run compensation (ORC) for a period of first **Three (3)** months after the expiry of **Twenty two (22)** months. Incase ORC arises the same will apply at **Rs.40,000/- (Rupees Forty Thousand only) per month** for extension to the completion period beyond **25(22+3)** months as stated above duly taking into account the balance work at the end of that period.

6.13.2 The exact period of over run will have to be ascertained before the commencement of grace period.

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

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

6.14.0 PRICE ESCALATION

6.14.1 The quoted / accepted rate has to be kept firm for the entire contractual period including total extended period if any and no claim for revision of rates is allowed under any circumstances.

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

6.15.0 TAXES

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

6.15.2 The contractor has to register under local Sales Tax-Law and get assessed. The contractor has to give a certificate each year that the returns and submitted regularly and the turnover on this contract is included in his sales tax return. The sales tax registration number and certificate is to be furnished at site soon after the award of contract. However in case delay is anticipated in obtaining S.T. Regn.No. a copy of application for registration filed with ST authorities shall be submitted along with first running bills and the ST Regn.No. will be submitted within a reasonable time.

6.15.3 The final bill amount would be paid only after submission of proof of inclusion of the turnover of this contract in the ST Returns or ST Clearance certificate. The ST deduction at source will be made from running bills, unless necessary exemption is produced.

6.15.4 IMPORTANT CONDITIONS FOR PAYMENT

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

i. PF Regn. No.

ii. Labour License No.

iii. Workmen Insurance Policy No.

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

v. Initial 50% Security Deposit.

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

6.16.0 PROVIDENT FUND & MINIMUM WAGES

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

6.16.4 OTHER STATUTORY REQUIREMENTS

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

2) The contactor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(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. Incase of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contactor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.

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

5) 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.

6.17.0 SALES TAX

Service Tax as applicable for this Contract will be paid by BHEL.

The contractor may claim the Service Tax in their First R.A.bill and the same will be paid by BHEL, on production of copy of registration certificate. Proof of remittance of service tax by the contractor to the service tax authorities, relating to previous RA bill, has to be produced from the second running bill onwards.

6.17.1 TAXES, DUTIES, LEVIES

Refer to clause 2.8.4 of general conditions of contract in this regard.

New Levies / Taxes

In case the government imposes any new levy / Tax after award of the work, BHEL shall reimburse the same at actuals on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / Tax is applicable to this contract. No reimbursement on account of increase in the rate of existing levies shall be made.

6.18.0 SCOPE OF WORK FINAL PAINTING

6.18.1 The scope of work shall also include supply and application of final painting as required and specified for the components of boiler and its auxiliaries.

6.18.2 All exposed metal parts of boiler, equipment including pipings, structures, hand-railing etc. Wherever applicable after installation unless otherwise surface protected, be first painted after thoroughly cleaning all such parts duct, rust, scales, grease, oil and other foreign materials. The same after inspected and approved by BHEL/Customer Engineers shall be released for painting. The instrument for checking the thickness of coat is to be procured by contractor and should be calibrated after periodical intervals.

6.18.3 The quality of the finish paint shall be as per the standards of ISI or equivalent and the colour is as approved by BHEL/ Customer. (Refer Annexure)

6.18.4 The scope of painting includes application of colour bands, lettering the names of the systems, equipments tag nos of valves, marking the directions of flow and other datas required by customer / BHEL at the appropriate place as identified by BHEL / Customer, within the quoted rate.

6.18.5 Paints, thinner and brush, emery sheets, platform materials and other consumables shall be arranged by the contractor at his cost.

6.18.6 The primer coat and final coat painting shall be as indicated in painting specification.

The colour shades should be to match with the shop paint.

6.18.7 The paints should be procured from the BHEL approved agencies like BERGER, ASIAN, SHALIMAR, JHENSON & NICHOLSON. Before procuring the paints contractor must obtain clearance from BHEL. (Refer Annexure)

6.18.8 Customer painting specification enclosed in the annexure. The contractor shall obtain clearance from BHEL Engineer/ Customer Engineer.

PAINTING SPECIFICATION

1.0 SCOPE

1.1 This section covers the painting requirements for the power plant equipment, structures, piping etc. and any other surface required to be painted.

2.0 CODES AND STANDARDS

Painting of equipment shall be carried out as per the specifications indicated below and shall conform to the relevant IS specification for the material and workmanship.

The following Indian Standards may be referred to for carrying out the painting job :

IS:5 : Colours for ready mixed paints and enamels

IS:1303 : Glossary of terms relating to paints

IS:2379 : Colour code for identification of pipelines

IS:1477 : Code of practice for painting of ferrous metals in buildings (Parts I & II)

IS:2524 : Code of practice for painting of non-ferrous metals in buildings (Parts I & II)

IS:2395 : Code of practice for painting of concrete, masonry and plaster surfaces (Parts I & II)

IS:2338 : Code of practice for finishing of wood and wood based materials (Parts I & II)

IS:6278 : Code of practice for white washing and colour washing

IS:3140 : Code of practice for painting asbestos cement building products

IS:158 : Ready mixed paint, brushing, bituminous, black, leadfree, acid, alkali, water and heat resisting

IS : 2074 : Ready mixed paint, air drying, red Oxide Zinc Chrome, priming

IS : 104 : Ready mixed paint, brushing, Zinc Chrome, priming

IS : 2932 : Enamel , synthetic, exterior (a) undercoating (b) finishing specification.

3.0 PREPARATION OF SURFACES

All surfaces to be painted shall be thoroughly cleaned of all grease, oil, loose mill scale, dust, rust and any other foreign matter. Mechanical cleaning by power tool and scrapping with steel wire brushes shall be adopted to clear the surfaces. However, in certain locations where power tool cleaning cannot be carried out, sand scrapping may be permitted with steel wire brushes and/or abrasive paper. Cleaning with solvents shall be resorted to only in such areas where other methods specified above have not achieved the desired results. Cleaning with solvents shall be adopted only after written approval of the PURCHASER/CONSULTANT.

4.0 PRIMER PAINTS (P)

Primer paints shall be applied only on dry and clean surfaces:

4.1 Primer paint P1: (Epoxy based)

A two pack air drying epoxy polyamide resin based red oxide –zinc phosphate (primer):

Epoxy content (% wt)	15 to 18
Air drying time	About 30 minutes (touch dry) Over night (hard dry)
Dry film thickness (DFT/coat)	30 microns (min)
Temperature resistance	Upto 120 deg.C dry heat

4.2 Primer paint P2 (Epoxy based)

A two pack air drying epoxy polyamide with zinc dust of at least 92% zinc dust on the dry film.

Epoxy content (% wt)	8 to 10
Air drying time	About 10 minutes (touch dry) 2 hours (hard dry)
Dry film thickness (DFT/coat)	40 microns (min)
Temperature resistance	Upto 300 deg.C dry heat

4.3 Primer paint P3 (Ethyl zinc silicate, EZS, based)

A two pack heavy duty zinc dust rich silicate primer:

Total solids (% wt)	84 + or - 2
Air drying time	16 hours
Density	3.07 +/- 0.005
Dry film thickness (DFT/coat)	60 microns (min)
Temperature resistance	Upto 450 deg.C dry heat

4.4 Intermediate paints (I)

These paints shall be applied over primer coats as an intermediate layer to provide weather proof seal of primer coats.

4.5 Intermediate paint II

A two pack air drying high build epoxy resin based paint with MIO.

Air drying time	6 to 8 hours (touch dry) 7 days (full cure)
Dry film thickness (DFT/coat)	100 microns
Temperature resistance	Upto 180 deg.C dry heat
Compatible with	Primer P1 and P2

5.0 FINISH PAINT

Finish paint coats shall be applied over primer coats and intermediate coats after proper cleaning and touch up of primed coats.

5.1 Finish paint F1

A two pack air drying epoxy polyamide enamel suitably pigmented.

Air drying time	2 to 3 hours (touch dry) 7 days (full cure)
Dry film thickness (DFT/coat)	40 microns
Temperature resistance	Upto 130 deg.C dry heat
Compatible with	Primers P1 and P2 Intermediate II
Colour	Generally all shades

5.2 Finish paint F2

A single pack synthetic rubber based enamel paint.

Air drying time	2 hours (touch dry) 24 hours (hand dry)
Dry film thickness (DFT/coat)	25 microns
Temperature resistance	Upto 200 deg.C dry heat
Compatible with	No primers
Colour	Generally all shades

5.3 The colour / shade shall be as approved by the PURCHASER/ CONSULTANT. After cleaning the dust on the dried up primer, first coat of synthetic enamel shall be applied. After this first coat dries up hard, the surface is wet scrubbed cutting down to a smooth finish and ensuring that at no place the first coat is completely removed. After allowing the water to get evaporated completely, the second finish coat of synthetic enamel paint shall be applied.

5.4 Equipment no. and the name of the equipment shall be painted on the surface of the equipments on visible locations. Service of the Pipe/Line designation with arrow identification for the direction of flow shall be painted on all pipes at visible locations at an interval of 20 metres. Wherever pipe lines are insulated, the service of the piping and arrow mark shall be painted over the clad surface.

6.0 SUGGESTED COLOUR CODES FOR PAINTING

SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
1.0	Structures,platforms, galleries, ladders and handrails	Dark Admirality Grey	632	-	-
2.0	Boiler casing, ESP and ducting	Nut Brown	413	-	-
3.0	Fans, pumps, motors, compressors, Blowers	Light Grey	631	-	-
4.0	Tanks (without insulation and cladding)				
4.1	Outdoor ,Stand pipes,vent pipes	Aluminium	-	-	-
4.2	Indoor	Aluminium	-	-	-
5.0	Vessels & all other proprietary equipment (without insulation & cladding)	Light grey	631	-	-
6.0	Switchgear	Light grey	631	-	-
7.0	Control & relay panels	Light grey	631/7078 of IS 1650	-	-
8.0	Turbine	Golden Yellow	356	-	-
9.0	Generator & exciter	Light grey	631	--	-
10.0	Transformers	Dark Admiralty Grey	632	-	-
11.0	Machinery guards	Signal red	537	-	-

SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
12.0	Piping (without insulation and cladding)				
12.1	Water System				
a)	Boiler feed	Sea green	217	-	-
b)	Condensate	Sea green	217	Light brown	410
c)	D M Water	Sea Green	217	Light orange	557
d)	Soft water	Sea green	217	French blue	166
e)	Bearing cooling water	Sea green	217	French blue	166
f)	Potable & filtered water	Sea green	217	French blue	166
g)	Service & clarified water	Sea green	217	French blue	166
h)	Raw water	Sea green	217	White	-
i)	Cooling water	Sea green	217	French blue	166
12.2	Compressed Air System				
a)	Service air	Sky Blue	101	-	-
b)	Instrument air	blue	101	White	-
12.3	Oil system				
a)	Fuel oil	Light brown	410	French	166
b)	Light oil	Dark Brown	412	Brilliant green	221
c)	Lubricating oil	Light brown	410	Light grey	631
d)	Control oil	Light brown	410	Light orange	557
e)	Transformer oil	Light brown	410	Light orange	557
12.4	Gas system				
a)	Hydrogen	Canary yellow	309	Post office red	538
b)	Carbon dioxide	Canary yellow	309	Light grey	631
12.5	Fire services	Fire red	536	-	-

SL. NO.	ITEM/SERVICE	COLOUR	IS-5	COLOUR (BAND)	IS-5
12.6	Ash slurry pipes	Black	-	-	-
12.7	Vacuum pipes	Sky blue	101	Black	-
12.8	Fuel pipes (lignite)	Light brown	410	-	-
12.9	Drainage	Black	-	-	-
12.10	Stand pipes and all Vent pipes	Aluminium	-	-	-
12.11	Bottom Ash system	Light Grey	631	-	-
12.12	Powdered Limestone handling system	White with green band	-	-	-

Notes :

1. This colour code basically refers to IS:2379 for piping with necessary modifications.

2. Where band colour is specified, same shall be provided at 10 meter intervals on long uninterrupted lines and also adjacent to valves and junctions.

7.0 PAINT APPLICATION

7.1 Paint shall be applied in accordance with manufacturer's recommendations. The work shall generally follow IS 1477 (Part II) for jobs carried out in India and SSPC-PA-I or DIN 55928 or equivalent for jobs carried out outside India.

7.2 Paint shall not be applied when the ambient temperature is 5 deg. C and below. Also paint shall not be applied in rain, wind, fog or at relative humidity of 80% and above.

7.3 Each coat of paint shall be continuous, free of pores and of even film thickness without thin spots.

7.4 Each coat of paint shall be dry sufficiently before application of next coat.

7.5 The Contractor shall furnish paint manufacturer's test report or technical data sheet pertaining to the paint selected. The data sheet shall indicate among other things the relevant standards, if any, composition in weight percent of pigments, vehicles, additives, drying time, viscosity, spreading rate, flash points, methods of application quality of surface preparation required, corrosion resistance properties and color.

7.6 **Painting scheme**

7.6.1 Type of paint products like P1, P2, P3, I1, F1, F2 and F3 has been specified elsewhere in the specification.

7.6.2 For a complete painting scheme of any item being painted, all types of paints are to be procured from the same manufacturer as approved by the purchaser.

7.7 **Legend**

Sa - 2 .5 – The quality of surface cleaning, i.e 95 % of the surface area is free from all rust, mill scales and visible residues, foreign materials etc.

SP - surface preparation quality

2P1 - Two (2) coats of primer paint type P1

1I1 - One (1) coat of intermediate paint type I1

2F1 - Two (2) coats of finish paint type F1

DFT - Dry film thickness

CRT - Clean and retouch.

The painting scheme to be followed for various equipment / structures is briefly given below for guidance to the Contractor.

Sl. No.	Description	Painting scheme		Total DFT in Microns
		At shop	**At site**	
1.	Steel structure	SP-Sa 2 ½ 2P1 + 1 I 1	2F1	240
2.	Mechanical equip-ment (temperature not over 80 deg.C) Both static and rotary equipment for indoor or outdoor duty	SP-Sa 2 ½ **2P1 + 1 I1**	2F1	240
3.	Equipment with hot surfaces (temperature upto 400 Deg,C)	SP-Sa 2 ½ 2P2	2F2	130
4.	Equipment with hot surfaces (temperature above 400 Deg.C)	SP – Sa 2 ½ 2P3	2F2	170
5.	Non insulated pipe/duct works	SP-Sa 2 ½ 2P1 + 1 I1	2F1	240
6.	Insulated pipe/duct works	SP – Sa 2 ½ 2 coats primer suitable for intended temperature application as per the manufacturer's recommenda-tion. The primers selection shall be done generally inline with the specification laid down in clauses above.	2F2 Final painting shall be done over the cladding. In case of aluminium cladding, final painting will not be required.	60-120

SCOPE AT A GLANCE
SECTION VII – APPENDIX I
SITE FACILITIES

PROJECT : Neyveli RATING: 2 x 250 MW Unit – I

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		Yes	
B	Living accommodation		Yes	
1.2.0	**ELECTRICITY**			
1.2.1	Electricity For construction purposes **(to be specified whether chargeable or free)**	Yes		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:			
1.2.2.1	Distribution from single point including supply of matreials 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	

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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**			
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:			
1.4.1.1	For the site personnel of the bidder		Yes	
1.4.1.2	For the bidder's euipments and consumables (T&P, consumables etc)		Yes	
1.5.0	**LIGHTING**			
1.5.1	For construction work (supply of all the necessary materials) 1. At office storage area 2. At the preassembly area 3. At the construction site /area		Yes	
1.5.2	For construction work (execution of the lighting work/ arrangements) 1. At office storage area 2. At the preassembly area 3 At the construction site /area		Yes	
1.5.3	Providing the necessary consumables like bulbs, switches, etc during the course of construction		Yes	

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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
SECTION VII – APPENDIX I
SITE FACILITIES

PROJECT : Neyveli TPP RATING: 2 x 250 MW Unit – I

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.1.0	Engineering works for construction :			
2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		
2.1.2	Drawings for construction methods	Yes		
2.1.3	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site-example – routing of small bore pipes		Yes	
2.1.4	Shipping lists etc for reference and planning the activities	Yes		
2.1.5	Preparation of site erection schedules and other input requirements	Yes		
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 Sl No 2.1.5		Yes	
2.1.8	Daily erection / work plan based on Sl No 2.1.7		Yes	
2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in 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	

Sl.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	250 T or above crawler crane (1 No)	Yes		
2.2.2	250 T tyre mounted crane			
2.2.3	150 T crawler crane (1 No)	Yes		
2.2.4	150T tyre mounted crane			
2.2.5	100 T crawler crane *			*
2.2.6	100T tyre mounted crane			
2.2.7	75 T crawler crane		Yes	
2.2.8	75 T Crawler Crane	Yes		
2.2.9	60T Kroll tower crane			
2.2.10	18 T crawler crane		Yes	
2.2.11	18/20 T tyre mounted crane one			
2.2.11 A	8T Escort crane		Yes	
2.2.12	30T gantry crane		As per scope of Work	
2.2.13	15 T gantry crane			
2.2.14	10T gantry crane			
2.2.15	30T tractor trailor			
2.2.16	20T trailor			
2.2.17	10 T trailor / truck			
2.2.18	Electrical winches 15 T with / wire ropes Drum lifting (2 Nos)			
2.2.19	Electrical winches 10T with / without wire ropes		**As per scope of Work**	
2.2.20	Electrical winches 5 T with / without wire ropes			
2.2.21	Electrical winch 3 T with or without wire rope			
2.2.22	Electrical winches with/without wire ropes			
2.2.23	Pneumatic winches 1 T with / without wire rope			
2.2.24	Welding generators			
2.2.25	Welding rectifiers			
2.2.26	Welding transformersair cooled			
2.2.27	Welding transformers oil cooled			

Note : * A Suitable Heavy Duty Crane with capacity to lift heaviest ceiling girder with operator will be provided by BHEL, Free of hire charge.

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.28	Chain pulley block 10T		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.29	Chain pulley block 5 T			
2.2.30	Chain pulley block 3T			
2.2.31	Chain pulley block 1T /2T			
2.2.32	Pulling & lifting machines 5T			
2.2.33	Pulling & lifting machine 3T			
2.2.34	Pulling and lifting machine 2T / 1T			
2.2.35	Multi sheave pulley block 200 T (4) Drum Lifting			
2.2.36	Multi sheave pulley block 100 T (As Required)			
2.2.37	Multi sheave pulley block 50T			
2.2.38	Multi sheave pulley block 30T			
2.2.39	Multi sheave pulley block 20T			
2.2.40	**Multi sheave pulley block 5T**			
2.2.41	Single sheave shackle pulley blocks 20T			
2.2.42	Single sheave shackle pulley block 10T			
2.2.43	**Single sheave shackle pulley block 5 T**			
2.2.44	25V transformer with sufficient spare bulbs			
2.2.45	Gas cutting torches with regulators			
2.2.46	Torque wrench			
2.2.47	Pipe vice			
2.2.48	Bench vice			
2.2.49	Anvil			
2.2.50	Baking oven for welding electrodes			
2.2.51	Portable drying oven for baked welding electrodes			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.52	GQA grinding machine		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.53	FF2 grinding machine			
2.2.54	Angle grinders AG7			
2.2.55	Tig welding sets			
2.2.56	Air conditioners 1.5 T			
2.2.57	Sheet bending machine			
2.2.58	Sheet rolling m/c			
2.2.59	Sheet grooving m/c			
2.2.60	Pedestal drilling m/c			
2.2.61	Drilling m/c 31 mm			
2.2.62	Drilling m/c 20mm			
2.2.63	Drilling m/c 10 mm			
2.2.64	Hand drilling m/c 6 mm			
2.2.65	D shackles 30 T			
2.2.66	D shackles 20T			
2.2.67	D shackles 15 T Drum lifting			
2.2.68	D shackles 10T			
2.2.69	D shackles 5T/3T			
2.2.70	Wire rope sling 6x36 12mmx6m			
2.2.71	Wire rope slings 12mmx10m			
2.2.72	Wire rope slings 16mmx4m			
2.2.73	Wire rope slings 16mmx6m			
2.2.74	Wire rope slings 16mmx10m			
2.2.75	Wire rope sling 19mmx15 m			
2.2.76	Loose wire rope 16mm			
2.2.77	Loose wire rope 19 mm			
2.2.78	Loose wire rope 25mm			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.79	Loose wire rope 32mm		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.80	Wire rope clamps for the above sizes sufficient quantity			
2.2.81	Manila ropes of sufficient quantity in different sizes			
2.2.82	Hydraulic jacks 250/200T			
2.2.83	Hydraulic jacks 100T			
2.2.84	Hydraulic jacks 50T			
2.2.85	Hydraulic jacks 25 T			
2.2.86	Hydraulic jacks 10T			
2.2.87	Tower crane 50T			
2.2.88	Derricks 30T with 70 M high with all necessary accessories 2 nos			
2.2.89	EOT cranes in TG hall ♦ Main hook ♦ Aux hook			
2.2.90	Sleepers both wooden and concrete for movement of cranes at site			
2.2.91	Concrete blocks for pre assembly works at site			
2.2.92	15 T snatch pulley blocks Drum lifting			
2.2.93	Hydro test pump 600 bar / 400 bar (One No)	Yes		
2.2.94	Hydro test pump			
2.2.95	Hand operated hdro test pump			
2.2.96	Boiler filling pump One No.	Yes		
2.2.97	Pressure gauges 400 bar			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.98	Pressure gauges 600 bar		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.99	Pressure gauges 100 bar			
2.2.100	Acid cleaning pumps with all accessories including switch gears	Yes		
2.2.101	Stress relieving / preheating equipments including transformers, controllers, heating pads and insulating materials and consumables			
2.2.102	Hydrauli pipe bending machines to suit up to 80mm dia and 11 mm thick			
2.2.103	Electric driven pipe chamfering machines up to 100 mm dia tubes with necessary cutting tools and other consumables			
2.2.104	Electric driven pipe chamfering m/c to suit pipes from dia 100 mm to 500/600 mm			
2.2.105	Theodolite 1 min accuracy			
2.2.106	Dumpy level			
2.2.107	6 point temp. recorder			
2.2.108	Radiographic equipments with suitable isotopes/ x ray machines			
2.2.109	MPI test kit			
2.2.110	Ultrasonic flaw detector			
2.2.111	Dye penetrant test kits (as required)			
2.2.112	Moving platforms Sky Claimber	Yes		
2.2.113	Passenger cum goods lift (1)	Yes		
2.2.114	Dip lorries			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.115	Rails and sleepers for dip lorries, both supply and installation		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.116	Calibrated steel tapes of different sizes			
2.2.117	Plumb bobs			
2.2.118	Micro meters of different sizes both inside and out side			
2.2.119	Vernier calipers of different sizes			
2.2.120	Surface plate			
2.2.121	Straight edges of different lengths			
2.2.122	Feeler gauges of different lengths			
2.2.123	Inside and out side calipers			
2.2.124	Bolt heating equipments including thermo couples			
2.2.125	Dial gauges with magnetic base			
2.2.126	Magnifying glass			
2.2.127	Piano wires			
2.2.128	Precision water level micrometer			
2.2.129	Parallel blocks			
2.2.130	Taper wedges			
2.2.131	Micro jacks			
2.2.132	Lead wires			
2.2.133	Dial bore micro meter			
2.2.134	Thermo meters of different ranges			
2.2.135	Depth gauges			
2.2.136	“GO & “NO GO” gauges			
2.2.137	Drill sets			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.138	Taps and die sets		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK	
2.2.139	Spirit levels			
2.2.140	Master spirit level			
2.2.141	Spring balance			
2.2.142	Hg manometer			
2.2.143	Vibro meter			
2.2.144	Noise level meter			
2.2.145	Litmus paper			
2.2.146	Portable gas purity meter			
2.2.147	Dead weight tester			
2.2.148	Temp bath for calibration			
2.2.149	250V/500V megger			
2.2.150	½.5/5.0 KV motorised megger			
2.2.151	Ammeter and voltmeters			
2.2.152	HV test kit			
2.2.153	Double kelvin Bridge			
2.2.154	DC bridge			
2.2.155	Mano meters			
2.2.156	Auto transformers			
2.2.157	CT(100/5A)			
2.2.158	Purge test kits			
2.2.159	Multi meters			
2.2.160	Variac 3phase 10 A			
2.2.161	Phase sequence meter			
2.2.162	Dual beam osciiloscope continuity tester			
2.2.163	Rheostats			
2.2.164	Milli seconds syn timer			
2.2.165	Ultra violet recorder			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.166	Tong tester		TO BE ARRANGED BY THE BIDDER AS PER SCOPE OF WORK t	
2.2.167	Hardness tester			
2.2.168	Bolt stretching device			
2.2.169	Reamers of various sizes			
2.2.170	Vacuam cleaner			
2.2.171	Sand blasting machine with accessories			
2.2.172	Spray painting equipments			
2.2.173	Oil filtration units			
2.2.174	Bearing pullers of different sizes			
2.2.175	Bearing scrappers			
2.2.176	Slip gauges			
2.2.177	Elko meter to measure paint thickness			
2.2.178	MIG welding machines			
2.2.179	Files of different sizes			
2.2.180	Socket wrenches			
2.2.181	Spanner and pipe wrenches sets			
2.2.182	Hammers of different sizes both soft and hard			
2.2.183	Allen keys sets			
2.2.184	Fire proof tarpaulins			
2.2.185	Steel scaffolding materials			
2.2.186	Pipe cutters			
2.2.187	Magnetic base for drilling machines			
2.2.188	Vibrator for grouting			
2.2.189	Mixing machine for grouting and concreting			
2.2.190	Tube expanding machine ie drives – hydraulic or pneumatic ( )			
2.2.191	Tube expanders – both for expansion and flaring			
2.2.192	Mercury plumb bob			

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.2.193	Band saw machines			
2.2.194	Copper rods		Yes	
2.2.195	Needle vibrators		Yes	
2.3.0	All consumables including :		Yes	
	Ordinary cement		Yes	
	Grouting cement		Yes	
	Any special cement		Yes	
	Sand, bricks etc		Yes	
	Tig wires		Yes	
	Electrodes		Yes	
	Brazing rod, flux etc		Yes	
	Soldering		Yes	
	DA, oxygen, argon		Yes	
	Nitrogen required for chemical cleaning	Yes	--	
	Nitrogen required for construction		Yes	
	Paints along with thinner, brushes, cleaning materials etc for preservation of components		Yes	
	Paints including thinner, brushes, cleaning materials etc for final painting , as per specifications		Yes	
2.4.0	WELDING		Yes	
2.4.1	All welding works		Yes	
2.4.2	All radiography and other testing works like DPI, MPI, UT,		Yes	
2.4.3	All connected works like preheating, post heating, stress relieving,		Yes	
2.4.4	Providing certified either IBR or as per other relevant welders for the works. BHEL will not provide materials, test certificates etc for the above purpose unless specifically stated .		Yes	

Sl.No	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
2.4.5	To submit the welders to BHEL/client's approval (preproduction test) before putting them on regular work. Required materials for preproduction test to be arranged by BHEL.		Yes	
2.4.6	The accessories required for the welders to be arranged by the bidder		Yes	
2.5.0	CHEMICAL CLEANING			
2.5.1	Supply of pumps, motor, starters, cables, piping and other materials required for the operation	Yes		
2.5.2	Servicing the required equipments and commissioning		Yes	
2.5.3	Chemicals required for the operation including Nitrogen gas	Yes		
2.5.4	Handling equipments / consumables for the chemical cleaning works		Yes	
2.5.5	Effluent disposal system		Yes	Schemes given by BHEL
2.5.6	Services for the effluent disposal		Yes	

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

SCOPE AT A GLANCE
SECTION VII – APPENDIX I
SITE FACILITIES

PROJECT : Neyveli TPP RATING: 2 x 250 MW Unit – I

Sl.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1.0	**SCOPE OF WORK**		Yes	
3.1.0.1	Handling at site stores/ storage yard		Yes	
3.1.0.2	Transportation within the site		Yes	
3.1.0.3	Erection testing & commissioning		Yes	
3.1.0.4	Final painting of erected materials including supply of paints, thinners etc		Yes	
3.1.0.5	Carrying out P.G.test		Yes	
3.1.1.0	HANDLING & TRANSPORTATION		Yes	
3.1.1.1	Stores/storage yard to preassy area/ erection site		Yes	
3.1.1.2	Pre assembly area to site of installation		Yes	
3.1.1.3	Erection site to pre assembly area / stores/ storage area if required		Yes	
3.1.1.4	Touch up painting wherever required till final painting.(please refer the relevant clause for supply of paints, thinners etc)		Yes	
3.1.1.5	Preparation storage at site for proper stacking of materials		Yes	
3.1.2	ERECTION TESTING & COMMISSIONING		Yes	
3.1.2.1	Erection drawings/documents/working instructions etc	Yes		
3.1.2.2	Welding schedules	Yes		
3.1.2.3	Engineering drawings for construction methods	Yes		
3.1.2.4	Organising the resources required for erection, testing &commissioning of the materials covered under the scope and executing the work as per instruction of BHEL engineer		Yes	
3.1.2.5	Final painting of all the materials erected		Yes	
3.1.2.6	Demobilization of the erection site		Yes	
3.1.2.7	Cleaning of / upkeep of erection / preassembly /storage areas		Yes	

Sl.No	Description PART III ERECTION TESTING & COMMISSIONING	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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	Yes	
3.1.3.2	Checking, chipping and correcting final dimensins of the foundations if required		Yes	
3.1.3.3	Placement, erection of embedded parts integral for the scope of work and coordination with customer's civil/other agencies for embedments		Yes	
3.1.3.4	Bolt grouting with grout as specified		Yes	
3.1.3.5	Final grouting of all the equipments covered under this scope		Yes	
3.1.4	STATUTORY CLEARANCES			
3.1.4.1	Labour license		Yes	
3.1.4.2	Provident fund		Yes	
3.1.4.3	Insurance what ever comes under bidder's scope		Yes	
3.1.4.4	Workmen compensation		Yes	
3.1.4.5	Minimum wages		Yes	
3.1.4.6	Sales tax		Yes	
3.1.4.7	Local laws governing the works like electrical inspectorate, factory inspectorate, etc		Yes	
3.1.4.8	Professional tax		Yes	
3.1.4.9	Safety rules and regulations		Yes	
3.1.4.10	Approval from competent authority for installation like IBR etc		Yes	
3.1.5	SUBMISSION OF REPORTS			
3.1.5.1	Man power deployment category wise and area wise		Yes	
3.1.5.2	Deployment of tools and plant , area wise		Yes	

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

SECTION – VII APPENDIX - II

WEIGHT SCHEDULE

2x250MW - NEYVELI TS II EXPANSION PROJECTS - UNIT -1

S. No	PG	DESCRIPTION	WEIGHT (MT)
			(Approx.)
		CFBC, BUNKERS, APH & FANS	
01	04	Drum	155.00
02	05	Water Wall Headers	85.00
03	06	Water wall Panels	476.00
04	07	Circulating System	755.00
05	08	Buck Stays	425.00
06	09	Seal Boxes	50.00
07	10	SH Headers	100.00
08	11	SH Coils	591.00
09	12	SH Components	251.00
10	15	RH Headers	20.00
11	16	RH Coils	301.00
12	17	RH Components	40.00
13	18	Roof Skin Casing	4.50
14	19	Economiser Tubular APH	1100.00
15	20	Soot Blowers	30.00
16	21	SB Pipes & Fittings	18.00
17	24	Fine Fitting	205.00
18	28	Man Holes & Mountings	5.00
19	30	Enclosures	40.00
20	31	Boiler Skin Casing	20.00
21	32	Fixing Components for Insulation	115.00
22	34	Bunker Bay Structures	1040.00
23	35	Main Boiler Structures	4890.00
24	36	Galleries & Structures	1750.00
25	38	Inter Connecting platforms	120.00
26	41	Oil Furners & Scanners	6.00
27	42	Fuel Oil System	21.00
28	43	Ignitor & Scanner Air System	10.00
29	44	Bed/Bottom Ash System	150.00
30	47	Lignite, Lime Stone & Bed material handling System	280.00
31	48	Ducts(Boiler & Bunker Area upto BOF)	2020.00

S. No	PG	DESCRIPTION	WEIGHT (MT)
32	52	Air Heaters	734.00
33	56	Fans (All)	289.00
34	66	Bunkers & Bunker lining(Lignite, Lime Stone & Bed Materials)	1300.00
35	99	Equipment handling System	10.00
36	97	C&I(Pr Parts Attachments)	1.00
		Total (Unit 1)	**17407.50**

Note to weight schedule

1. The weights mentioned above are approximate and are liable to vary as per design consideration. There will be change in PG, weight, description etc., however the payments will be made to bidder for the tonnage actually erected at the quoted rate upto the variation in cumulative weight of with in ⍮15% of the tonnage indicated above.

2. Besides the PG indicated above there is likely hood of addition of product groups integral to Boiler, Bunker and its aux. The quoted rate shall be applicable for such product group also

3. Fixing Components for Insulation : The scope of work covers welding of all attachment on the pressure parts for fixing insulation & refractory

4. The Erection & dismantling of temporary piping, Pumps, tanks, dummy plates & other misc. equipments etc., for pre commissioning & commissioning activities like Hydraulic Test, Chemical Cleaning, Steam Blowing etc.,(Limited to Scope of Work) are covered in this contract and shall be carried out with in the quoted rate.

SECTION – VII

APPENDIX – III

AA) The Following minimum Tools & Plants shall be arranged by the contractor for execution of this contract with in the quoted rate

S.No	Description	Qty
1	75T Crawler Crane	01
2	18T Crawler Crane	01
3	08T Mobile Crane	01
4	Hydraulically Operated Strand Jack arrangement for Drum Lifting	01

Copy of ownership of the above cranes or the Documents with respect to the tie-up in the form of a registered agreement with a resourceful party are to be enclosed along with offer. Contractor shall mobilize all these crane during the initial stage itself irrespective of availability of BHEL cranes & demobilize only after completion of work after necessary clearance from BHEL

For drum lifting contractor shall use hydraulically Operated Strand Jack method for which contractor shall have a necessary tie-up with established vendor who has executed similar job. The credential of the vendor & the procedure for lifting the drum shall be submitted to BHEL for review and approval with in a month of award of work. Any additional arrangement/structures required to carry out drum lifting shall be arranged by the contractor with in the quoted rate.

BB) List of Tools & Plants to be made available by BHEL to contractor free of hire charges on sharing basis

S.No	Description	Qty
1	250T Crane above capacity	1No
2	150T Crawler Crane or Equivalant	1No
3	75T Crawler Crane	1No
4	18T Crawler Crane	1No
5	Hydraulic Pressure Testing Pump	1No
6	Chemical Cleaning Pumps with Motor	Reqd Set
7	Sky Climber	1No
8	Passenger Lift	1No

NOTE

1) All the above T&Ps shall be given to contractor on sharable basis and the allotment is made by BHEL/Site in Charge, on need basis.

2) Incase of non-availability of these equipments, due to any reason ie., unavoidable breakdown, major overhaul or any other reason etc., the contractor should make arrangement at his own cost to meet the erection targets. No extra claim will be admitted due to non-availability of any of the above equipments. No delay in execution of work shall be accepted on this account.

3) For 75T crane contractor shall provide the qualified operator. 150T crane and 250T cranes contractor to identify two operators who will be trained and used for assisting BHEL operator at all time whenever the crane is in use.

4) For 250T crane above capacity or Equivalent crane, the required consolidation and preparation of ground for placing crane for operation (complete civil work with material) is covered in the scope of contract. The scope also includes raising the ground level, if required, up to 0.5 meters.

5) For all the crane, the contractor with in the quoted rate shall provide fuel.

6) Cranes are only for erection purpose and shall not be available for material handling and for transportation purpose for which contractor shall make his own arrangement.

7) The day to day and routine maintenance of BHEL cranes (only) will be carried out by BHEL. All the BHEL supplied cranes have to be handed over to maintenance through on completion of days work BHEL(I/C) on daily basis as indicated by site in-charge, preferably after 7PM. The crane will be re-allotted in the next day after due maintenance. However the modification of boom length to suit erection requirement shall be carried out by the erection contractor with in the quoted rate.

8) The fuel tank fitted in the crane should not be by-passed by the agency.

9) Passenger Lift which is the facility for erection activity (Personnel Movements) , the scope includes taking delivery from store, transporting to site, assembling as per drawing/instructions, commissioning, operating on regular basis with trained operator, routine maintenance (Spares will be provided by BHEL), dismantling after the work is over and hand over to BHEL Store.

10) Filling pump for hydro test is to be arranged by the contractor, if required.

11) Any loss/damage of tools by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.

Apart from the above, any other tools and plants required for satisfactory completion of the work has to be arranged by the contractor.

SECTION - VII APPENDIX – IV

2x250MW - NEYVELI TS II EXPANSION PROJECTS - UNIT – 1
CFBC BOILER
ESTIMATED HP JOINTS(TENTATIVE)

SNo.	DESCRIPTION	PIPE/TUBE	MATERIAL	No.OFF JTS
		(ODXT)		
1	ECO COILS	38.1X4.5	SA210GRA1	2500
2	ECO FEED PIPE	457.2X45	SA106GRC	10
3	ECO LINKS TO DRUM	457.2X45	SA106GRC	20
4	DRUM TO BP INLET HEADER	159X18	SA106GRC	350
5	SUPER HEATER LINKS	368X40	SA106GRC	30
6	SUPER HEATER LINKS	219.1X25	SA106GRC	10
7	SUPER HEATER LINKS	368X40	SA335P12	30
8	SUPER HEATER LINKS	368X40	SA335P12	30
9	SUPER HEATER LINKS	406.4X40	SA335P91	20
10	DESH LINKS	368X50	SA335P12	20
11	REHEATER LINKS	508X25	SA335P22	20
12	BACK PASS SUPPORT TUBES	38.1X6	SA213T11	4800
13	SUPER HEATER 1.2A	38X7.1	SA213T22	1200
14	SUPER HEATER 1.2A	38X7.1	SA213T91	300
15	SUPER HEATER 1.2B	38X7.1	SA213T22	1200
16	SUPER HEATER 1.2B	38X7.1	SA213T91	300
17	SUPER HEATER 2.1A	38X7.1	SA213T22	1200
18	SUPER HEATER 2.1A	38X7.1	SA213T91	300
19	SUPER HEATER 2.1B	38X7.1	SA213T22	1200
20	SUPER HEATER 2.1B	38X7.1	SA213T22	300
21	SUPER HEATER 2.1A	38X7.1	SA213T91	900
22	SUPER HEATER 2.2A	38X7.1	SA213T91	900
23	SUPER HEATER 2.2B	38X7.1	SA213T22	900
24	SUPER HEATER 2.2B	38X7.1	SA213T91	600
25	SUPER HEATER -3	38X7.1	SA213T22	1800
26	SUPER HEATER -3	38X7.1	SA213T91	1800

SNo.	DESCRIPTION	PIPE/TUBE	MATERIAL	No.OFF JTS
27	RE HEATER-1A	51X6	SA213T22	1000
28	RE HEATER	51X6	SA213T91	250
29	RE HEATER-1B	51X6	SA213T22	500
30	RE HEATER	51X6	SA213T91	250
31	RE HEATER-2	38X5.6	SA213T22	3000
32	RE HEATER-2	38X5.6	SA213T91	3000
33	BACK PASS STEAM COOLED WALL	38.1X6	SA210 GRA1	1500
34	BACK PASS STEAM COOLED WALL	38.1X6	SA213T11	1800
35	DC PIPES	558X60	SA106GRC	150
36	RELIEF PIPES	159X18	SA106GRC	700
37	SUPPLY PIPES	159X18	SA106GRC	800
38	SUPPLY PIPES	508X55	SA106GRC	25
39	COMBUSTOR WW	57X8	SA209T1	6300
40	COMBUSTOR WW	57X8	SA210GRA1	3500
41	EVAPORATOR COIL	38.1X5.6	SA210GRA1	5500
42	SOOT BLOWER PIPING	EQ JTS	CS	1000
43	TRIM PIPING	EQ JTS	CS/AS	2000

Note for Welding Schedule

1. The welding joints indicated above is approximate and is liable for variation in description, size, materials etc.,
2. Radiography/ UT and other NDT requirements are to be carried out as per the welding schedule or as per the direction of BHEL Engineer with in the quoted rate.
3. The welding joints indicated above is only butt weld joints of IBR category and does not include the joints for drains, vents, root valves, temporary piping for Hydro test, chemical cleaning, steam blowing etc., and contractor shall carry out these joints with in the quoted rate
4. All the other welds via pressure parts attachments, fillet welding of flanges, valves, inserts, couplings, instrument tapings, supports & supporting arrangements on pressure parts/non- pressure parts, panel to panel fin welding, buck stay attachments etc., are not covered in the above schedule and contractor shall carry out these joints with in the quoted rate

5. TGSM, TGS1CM & TGS2CM filler wires & T91/P91 electrodes, if any, which are supplied against PGMA will be supplied to the contractor on free of cost. Contractor to use the same economically and account for the same on monthly basis. All other filler wires and electrodes (from BHEL approved vendors) are in the scope of contractor and shall carry out the work with in the quoted rate.

6. Argon purging & arrangement for welding of T91 / T1 joints has been covered in the scope of contractor and shall carry out with in the quoted rate.

7. Oil system piping under PG 42 is not indicated in this schedule and contractor shall carry out these joints also with in the quoted rate

8. Piping for fine fitting, trim piping, soot blower system, oil system shall be supplied mostly in running meters which will be erected & welded as per the drawing/site routing with in the quoted rate.

9. All the joints shall be carried out root run by TIG welding & subsequent run by ARC welding or full TIG welding as per drawing/schedule and as per the decision of BHEL Engineer at site. The decision of BHEL engineer at site is final and binding on the contractor.

10. All the joints are to be carried by the BHEL approved welders who posses the requisite statutory authority certificate and are tested at site by BHEL engineers for specific category of work.

11. The Panel to panel welding should have proper penetration and it is necessary to weld on both sides if uniform penetration is not achieved. The decision of BHEL engineer is final & binding on the contractor.

12. A separate booklet "GUIDELINES FOR WELDING, NDE AND OTHER HEAT TREATMENT PROCEDURES" is enclosed which is to be taken as guide lines for carrying out the job.

13. All the joints in combustor area to be flash ground to tube level on completion of welding.

14. All fin welding between panel to panel in combustor area and the second pass need to have full penetration weld and to be ground to have smooth surface in gas path.

NOTE – TO WELDING SCHEDULE

1. Additional Payment for Extra joints
   The welding joints indicated in the above welding schedule shall be grouped category wise as indicated below on the basis of volume of weld metal deposit for each joint.

Categories			
Volume of weld metal deposit for each joint	)	Upto 100 CC	category A
Do		101 CC TO 300 CC	" B
Do		301 CC TO 1500 CC	" C
Do		1501 CC TO 3000 CC	" D
Do		3001 CC TO 4500 CC	" E
Do		4501 CC TO ABOVE	" F

   If the total volume of metal deposit of all the joints actually carried out in each category exceeds +25% of the total volume of metal deposit of all the joints in each category indicated in the above welding schedule, the contractor shall be paid extra for the additional volume over and above +25% of the each category as per the rate schedule irrespective of the material whether carbon steel or alloy steel / stainless steel.

   The weld volume deposit calculation graphs which indicate the volume of weld metal deposited in cc for Various diameters and thickness with edge preparation for ANSI standard type and "P" type and as well as the rate schedule in terms of cost per cc are attached herewith Tender specification

   The weld volume types involved above are GTAW/SMAW/SOCKET weld. For socket welds, the weld volume shall be 50% of that shown in the chart for butt welds.

2. The all joints are to be welded as per the drawings / site routing within the quoted rates by the bidder. The extra rates indicated in point 1 of this

note shall not be applicable for the site routed piping. All the site routed joints are to be welded within the quoted rates.

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

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

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

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

7. All the joints in piping upto Nb.65 mm will be supplied mostly in running metres. The contractors should carry out the cutting of the pipes to the required size, edge preparation / bend fabrication and welding at site as per the drawing within the quoted value. For these joints no extra payment will be made. The contractors quoted / accepted value shall be inclusive of this. However for the purpose of estimation and guide line for the tenderers the approximate quantum of joint / no . of joints likely to be welded are also indicated in the welding schedule. No additional payment for extra welds shall be applicable.

8. Welding of hangers and supports stubs are not indicated in the weld joints indicated above. These welding' are to be carried out within the quoted value as per drawings and specifications and as per BHEL Engineers instruction whose decision is final and binding on the contractor.

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

10. Pre-heating, PWHT/Stress relieving have to be carried out for piping, higher thickness pipes / tubes and alloy steel tubes / pipes as per the welding schedule or as per the directions / instructions of BHEL Engineer within the quoted rates.

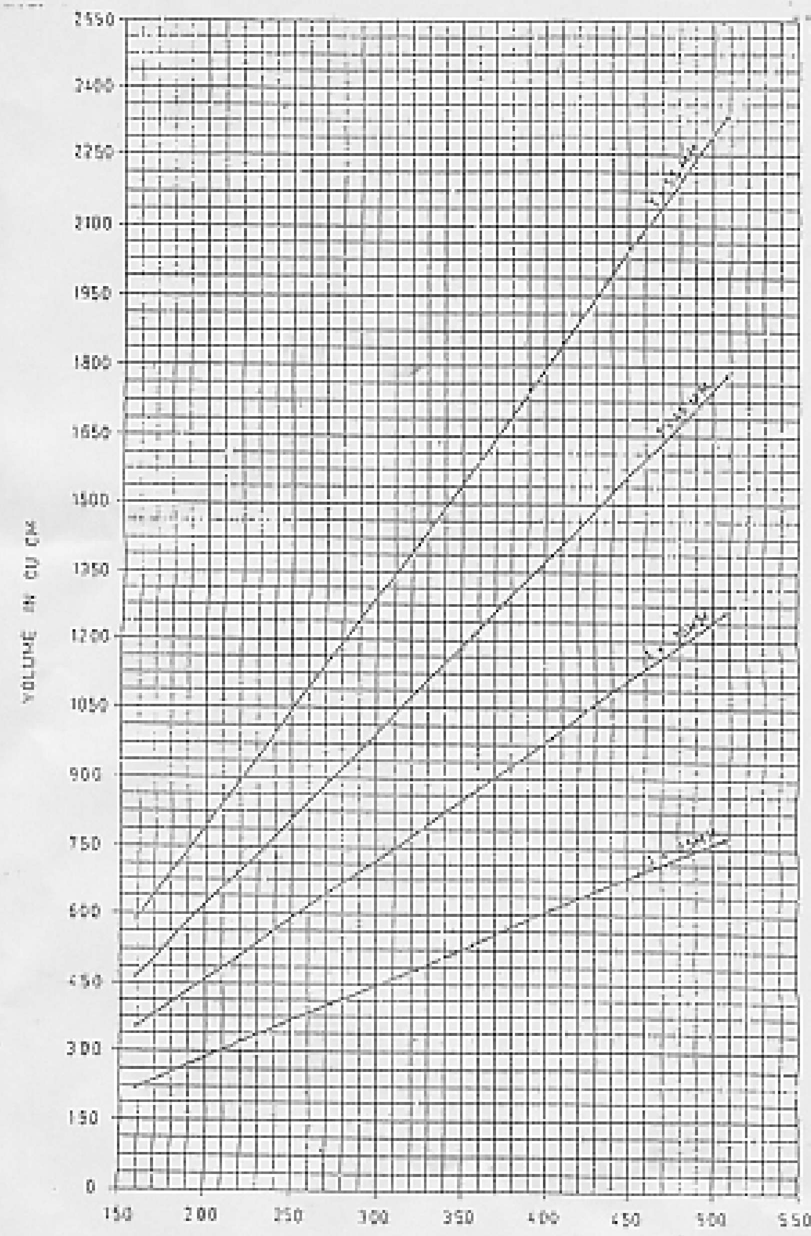
RATE SCHEDULE IN TERMS OF COST PER C.C. AS DETAILED BELOW

	Edge prepared Joints (WDEP)	Fabricated Joints (WEP)
Upto 100 cc	10.00	12.00 Category - A
101 – 300 cc	8.00	10.00 Category - B
301 – 1500 cc	4.50	6.00 Category - C
1501 – 3000 cc	4.00	5.50 Category - D
3001 – 4500 cc	3.50	4.25 Category - E
4501 & above cc	2.50	3.00 Category - F

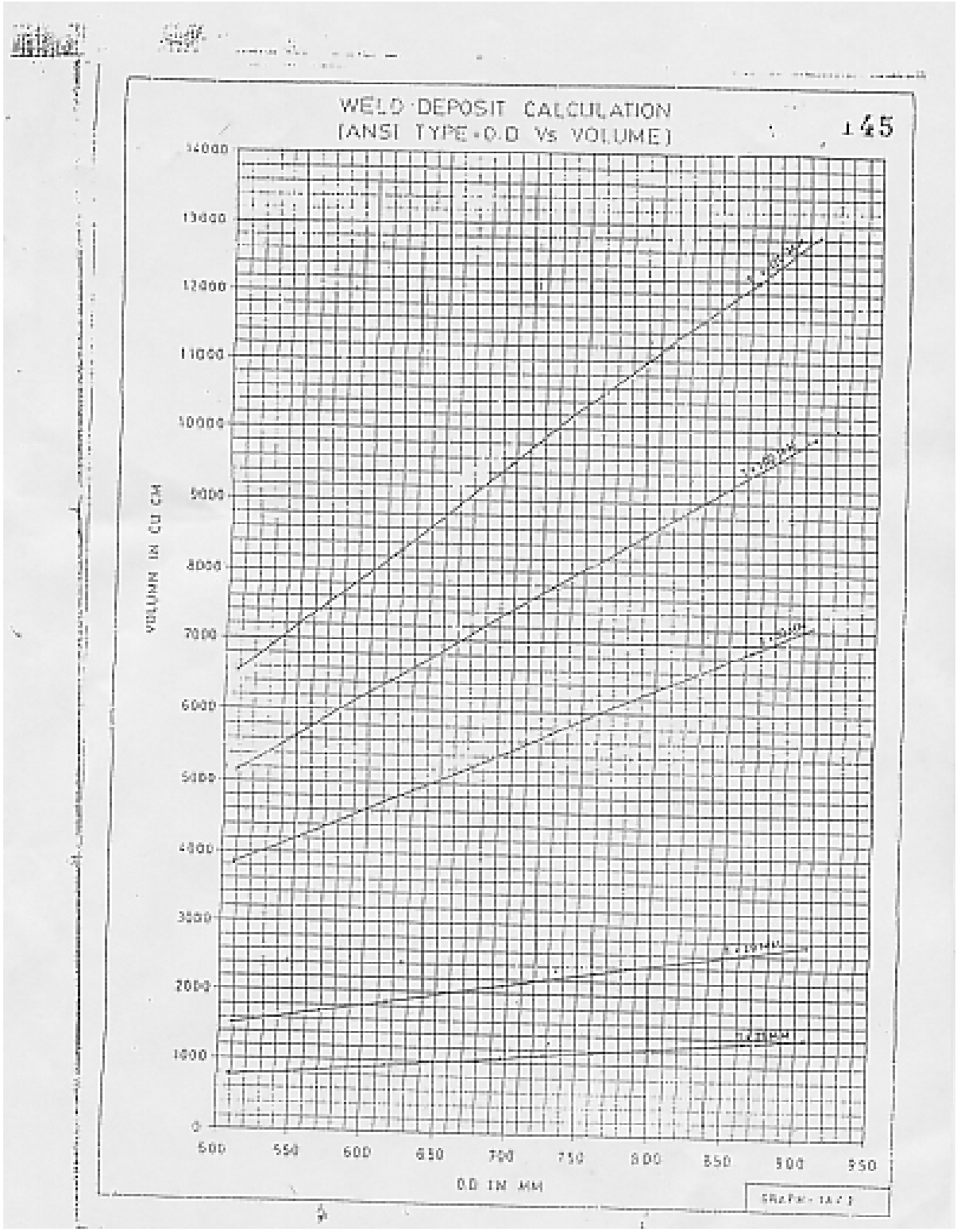
The weld type involved above are GTAW/SMAW/Socket weld. For socket welds the weld volume shall be 50% of that shown in the chart for butt welds.

The contractor shall consider the above rates while submitting his offer.

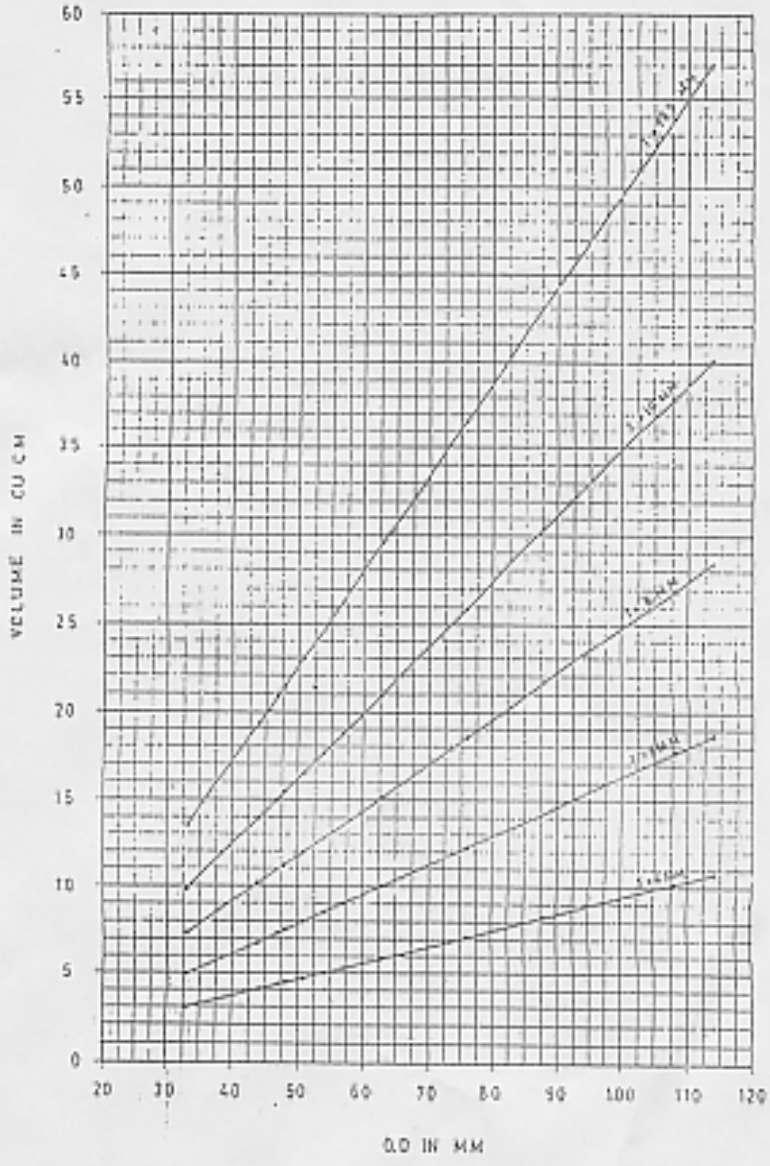
WELD DEPOSIT CALCULATION
(ANSI TYPE - O.D Vs VOLUME)



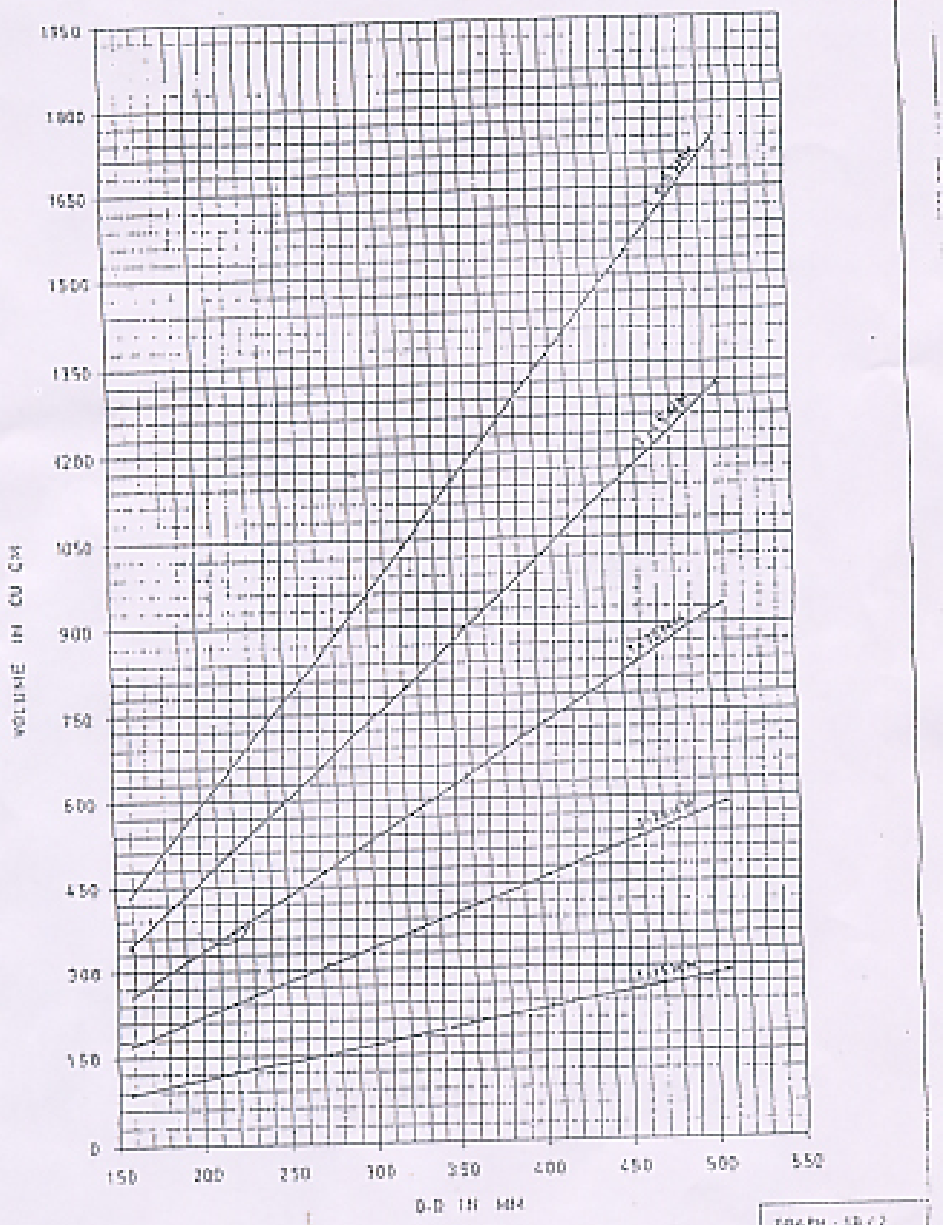
GRAPH - 16/1


WELD DEPOSIT CALCULATION
(ANSI TYPE-0.0 Vs VOLUME)
145
VOLUMN IN CU CM
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3500
2000
1000
0
500
550
600
650
700
750
800
850
900
950
OD IN MM

WELD DEPOSIT CALCULATION
(P TYPE-O.D Vs VOLUME)

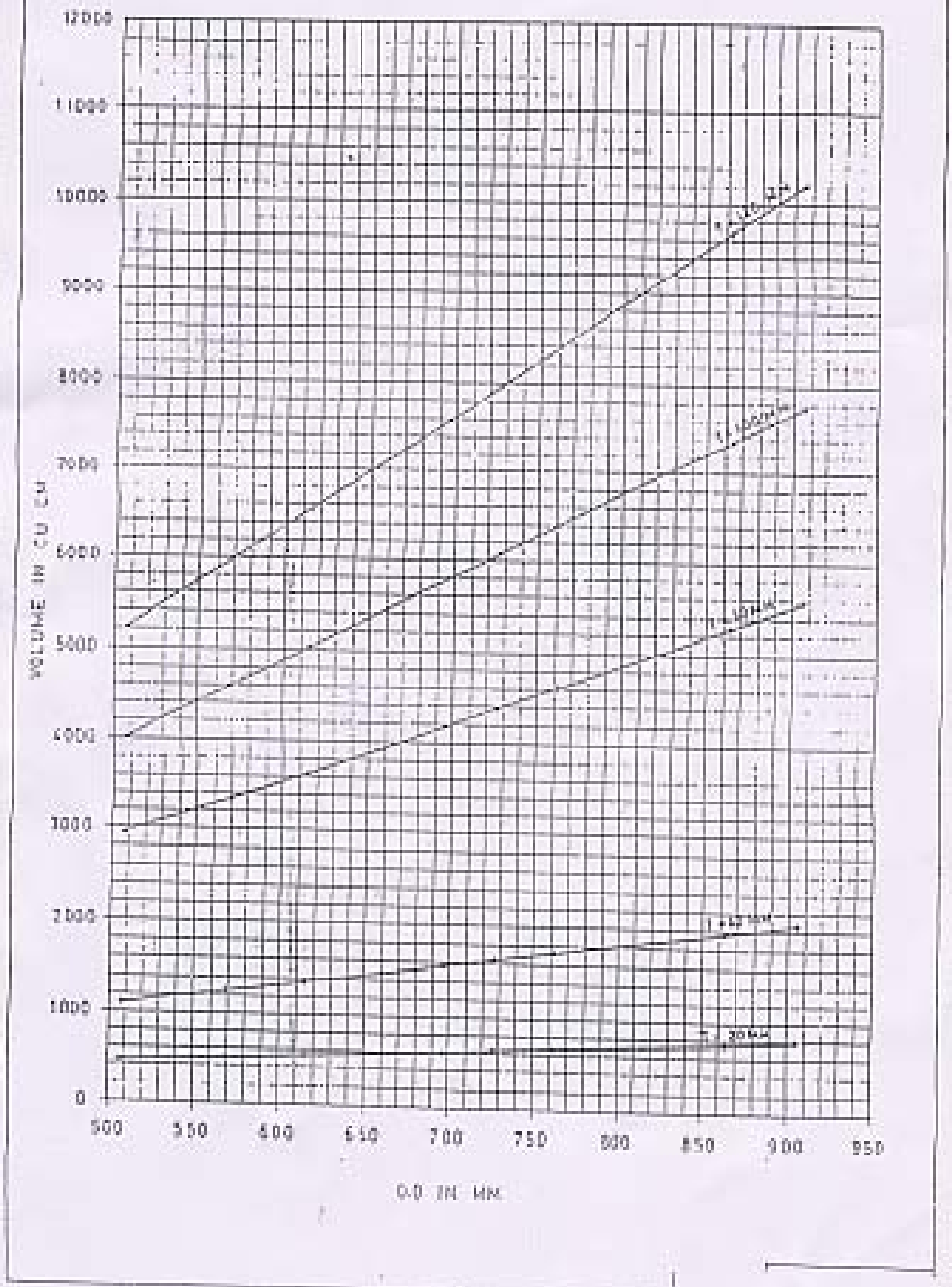


WELD DEPOSIT CALCULATION
(P TYPE - O.D Vs VOLUME)



GRAPH - 58 / 2

WELD DEPOSIT CALCULATION
(P TYPE - O.D Vs VOLUME)



ERECTION WELDING PRACTICE FOR SA 213 t91 MATERIAL

1.0 SCOPE

1.1 This document details salient practice to be adopted during erection of SA213 T91 material.

2.0 MATERIAL

SA213 T91 Dia. and thickness will be as per Field Welding Schedule

When any defect like crack, lamination, and deposit noticed during visual examination the same shall be confirmed by Liquid Penetrant Inspection. If confirmed, same shall be referred to unit.

3.0 ERECTION

3.1 EDGE PREPARATION AND FIT UP

3.1.1 Cutting of T-91 material shall be done by band saw / hacksaw / machining / grinding only. Edge preparation (EP) shall be done only by machining. In extreme cases, grinding can be down with prior approval of welding Engineer / Quality Assurance Engineer. During machining / grinding, care should be taken to avoid excessive pressure to prevent heating up of the tube edges.

3.1.2 All Edge preparations done at site shall be subjected to Liquid Penetrant Inspection (LPI). Weld build-up on Edge Preparation is prohibited.

3.1.3 The Weld fit-up shall be carried out properly to ensure proper alignment and root gap. Neither tack welds nor bridge piece shall be used to secure alignment. Fit-up by a clamping arrangement is recommended. Coil load to be transferred to crown plate / end bar assembly. Ensure that coil load should not come on stubs / header. Use of site manufactured clamps for fit up is acceptable. The necessary preheat and purging shall be done as per clause 4.1 and 3.2.2.

3.1.4 The fit-up and root gap shall be as per drawing.

3.2.0 FIXING OF THERMOCOUPLE (T/C), DURING PREHEATING AND PWHT

3.2.1 No Preheating is required for fixing T / C with resistance spot welding Following are the equipment / facilities for heating cycles.

(1) Heating methods : Resistance heating
(2) Thermo couples : Ni-Cr / Ni-AL OF 0.5 MM GAUGE SIZE.
(3) Temp. Recorders : 6 points / 12 Points

3.2.2 **ARRANGEMENT FOR PURGING:**

Argon gas with requisite quality shall be used for purging the root side of weld. The purging dam (water soluble paper) shall be fixed on either side of the weld bevel prior to fit-up and preheating. The dam shall be fixed inside the tube and it shall be located away from the heating zone. Purging is to be done for root welding (GTAW). The Argon to be used shall be dry. The flow rate is to be maintained during purging is 10 to 12 liters / minute and for shielding during GTAW is 16 to 20 liters / minute. (A minimum flow rate as per Welding Procedure Specification shall be maintained).

3.2.3 When root temperature reached 200°C, start purging through root gap for 5 minutes. Then the root gap to be covered by asbestos rope. Provide continuous and adequate argon gas to ensure complete purging in the root area. Only water-soluble paper is to be used. Plastic foils that are water-soluble are NOT acceptable.

3.2.4 **USING OF WATER SOLUBLE PAPER**

The dams can be made of water-soluble paper for creating the purging chamber. The advantage in such dam arrangement is that dissolving in water can flush the dams. The following is the method to be used:

Simply stuff water-soluble paper into each section to be joined as directed by BHEL site engineer.

4..0 **WELDING / WELDERS QUALIFICATION:**

Only qualified welding procedure is to be used. Welders qualified as per A SME Sec IX and IBR on T91 material shall b engaged. Welders log book to be maintained and welders performance to be monitored by site welding engineer / Quality assurance engineer. The applicable WPS for T91+T91 shall be WPS No.136.

4.1 **PREHEATING (bunching of tubes can be followed)**

Prior to start of preheating ensure that surfaces are clean and free from grease, oil and dirt. Preheating temp shall be maintained at 200°C(min) by using resistance heating. Sufficient number of thermo couples shall

be fixed on both coils and header nipples away from the EP. The thermocouple shall be welded with the condenser discharge portable spot welding machine. The preheating arrangements shall be inspected and approved by welding engineer / Quality Assurance Engineer.

4.2.1 **WELDING:**

Welding shall be done using GTAW process (as per WPS). Filler wire shall be clean and free from rust or oil. Argon Purging shall be continues till completion of root welding.

5.0 **POST WELD HEAT TREATMENT – RESISTANCE HEATING METHOD**

(Bunching of tubes can be followed) :

Arrangement: Sufficient number of thermocouples shall be placed covering weld and the base material. The width of heated circumferential band on either side of the weld must be at least 100mm.

5.1 Obtain the clearance for post weld heat treatment cycle from QAE / Welding Engineer. The PWHT temp for T91 material shall be 760 $\pm$10°C and the soaking time shall be 90 minutes. Welding Engineer shall review all records prior to PWHT clearance.

5.2 Welding and Heat treatment chart given in fig.1 (Page 4 of 4) shall be followed for pre-heating, welding, PWHT, rate of heating / cooling etc.

6.0 NDE: Carry out Non-Destructive Examination (RT) as per Field Welding Schedule. The maximum allowable hardness at weld and parent metal shall be less than 300 HV10.

SECTION VII – APPENDIX V

DETAILS OF ELECTRODES
(To be provided by Tenderer)

Sl. No	Type of Electrodes	Name of Electrodes	General sizes in mm
01	E 6013	Overcord, Philips – 45 Normal Gircon Black	2.50, 3.15 & 4.00
02	E 6013 IBR	Overcord S Media	2.50, 3.15 & 4.00
03	E 7016	Universe, Philips – 56, Ferroweld I – Indotherme	2.50,3.15 & 4.00
04	E 7018	Supertherme supercito, ferro weld II, Philips – 36H, Modi Arc (Modi 7018)	2.50, 3.15 & 4.00
05	E 7018 IBR	Supertherme (special) Tenacito	2.50, 3.15 & 4.00
06	E 7018 A1	Molycord, Molytherme	2.50, 3.15 & 4.00
07	E 7013 A1	Moloycord Ti Medio-Mo	2.50
08	E 8018 B2	Cromocord, Cromotherme I	2.50, 3.15 & 4.00
09	E 9018 B3	Cromocord C, Cromotherme - I	2.50, 3.15 & 4.00
10	E 310	Inox Cw, RS 310, D & H-310 cromoid 5, cromotherm 25/20	2.50, 3.15 & 4.00
11	E 347	Philips RSS-BC, Rutok – A (stap) Superinox – IB, Chromoweld – 347	2.50
12	E 308	Superionox – 1A Rutox A	2.50 & 3.15
13	E 309	Inox D2 Philip RS-309 Cromoweld R 309	2.50 3.15
14	E 9013 B3	Cromocord CTI	2.50, 3.15 & 4.00

NOTE:

1. The specifications are subject to variation depending upon the site conditions. They should not be taken as final.

2. If any other type and size of electrodes not specified above, but considered suitable by BHEL Engineer for erection work, the contractor shall purchase at his cost and use the same as per BHEL's instructions.

   Use of 6013 Electrodes

3. It is to be noted by the tenderer that E 6013 electrodes are not to be used in pressure parts, columns, ducts and other works. Unless otherwise specified in the drawing. All welding has to be done as specified in the detailed drawing using E 7018, E 8018, and E 9018 electrodes as the case may be. This shall be taken into account while quoting.

SECTION VII

APPENDIX - VI

ERECTION OF BOILER STRUCTURES AND POINTS TO BE TAKEN CARE OF FOR ACHIEVING VERTICALITY OF BOILER COLUMNS.

The column pieces are pre-assembled at site and match marks are to be provided:

1. Pre-assembly checks to detect and deviations in the columns like length, camber sweep, twist etc.

2. Checking of the foundations for its levels, distance, diagonal distance etc.

3. Proper tightening of the foundation bolts

4. Erection of columns tier by tier and box by box. Grouting to be done immediately after first tier erection.

5. Ensuring the availability of adequate guy ropes, pulllifts etc., during column erection and the removal of guy ropes to be done only after tie-up of the columns with adjacents columns after ensuring their verticality.

6. Using a calibrated theodolite for verticality measurement of the columns and cross checking these readings with plumb bob at random.

7. Tightening of the HSPG bolts to be done by turnoff nut method only. This should be done only in position after ensuring the verticality of the columns.

8. Measuring the adjacement diagonals of the ceiling girders after its erection.

9. Ensuring the verticality of the columns before and after drum lifting.

The above will enable to achieve verticality of columns which, inturn, will enable to achieve correct furnace dimensions as well as second pass dimensions.

SECTION VII

APPENDIX – VII

DECLARATION SHEET

I, hereby certify that, all the information and data furnished by me with regard to this Tender Specification No.BHEL:PSSR:SCT:1208 are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations in detail and agree to comply which the requirements and intent specifications.

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

TENDERER'S NAME & ADDRESS

AUTHORISED REPRESENTATIVE'S
SIGNATURE WITH NAME & ADDRESS

SECTION VII

APPENDIX – VIII

TENDER SPECIFICATION NO BHEL:PSSR:SCT:1208

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 - IX

CHECK LIST

TENDER SPECTFICATION NO, BHEL: PSSR : SCT : 1208

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

SIGNATURE OF THE TENDERER

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

SIGNATURE OF THE TENDERER

TENDER SPECIFICATION

BHEL:PSSR:SCT: 1208

FOR

Handing at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Structures, Pressure Parts, Non Pressure Parts, Air Pre Heaters, Fans, Bunkers, Bunker Liners, Dampers Ducts including Supply and Application of Final Painting of CFBC Boiler, for Unit –1 of 2 x 250 MW CFBC Boiler

at

Neyveli Thermal Power Station II

EXPANSION

Neyveli, Cuddalore Dist.
Tamil Nadu.

PART – II PRICE BID

BOOK NO :

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

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

TENDER SPECIFICATION NO:BHEL:PSSR:SCT:1208

NAME OF WORK

Handing at Site Stores / Storage yard, Transportation to Site of Work, Erection, Testing and Commissioning of Structures, Pressure Parts, Non Pressure Parts, Air Pre Heaters, Fans, Bunkers, Bunker Liners, Dampers Ducts including Supply and Application of Final Painting of CFBC Boiler, for Unit –1 of 2 x 250 MW CFBC Boiler at Neyveli Thermal Power Station II Expansion, Neyveli, Cuddalore Dist. Tamil Nadu.

(PRICE BID)

PART II

Issued to
M/s.

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

Senior Deputy General Manager/Contracts

(This tender document is not transferable)

Place: Chennai-600 035.
Date:

NEYVELI THERMAL POWER STATION II
EXPANSION,
2 X 250 MW UNIT - BOILER I
SECTION - VI
RATE SCHEDULE SCT : 1208

Sl.No.	Description	Weight In MT	Unit Rate (Rs.)	Amount (Rs.)
01.	**Boiler and associated equipments** Erection, Testing and Commissioning and completion of trial operations of the complete **Boiler and associated equipments Bunker bay structure and Bunkers** as per the detailed description and nature of work enumerated in the tender specification, supply and application of final painting including supply of consumables, tools and tackles T & P required for erection excepting T&P supplied by BHEL. All handling and transportation from BHEL/Customer's storage and other incidental works during pre-assembly, erection, grouting, testing and commissioning work as detailed in the Tender Specification. This shall include all types of handling and transportation of materials from site store sheds/storage yard to pre-assembly yard to place of erection, any extra work of modification/rectification that may arise during erection, testing and commissioning of works which is incidental to normal erection works.	**17408 MT**		

SIGNATURE OF THE TENDERER

Note:

1. The Weights indicated in column 3 are approximate and are liable for variation and alteration at the discretion of BHEL. The quoted unit rate shall be applicable for any additional product groups of manufacturing unit, integral to the scope of work. The work executed shall be measured and priced at unit rate quoted by the contractor and accepted by BHEL. The payment will be made to bidder for the tonnage actually exected at the quoted rate upto the variation in cumulative weight of within +15%

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

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

SIGNATURE OF THE TENDERER