T E N D E R S P E C I F I C A T I O N No.

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 3/1088**	**600 MW Boiler Vertical Pkg** of **Unit 3**
2	**BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 4/1089**	**600 MW Boiler Vertical Pkg** of **Unit 4**

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE, ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES INCLUDING ESP, AIR PREHEATERS, DUCTS AND DAMPERS FANS, COAL MILLS, FUEL PIPING, BOILER INTEGRAL PIPING, POWER CYCLE PIPING, CHEMICAL DOZING SYSTEM, LINING & INSULATION, FINAL PAINTING (INCLUDING SUPPLY OF PAINT) ETC FOR UNIT-3 & 4

AT

2X660 MW NTPC MOUDA PROJECT
DISTRICT NAGPUR IN
MAHARASHTRA STATE

VOLUME – I

CONSISTING OF:

- **Notice Inviting Tender,**
- **Volume-IA : Technical Conditions of Contract-,**
- **Volume-IB : Special conditions of Contract,**
- **Volume-IC : General conditions of Contract**
- **Volume-ID : Forms & Procedures**

Bharat Heavy Electricals Limited
(*A Government of India Undertaking*)
Power Sector - Western Region
345-Kingsway, Nagpur-440001

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NIL	Tender Specification Issue Details	1	(Part of **Vol-IA-1088-89**)
NIL	Notice Inviting Tender	24	(Part of **Vol-IA-1088-89**)
I-A	Technical Conditions of Contract	102	Vol-IA-1088-89
I-B	Special Conditions of Contract	47	Vol-IBCD-1088-89
I-C	General Conditions of Contract	29	(Part of Vol-IBCD-1088-89)
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Tender Specification Issue Details

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 3/1088**	**600 MW Boiler Vertical Pkg** of **Unit 3**
2	**BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 4/1089**	**600 MW Boiler Vertical Pkg** of **Unit 4**

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE, ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES INCLUDING ESP, AIR PREHEATERS, DUCTS AND DAMPERS, FANS, COAL MILLS, FUEL PIPING, BOILER INTEGRAL PIPING, POWER CYCLE PIPING, CHEMICAL DOZING SYSTEM, LINING & INSULATION, FINAL PAINTING (INCLUDING SUPPLY OF PAINT) ETC FOR UNIT-3 & 4

AT

2X660 MW NTPC MOUDA PROJECT
DISTRICT NAGPUR IN
MAHARASHTRA STATE

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION: Refer Notice Inviting Tender

THESE TENDER SPECIFICATION DOCUMENTS CONTAINING VOLUME-I AND VOLUME- II ARE ISSUED TO:

M/s. ……

……

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date:

1088
&
1089

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/MADT2-BLR(Vertical Pkg)/1088-1089 Date: 10/01/2013

NOTICE INVITING TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES OR PURCHASE TENDERS FROM THIS OFFICE ALSO

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To

Dear Sir/Madam

Sub: NOTICE INVITING TENDER

Sealed offers in two part bid system are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-I) for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHE/PW/PUR/ MADT2-BLR(Vertical Pkg)U-3/1088** **BHE/PW/PUR/ MADT2-BLR(Vertical Pkg)U-4/1089**	
ii	**Broad Scope of job**	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD, TRANSPORTATION TO SITE, **ERECTION ,TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES** INCLUDING ESP, AIR PREHEATERS, DUCTS AND DAMPERS, FANS, COAL MILLS, FUEL PIPING, BOILER INTEGRAL PIPING, POWER CYCLE PIPING, CHEMICAL DOZING SYSTEM, LINING & INSULATION, FINAL PAINTING (INCLUDING SUPPLY OF PAINT) ETC FOR **UNIT-3 & 4 OF 2X660 MW NTPC MOUDA** PROJECT AT MOUDA, DISTRICT NAGPUR IN MAHARASHTRA STATE **(UNIT-3 and UNIT-4 shall be awarded to 2 separate agencies)**	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*

iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :Nagpur*** ***Start : 10/01/2013*** ***Closes: 24/01/2013 , Time :16.00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents can however be downloaded from website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 25/01/2013, Time :15.00Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be handed over to any of the following BHEL officials after making entry/registration at the reception: SM Borkar/ DGM (Purchase) RK Ranade/ Sr Manager (Purchase) Pratish Gee Varghese/Engineer(Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***1 hours after the latest due date and time of Offer submission*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2,00,000/- (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Date: Atleast 5 days before the due date of offer submission* *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	*Date : Not applicable.*	*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	Shri D. P. Bagchi, IAS (Retd.) Y-165, Regency Park - II, DLF City, Phase IV, Gurgaon - 122 009	*Applicable(Bidders to submit duly filled & signed Annexure III of NIT)*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**

3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at NAgpur Sundays and second/ last Saturdays

4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.

5.0 **Procedure for Submission of Tenders**: The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
- One set of tender documents shall be retained by the bidder for their reference

6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped)**

Sl no	Description	Remarks
	Part-I A	
	ENVELOPE – I superscribed as : PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**:-	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled-in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. **Note:** a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed	

	properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

	PART-I B	
	ENVELOPE – II superscribed as: PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**:-	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender **OR** Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender 2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)	

	PART-II	
	PRICE BID consisting of the following shall be enclosed	
	ENVELOPE-III superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**	
i	Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I	
ii	Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)	

	OUTER COVER	
	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i	o Envelopes I o Envelopes II o Envelopes III	

SPECIAL NOTE : All documents/ annexures submitted with the offer shall be properly annexed and placed in respective places of the offer as per enclosure list mentioned in the covering letter. BHEL shall not be responsible for any missing documents.

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 Assessment of Capacity of Bidders:

Bidders capacity for executing the job under tender shall be assessed 'LOAD' wise and 'PERFORMANCE' wise as per the following:

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The 'Load' is the sum of the unit wise identified packages (refer Table-1) for contracts with BHEL Regions. The cut off month for reckoning 'Load' shall be the month, two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

(Note: For example if latest bid submission is in Aug 2011, then the 'load' shall be calculated upto and inclusive of June 2011)

i). Total number of Packages

Total number of Packages in hand = P

Where

- P is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced.

ii) Weightage "A" assigned to bidders based on Total number of Packages 'P':

a) If 'P' = 0-9, : "A" will be equal to '4'
b) If 'P' = 10-18, : "A" will be equal to '3'
c) If 'P' = 19-36, : "A" will be equal to '2'
d) If 'P' = 37-60, : "A" will be equal to '1'
e) If 'P' is above 60 : "A" will be equal to '0'

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (**under execution**/ executed during the 'Period of Assessment' in all the Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the month two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

(Note: For example if 'latest date of bid submission' is in Aug 2011, then the 'performance' shall be assessed for a 6 month period upto and inclusive of June 2011, for all the unit wise identified packages (refer Table I)

i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions:
This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

a) $P_1, P_2, P_3, P_4, P_5, \ldots P_N$ etc be the packages (**under execution**/ executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (ie $P_T = P_1 + P_2 + P_3 + P_4 + .. P_N$)

b) Number of Months 'T_1' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1. Similarly T_2 for package P_2, T_3 for package P_3, etc for the tendered scope. Now calculate cumulative total months '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + .. T_N$)

c) Sum 'S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$,.... $S_{1\text{-}N}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}N}$). Similarly S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3, etc for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e 'S_T '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating 'R_{BEHL}' for the similar Package/Packages** (**under execution**/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL)**:**

$$= \frac{\text{Aggregate of Performance scores for all similar packages in all the Regions}}{\text{Aggregate of months for each of the similar package for which performance should have been evaluated in all the Regions}}$$

$$= \frac{S_T}{T_T}$$

e) Bidders to note that the risk of non evaluation or non availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder

f) Table showing methodology for calculating 'a', 'b' and 'c' above

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions →	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	---------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

ii) Weightage "B" assigned to bidders based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions, for the respective Package:

a) If $\mathbf{R_{BHEL}}$ is ≥ 80%, "B" will be equal to '6'
b) If $\mathbf{R_{BHEL}}$ is ≥ 75% < 80%, "B" will be equal to '5'
c) If $\mathbf{R_{BHEL}}$ is ≥ 70% < 75%, "B" will be equal to '4'
d) If $\mathbf{R_{BHEL}}$ is ≥ 65% < 70%, "B" will be equal to '3'
e) If $\mathbf{R_{BHEL}}$ is ≥ 60% < 65%, "B" will be equal to '2'
f) If $\mathbf{R_{BHEL}}$ is < 60%, "B" will be equal to '0'

III. 'Assessment of Capacity of Bidder' to be Qualified for the tender:

Shall be based on the sum of the weightages obtained in 'LOAD' (A) and 'PERFORMANCE' (B) as below:

a) If the sum (A+B) is 6 or above for each of the applicable Package, then the Bidder is considered 'Qualified' for the tender

b) If the sum (A+B) is less than 6 for any of the applicable Package, then the Bidder is considered 'NOT Qualified' for the tender

IV. **Explanatory note**:

a) Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or CI, etc at the individual level irrespective of rating of Plant, and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, CI, Civil, Structure, etc is considered individual level of package. For example in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl no II above, needs to be evaluated considering all the identified packages (ie Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above

b) Identified Packages (Unit wise)

Table-1

	Civil	Electrical & CI	Mechanical
	i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	i). Electrical ii). CI iii). Others (Elec & CI)	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). LP Piping iv). ESP v). Steam Turbine Generator set & Aux vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Handling x). Material Management xi). Material Handling & Material Management xii). Others (Mechanical)

c) Vendors who are first timers to any BHEL Region, may be considered subject to satisfying other tender conditions. Eligibility of the party for the next tender of any package in that Region, shall be subject to the bidder satisfying the 'Assessment of Capacity of Bidder' for a period of first **nine months** after commencement of work or contract duration whatever is lesser.

In case the first timer is executing any other packages in any BHEL Region, then the performance evaluation will be based on the data available for the other packages though not similar, for the 'Period of assessment', for the purpose of 'Assessment of Capacity of Bidder'

d) Vendors who are not first timers and who have not been executing any package or packages similar to the packages under the tender in the 'Period of assessment', shall be considered qualified subject to them satisfying all other tender conditions.

e) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders', then BHEL at its discretion, reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating** 'R_{BHEL}**'** only**.**

f) 'Under execution' shall mean works in progress as per the following:

i. upto Boiler Steam Blowing in case of Steam Generator and Auxilliaries

ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)

iii. upto execution of at least 75% of anticipated contract value (unit wise), in case of Enabling works or Civil & Structures.

Note : BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (i), (ii) and (iii) above, depending upon the balance scope of work to be completed.

g) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**

16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

17.0 In case BHEL decides on a `Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .

However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDs' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.

20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.

23.2 'Stand alone' bidder cannot become a '**Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding**. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.

23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR

23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work

23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder' as specified in clause 9.0

23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'

23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified

23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.

23.9 Prime Bidder shall be responsible for the overall execution of the contract

23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats

23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.

23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.

23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.

23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also

24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 Order of Precedence

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
b. Notice Inviting Tender (NIT)
c. Price Bid
d. Technical Conditions of Contract (TCC)—Volume-1A
e. Special Conditions of Contract (SCC) —Volume-1B
f. General Conditions of Contract (GCC) —Volume-1C
g. Forms and Procedures —Volume-1D

for BHARAT HEAVY ELECTRICALS LTD

(AGM (Purchase)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List .
03 Annexure-3: Integrity Pact.
04 Annexure -4: Important Information

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD, TRANSPORTATION TO SITE, **ERECTION ,TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES** INCLUDING ESP, AIR PREHEATERS, DUCTS AND DAMPERS, FANS, COAL MILLS, FUEL PIPING, BOILER INTEGRAL PIPING, POWER CYCLE PIPING, CHEMICAL DOZING SYSTEM, LINING & INSULATION, FINAL PAINTING ETC FOR **UNIT-3 & 4 OF 2X660 MW NTPC MOUDA** PROJECT AT MOUDA, DISTRICT NAGPUR IN MAHARASHTRA STATE **(Unit 3 & Unit 4 shall be awarded to 2 separate agencies)**
TENDER NO	**BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 3/1088 (For Unit # 3 Boiler)** **BHE/PW/PUR/MADT2 - BLR(Vertical Pkg) U 4/1089 (For Unit # 4 Boiler)**

SL NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	
		Name and Description of qualifying criteria	Page no of supporting document
A	Submission of Integrity Pact duly signed (if applicable)	**APPLICABLE**	
B	Assessment of Capacity of Bidder to execute the work as per Sl no 9 of NIT	**APPLICABLE**	
C	**Technical** **Executed** Erection Testing & Commissioning of Atleast One Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of a Unit of 400 MW or higher.	**APPLICABLE**	
D 1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of **Rs 2850 Lakhs** or more over last three Financial Years (FY) i.e. 2009-2010, 2010-2011 & 2011-12	**APPLICABLE**	
2	**NETWORTH** (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive	**APPLICABLE**	
3	**PROFIT** Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1 above based on latest Audited Accounts.	**APPLICABLE**	

E	Approval of Customer Note: Names of bidders who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval. Price bid of only those bidders shall be opened who are approved by customer.	**APPLICABLE**	
F	Consortium criteria (if applicable)	**NOT APPLICABLE**	

Explanatory Notes for the PQR (unless otherwise specified in the PQR):

1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures
2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.
3. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)
4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above
5. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :~~
   1. ~~Bidder should have executed similar work of any one of the following:~~
      - ~~a. One (1) work of value not less than Rs XXX~~
      - ~~OR~~
      - ~~b. Two (2) works of not less than Rs YYY~~
      - ~~OR~~
      - ~~c. Three (3) works of not less than Rs ZZZ~~
      - ~~(Value XXX, YYY, ZZZ shall be as indicated by BHEL~~
   2. ~~'Similar' work for criteria 5 above means~~
      - ~~a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works~~
      - ~~b. Electrical works in respect of 'ELECTRICAL'~~
      - ~~c. CI works in respect of 'CI' Works~~
      - ~~d. Material Handling and/or Management works in respect of 'MM' works~~
6. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission
7. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed
8. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:
   1. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP
   2. ~~"SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG~~
   3. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping
   4. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping
   5. ~~"CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears~~
   6. ~~"Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~
   7. ~~Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
   8. ~~'Readiness for coal Filling" in respect of Bunker Structure Work.~~
9. Boiler means HRSG or WHRB or any other types of Steam Generator
10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines
11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.
12. ~~In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall~~

	~~be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.~~ ~~13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.~~ ~~14.~~ In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR~~.~~

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK OREDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

ANNEXURE - 2

CHECK LIST

NOTE: - Tenderers are required to fill in the following details and no column should be left blank

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3	Details of Contact person for this Tender	Name : Mr./Ms Designation: Telephone No: Mobile No: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (√) whichever applicable:- ONE TIME EMD / ONLY FOR THIS TENDER	
		APPLICABILITY	BIDDER REPLY
5	Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
6	Whether Audited profit and Loss Account for the last three years submitted	Applicable	YES/NO
7	Whether Copy of PAN Card submitted	Applicable	YES/NO
8	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	YES/NO
9	Whether duly filed & Signed Integrity Pact (Annexure III of NIT) submitted	Applicable	YES/NO
10	Declaration by Authorised Signatory	Applicable	YES/NO
11	Whether No Deviation Certificate submitted	Applicable	YES/NO
12	Whether Declaration confirming knowledge about Site Conditions submitted	Applicable	YES/NO
13	Whether Declaration for relation in BHEL submitted	Applicable	YES/NO
14	Whether Non Disclosure Certificate submitted	Applicable	YES/NO
15	Whether Bank Account Details for E-Payment submitted	Applicable	YES/NO
16	Capacity Evaluation of Bidder for current Tender	Refer Sl 9 of NIT	YES/NO
17	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	Not Applicable
18	Whether Power of Attorney for Submission of Tender/Signing Contract Agreement submitted	Applicable	YES/NO
19	Whether Analysis of Unit rates submitted	Applicable	YES/NO

NOTE: STRIKE OFF 'YES' OR 'NO', AS APPLICABLE

DATE:

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE - 3

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House" Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context of meaning hereof shall include its successors or assigns of the ONE PART

And

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____

_____

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and execution from future contracts

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per separate "Guidelines on for Suspension of Business Dealings with Suppliers/ Contractors" framed by the Principal.

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-Contractors

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section -7 Criminal Charges against violating Bidders/ Contractors/ Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder. Contractor or Sub-contractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section – 8 Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

_____	_____
For & On Behalf of the Principal	For & On Behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)

ANNEXURE IV

ANNEXURE 4: IMPORTANT INFORMATION

1. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -→ List of Banned Firms)

2. **This is a combined tender for E & C of 2 units of 660 MW Boiler Vertical Package (Unit 3 & 4 at NTPC MAuda Ph II).**

   i Tender specification (Volume I) is common for both units **(Unit 3 & 4)**.
   ii **Unit 3 & Unit 4** shall be awarded to separate agencies.
   iii **Bidder has to submit their 'SINGLE NOTIONAL RATE' for E & C of ONE UNIT of 660 MW Boiler Vertical Package as indicated in the Price Bid.**
   iv L-1 Bidder shall be considered for award of Unit-3.
   v For award of UNIT-4, next bidder in the order of their price competitiveness (i.e L-2, then L-3 and hence forth) shall be given an option to match their price/rate, with the Awarded/Finalised price/rate of UNIT 3. In case none of the bidders agree to match the Awarded price/RATE of UNIT-3, then BHEL may consider awarding the UNIT-4 to L-1 bidder or opt any other suitable method to finalize UNIT-4.

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&
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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

Following Drawings are uploaded separately as file titled drawings through Corrigendum 01:

1. BHEL drawing No. 0-00-020-76252 Rev.00 dated 01.06.2012 –General Arrangement –Key Plan, General Notes & Legend for Steam Generator.
2. BHEL drawing No. 0-00-22-76238–General Arrangement –Side Elevation 00-00 for Steam Generator.
3. BHEL drawing No. 0-00-22-76239–General Arrangement –Side Elevation 02-02 for Steam Generator
4. BHEL drawing No. 0-00-22-76240–General Arrangement –Side Elevation 03-03 for Steam Generator
5. BHEL drawing No. 0-00-22-76241–General Arrangement –Plan Section -04-04 for Steam Generator
6. BHEL drawing No. 0-00-22-76242–General Arrangement –Plan Section -05-05 for Steam Generator
7. BHEL drawing No. 0-00-22-76243–General Arrangement –Plan Section -06-06 for Steam Generator
8. BHEL drawing No. 0-00-22-76244–General Arrangement –Plan Section -07-07 for Steam Generator

1.0	**Project Information**
1.1	1. Purchaser / Owner :**M/s National Thermal Power Corporation Limited. (NTPC)** 2. Project Title :**2X660 MW NTPC Mouda** **(Extension of 2x500 MW PHASE-I)** **LOCATION AND APPROACH :** 1. Location : Village-Mouda, Dist- Nagpur State–Maharashtra, India. 2. Address Details : 2X660 MW NTPC Mouda. Village – Mouda Taluka – Mouda Dist.- Nagpur Pin Code- Maharashtra State, India" 3. Nearest Port : Mumbai 4. Nearest Air Port : Nagpur/ 50 KM from Mouda town 5. Approach Road : Mouda site is connected to Mouda town by 04 KM long all weather roads. Mouda town is 40 KM from Nagpur on NH-6. 6. Railway Approach : Nearest Railway Station Chacher 8 Kms away from site on Nagpur-Kolkata Broad Gauge section of South Eastern Railway (main line) 7. Data of Seismic Design : As per IS 1893 8. Ambient air temperature (Average) : a) Maximum : 50 degree centigrade b) Minimum : 6 degree centigrade 11: Average Relative Humidity: 60 %

	12: Wind speed : 44 m/s at ten meters above the ground level as per IS 875 (Part-3). 13. Geographical condition: Latitude- 21-10-50 N Longitude -79-23-52 E The Bidder shall visit site and get acquainted himself with the conditions prevailing at site before submission of the bid. The information's given here in under are for general guidance and shall not be contractually binding on BHEL/ Owner. All relevant site datas/informations as may be necessary shall have to be obtained /collected by the Bidder.

2.0 SCOPE OF WORK

1) The work to be carried out under the scope of these specifications is broadly as under:

Collection of materials from BHEL/Client's stores/storage yard; transportation to site, Erection ,Testing & Assistance for commissioning, Trial Operation and handing over of Boiler and its Auxiliaries, Air Preheaters, Ducts and Dampers, Fuel Piping, Boiler Integral Piping, Electrostatic Precipitator, Fans, Power Cycle Piping, Coal Mills and Coal Feeders, Chemical Dozing System, Insulation, Final Painting, including supply of paints etc. of 2X660 MW NTPC MOUDA PROJECT DISTRICT NAGPUR IN MAHARASHTRA STATE.

2) Erection, alignment and welding, bolting, fastening, grouting as applicable of:

- ✓ Boiler Supporting Structures
- ✓ Boiler Pressure Parts
- ✓ Boiler Trim & Integral Piping and Mountings
- ✓ Fuel Oil Piping
- ✓ Non-Pressure Parts, Ducts, Dampers
- ✓ Rotating Machines (e.g. Air Heaters, Coal Mills, Coal Feeders, Fans, and Blowers etc. with their drives & Lube Oil System etc.)
- ✓ Pulverized Fuel Piping
- ✓ External structures (e.g. Duct supporting) including elevator structure.
- ✓ Handling arrangements for Rotating Machines
- ✓ Power Cycle Piping (Main Steam, HRH, CRH etc) and valves including HP/LP Bypass
- ✓ Electrostatic Precipitator and Stairways & Galleries
- ✓ Chemical Dozing System
- ✓ Entire piping supplied by PC Chennai (SG piping, TG piping, LP piping)
- ✓ Vibration isolation system (VIS) for all Fans.

3) Pre-assembly, if any, Pre-erection checks as applicable

5) Non-Destructive Examination & post weld heat treatment.

6) Insulation of all exposed metal parts of the equipments including piping, structures etc.

7) Pre-commissioning checks/tests, Trial Runs/Testing and Commissioning

8) Supply of paints and Final Painting of erected items

9) Trial Operation and associated tests

10) Making unit ready for PG test and assistance for conductance.

11) Completion of all facilities/systems

12) Handing over of the unit

13) Providing assistance during commissioning.

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE**:			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
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	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
a	Open space for labour colony (as per availability)	**Yes**		Location will be finalized after joint survey with owner

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	**ELECTRICITY**			
3.2.1	**Electricity For construction purposes only** of Voltage 415/440 V			FREE
a	Single point source	Yes		At a distance of 1000 M from site (Distance is only estimated, it may vary upto any extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	**Electricity for the office, stores, canteen etc of the bidder**			Free
a	Single point source	yes		At a distance of 1000 M from site (Distance is only estimated, it may vary upto an extent depending on site condition)

Sl. No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**			
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	**WATER SUPPLY**			
3.3.1	**For construction purposes:**			
a	Making the water available at single point		**Yes**	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	Water supply for bidder's office, stores, canteen etc.			

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4.0	**LIGHTING**			
a	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	
b	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	

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6.0	**COMPRESSED AIR wherever required for the work**		**YES**	
3.7.0	**Demobilization of all the above facilities**		**YES**	
3.8.0	**TRANSPORTATION**			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.9.1	Engineering works for construction:			
a	Providing the erection drawings for all the equipments covered under this scope	Yes		
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	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**	"
d	Shipping lists etc for reference and planning the activities	Yes		"
e	Preparation of site erection schedules and other input requirements		Yes	"
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	"
g	Weekly erection schedules based on SL No. e		Yes	"
h	Daily erection / work plan based on SL No. g		Yes	"

Sl. No	Description **PART II** **3.9.0 ERECTION FACILITIES**	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
i	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	
j	Preparation of preassembly bay		Yes	
~~k~~	~~Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself~~		~~Yes~~	
L	Arranging the materials required for preassembly		YES	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV: Tentative list of T&Ps and MMEs to be deployed by Contractor

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
1	CRAWLER CRANE	75 MT	02 Nos.	01 No. - FROM Boiler Erection Start (BES) TO trial run completion. Second Crane from Boiler Erection Start to Synchronisation (Contractor shall provide the crane with operator)
2	TYRE mounted mobile CRANE With Telescopic boom	40 MT	2 No.	1 no. to be deployed within 30 days from BES to Trial Run & 2nd crane to be deployed within 60 days from BES to completion of the contract. (Contractor shall provide the crane with operator)
3	Tyre mounted mobile crane	18T/20T	02 Nos.	from BES till trial run.
4	Tyre mounted mobile crane/Hydra	14/20T	08 Nos.	2 nos within 30 days from BES and balance progressively within 120 days from BES till trial operation completion
5	TRAILER WITH PRIME MOVER	20MT	2 NOS.	1 no. to be deployed within 30 days from the BES to Trial Run & 2nd trailer to be deployed within 60 days from BES to trial run.
6	TRAILER WITH PRIME MOVER	40 MT	2 nos.	1 no. from start of contract period and 1 more from start+2 months. Both till trial run completion.
7	LOW BED TRAILER	60 MT	01 NO. (As required)	To be deployed within 30 days from the start of contract period to Trial Run

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
8	AIR COMPRESSOR (ELECTRIC/DIESEL OPERATED)	210 CFM, 7 KG/CM2	02 nos.	As required.
9	MIG/TIG WELDING SET	AS REQUIRED	Adequate nos.	
10	PLASMA CUTTING M/C		as required	
11	Submerged ARC WELDING M/C		Adequate nos.	
12	Oxy Acetelyne Gas cutting Machine		Adequate nos.	
13	DC arc welding machine		As required.	
14	3-PHASE DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER	AS REQUIRED	as required	
15	POWER CABLE FOR DRAWL OF CONSTRUCTION POWER	AS REQUIRED	as required	
16	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS, THERMOMETERS ETC.)	AS REQUIRED	as required	
17	RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE	IRIDIUM-192	5 sets (As required)	
18	RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE	COBALT-60	as required	
19	THEODOLITE OF REQUIRED ACCURACY	To ensure verticality of structural columns.	1 Nos.	
20	SELF DRILLING CUM TAPPING MACHINE FOR SCREWS OF BOILER ROOF SHEETS	AS REQUIRED	4 nos. (As required)	
21	A>> CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION, OPR TEMP 80 DEG	AS REQUIRED	4 SETS	Required for Chemical cleaning, Acid cleaning and alkali boil out activities.

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
	CEL, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT ETC. SUGGESTED RATING: 200 M^3, 120 – 150M WC, WITH COMPATIBLE ELECTRIC DRIVE MOTOR. B>>CHEMICAL TRANSFER PUMPS OF RATING 30M3/HR WC 10M. HOWEVER, CONTRACTOR SHALL DEPLOY THE REQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.		02 SETS.	
22	ARRANGEMENT FOR UT OF HIGHER THICKNESS JOINTS WITH RECORDING FACILITY & REQUIRED CALIBRATION BLOCKS.	TYPE USN 50 OR EQUIVALENT/ UP GRADED TYPE	02 SET (As required)	
23	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	UP TO 2" NB AND 12 MM THICK PIPES	2 SETS	
24	WELDING GENERATOR (ELECTRICAL)	300 AMPERE RATING	AS REQUIRED	
25	WELDING GENERATOR (DIESEL OPERATED)	300 AMPERE RATING	4 SETS	
26	RADIOGRAPHY FILM VIEWER	AS REQUIRED	AS REQUIRED	
27 a	HYDRAULIC PIPE BENDING MACHINE (MANUAL)	FOR BENDING OF PIPES UP TO 50 MM NB SIZE	4 SETS	
27 b	Pipe chamfering machine /Tube Cutting	4-14"	1 SET	

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
28	Pipe chamfering machine /Tube Cutting	14-20"	1 SET	
29	Pipe cutting & beveling machines		Adequate nos.	
30	Chain pulley blocks of various & suitable capacities		As Required	
31	BAKING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR WELDING ELECTRODES	AS REQUIRED	2 (As Required)	
32	HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR WELDING ELECTRODES	AS REQUIRED	2 (As Required)	
33	PORTABLE OVEN FOR WELDING ELECTRODES	AS REQUIRED	35 (As Required)	
34	ELECTRIC WINCH	2/3/5/10/15 TON CAPACITY	As per requirement (approx 30 Nos.)	
35	HYDRAULIC TEST/ PRESSURIZING PUMP	600 , 450 & 250 KG PER CM^2	01 no each	For hydraulic test of boiler and HP & LP pipelines.
36	FURNACE MAINTENANCE PLATFORM (SKY CLIMBER)	ADEQUATE CAPACITY	2 nos.	to cover one length and one width of furnace
37	HAND WINCH	0.5 TON CAPACITY	3 nos	
38	SCAFFOLDING MATERIALS WITH CLAMPS.	SUITABLE FOR WORKING AT VARIOUS HEIGHTS	12,000 nos.	
39	PROFILE MAKING M/C	FOR ALUMINIUM SHEET CLADDING	as required	

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
		WORK		
40	NIBBLING M/C	FOR REFRACTORY AND OTHER REQUIRED ACTIVITIES	as required	
41	SHEARING M/C		as required	
42	WATER PUMP TO LIFT WATER TO TOP OF BOILER		1 set	
43	PORTABLE GRINDING M/C	AS REQUIRED	as required	
44	PORTABLE DRILLING M/C	AS REQUIRED	as required	
45	HOISTING AND PULLEY DEVICES/PULLEYS	Assorted capacities	as required	
46	FIRE RETARDANT TARPAULINS	AS REQUIRED	as required	
47	FIRE EXTINGUISHER	AS REQUIRED	as required	
48	Electric operated Bolt tightening machines		Min 10 nos.	
49	Hydraulic Jacks	10/20/50/100 MT	as required	
50	Dewatering pumps		as required	
51	Sleepers of suitable sizes		min. 400 (as required)	
52	Various sizes of clamps/ fixtures for assembling		as required	
53	Portable hardness tester		as required	

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
54	Hardness testing equipment (Equotip or Microdur make) 33 Stress relieving equipment with temperature		(min 2 nos)	
55	Magnetic particle testing equipment-DRY & WET Type		as required	
56	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		as required	
57	Spectrometer for metal testing		as required	
58	Alco meter for paint thickness checking		as required	
59	Hand Operated Megger 500 / 1000 V		as required	
60	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy		as required	
61	Digital and Analogue Multimetres		as required	
62	U Tube Manometer 0-2000 mm Water Column		as required	
63	Inclined Manometer 0-50 mm Water Column		as required	
64	Calibrated Pneumatic Torque wrench		4 nos.	
65	Bolt Tension Calibrator		as required	
66	Special Slings for Erection of Ceiling Girders & other heavy components		as required	
67	DG SET	As required	01 sets	For continuos/ uninterrupted back up power during welding &

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY PER UNIT	*REMARKS*
				post weld heat treatment of HP joints.
68	Concrete Blocks		100 nos.	For making bed of steel structure for checking dimensional accuracy, configuration and minor rectification.
69	HUCK BOLTING MACHINE COMPLETE SET	As required	02 SET	FOR HUCK BOLTING OF SHOCK BARS AND SHOCK PADS.

PASSENGER CUM GOODS ELEVATOR

Contractor, as part of his T&P, shall arrange, install, operate and maintain 1.5 MT capacity passanger-cum-goods elevator in each boiler to facilitate access to various platform elevations upto top floor. The elevator shall conform to the national standard and industrial safety code as applicable. These shall be deployed at the time of start of pressure parts work in consultation with BHEL site engineer.

The probable suppliers for the elevator are:

1. M/s Avon cranes pvt ltd, Gurgaon
2. M/s Mekaster engineering & equipment pvt ltd, Halol

Laying of sleepers and rails and routine maintenance of the dip trolley system including assembly and dismantling are in Contractor's scope.

MEASURING AND MONITORING DEVICES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE, SHALL MEET THE REQUIREMENTS AS PER

FIELD QUALITY PLAN AND OTHER ERECTION, TESTING RELATED ACTIVITIES.

NOTE:

1. **The above list specifies only major T&P/MMD (may not be complete) to be deployed by the contractor. All additional/ other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate/ price.**

2. IF ABOVE MENTIONED T & P ARE NOT DEPLOYED IN SPECIFIED TIME BHEL WILL CHARGE TO CONTRACTOR CURRENT MARKET RATE + 30 % OVERHEADS FOR NON AVAILABILITY T&P OR LEVY A DAY WISE PENALTY FOR NON DEPLOYMENT OR DELAYED DEPLOYMENT

3 IF THE WORKS GET DELAYED DUE TO NON-AVAILABILITY OF T&P, BHEL RESERVES THE RIGHT TO GET THE WORK DONE AT THE RISK AND COST OF CONTRACTOR WITHIN PREJUDICE TO RIGHTS OF BHEL AS IN GCC.

4 THE MANUFACTURING YEAR OF ALL MAJOR T&PS DEPLOYED BY THE CONTRACTOR (75 MT, CRAWLER CRANE, 18 MT MOBILE CRANE AND 12/10 MT PICK & CARRY CRANE) SHOULD NOT BE MORE THAN 10 YEARS AS ON THE DATE OF DEPLOYMENT. IF AT ANY MOMENT OF TIME DURING THE EXECUTION OF WORK, ANY CRANE IS FOUND TO BE NOT IN A GOOD WORKING CONDITION AND NON-PERFORMING AT DESIRED MINIMUM CAPACITY, AS CERTIFIED BY BHEL ENGINEER, THE CONTRACTOR SHALL DEPLOY ANOTHER CRANE IN GOOD WORKING CONDITION WITH MINIMUM DESIRED CAPACITY. IF CONTRACTOR FAILS TO DEPLOY THE SAME WITH IN 10 DAYS, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER DAY OF DELAY IN THE FOLLOWING MANNER -

1. IN RESPECT OF 75 MT CRANE: @ RS. 5,000 / -
2. IN RESPECT OF 40 MT CRANE: @ RS. 4,000 / -
3. IN RESPECT OF 18 MT CRANE: @ RS. 3,000 / -
4. IN RESPECT OF 14 MT CRANE: @ RS. 2,000 / -
5. IN RESPECT OF 12 MT CRANE: @ RS. 1,000 / -

ABBREVIATION:

BES = BOILER ERECTION START, CF = COAL FIRING, BLU = BOILER LIGHT UP, FL = FULL LOAD, PG TEST= PERFORMANCE GUARANTEE TEST.

SL.NO.	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	HEAVY LIFT-HIGH REACH CRANE (HLHR)	01 NO.	THIS WILL BE HIRED BY BHEL. REFER NOTE 1-11 BELOW FOR UTILIZATION.
2	250 MT CAP CRANE	04 NO.	-DO-
3	150 MT CAP CRANE	02 NOS.	-DO-
4	INDUCTION HEATING M/C	04 SET	FOR WELDING OF P-91 PIPELINE, DG back up is in contractor scope.
5	AIR LEAK TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	FOR AIR LEAK TEST OF ESP AND DUCTING ETC.

NOTE:

1. HLHR CRANE IS TO BE USED FOR ERECTION OF BOILER CEILING STRUCTURES AND EQUIPMENT/ COMPONENTS ABOVE BOILER CEILING STRUCTURE, HEAVY STRUCTURES OF BUNKER THAT REQUIRE SERVICES OF THIS CRANE AS DECIDED BY BHEL. THIS CRANE WILL ACCORDINGLY BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

2. ONE NO. OF 150 MT CRAWLER CRANE WILL BE PROVIDED AT THE TIME OF START OF BOILER ERECTION. ONE NO. OF 250 T CRAWLER CRANES WILL BE PROVIDED PROGRESSIVELY IN A PHASED MANNER SO AS TO SUIT THE ERECTION REQUIREMENTS AS DECIDED BY BHEL ENGINEER.

3. OTHER T&P MENTIONED ABOVE CONTRACTOR SHALL TRANSPORT FROM BHEL STORES, INSTALL, OPERATE, CARRY OUT MAINTENANCE, DISMANTLE AFTER USE AND RETURN TO BHEL STORES.

4. ~~STRAND AND JACK ARRANGEMENT FOR BOILER DRUM ERECTION WILL BE PROVIDED BY BHEL. CONTRACTOR WILL ARRANGE FOR COLLECTION / TRANSPORTATION / HANDLING INCLUDING PROVIDING ALL NECESSARY LIFTING AND SHIFTING TRANSPORTATION ARRANGEMENT AND NECESSARY MANPOWER. IT WILL ALSO REQUIRE THE CLEANING; TRIAL ASSEMBLY AND FINAL ASSEMBLY ETC OF STRAND JACK ARRANGEMENT AND THE SAME SHALL BE IN THE SCOPE OF CONTRACTOR UNDER THE SUPERVISION OF BHEL. ALL ARRANGEMENTS SHALL BE DISMANTLED AND TO BE RETURNED TO BHEL STORE IN DULLY PACKED AND SAFE CONDITION IMMEDIATELY AFTER COMPLETION OF WORK AS PER INSTRUCTION OF BHEL.~~

5. THESE CRANES ARE OWNED OR HIRED BY BHEL. OPERATOR FOR BHEL OWNED CRANE WILL BE ARRANGED BY BHEL.

6. CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS LIKE LAYING OF SPECIAL SLEEPER BEDS AND STEEL PLATES (**ALL ARRANGED BY CONTRACTOR**), ASSEMBLY AND DISMANTLING OF HEAVY LIFT ATTACHMENT, BOOM, JIB ETC FOR MOVEMENT AND OPERATION OF THE CRANE

7. BHEL MAY OBTAIN THESE CRANES ON HIRING BASIS INCLUDING OPERATING AND MAINTENANCE CREW.

8. OPERATORS FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY.

9. **CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES (HIRED/OWNED) FOR HIS USE.**

10.CRANES PROVIDED BY BHEL WILL BE ON SHARING BASIS WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR. CRANES WILL BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

11. ABOVE T&P AND CRANES WILL BE USED FOR ERECTION OF BOTH UNITS & MILL BUNKER STRUCTURE ERECTION ALSO ON SHARABLE BASIS.

b. TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 2 weeks of issue of fax letter of intent or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

6.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

The activities for erection, testing etc. shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 6.1.1) as per requirement to commence the work of erection, testing etc. of boiler and auxiliaries and progressively augment the resources to match schedule of the project.

6.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on its designated foundation / location, of the first major permanent equipment / component / column covered in the scope of these specifications shall be recognized as “start of contract period”. Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.

The Contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:
According to the contract between BHEL and Owner the schedule of important milestones is as follows:

SL No.	Milestones	UNIT - 3
	Zero Date	
1	Boiler Erection Start	29-01-2013
2	Boiler Hydro Test- drainable	30-08-2014
3	Boiler Light Up (BLU) & Chemical cleaning completion	28-07-2015
5	Steam Blowing Completion & Safety Valve Floating	30-09-2015
6	Synchronization with coal firing Completion	31-12-2015
7	Full Load Operation	29-02-2016
8	Completion of trial run	30-04-2016

The above schedule is for Unit-3. Phasing between Unit#3 and 4 will be 06 month for all activity.

In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

6.1.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **39 (Thirty Nine months)** from the "start of contract period" as specified earlier.

The period from the commencement of preparatory work for erection till the actual "start of contract period" shall not be reckoned for the above purpose.

The progressive payment for erection, testing and commissioning on accepted price of contract value will be released as per the break up given hereinafter:

TERMS OF PAYMENT FOR STEAM GENERATOR

SL NO	Contract (Main Package) Identitification ---->	Boiler				Rotating Machine	ESP		PIPING			INSULATION
	Rate schedule Identification ------->	**Structure**	**Pressure Parts**	**Non Pressure Parts (upto ESP inlet Funnel)**	**Air Pre Heaters**	**1) RM 2) Handling Eqpts**	**ESP**	**NPP (ESP outlet Funnel to Chimney)**	**1)P-91 2) AS 3) CS (HP) 4) CS (LP) 5) SS**	**Hangers & Supports**	**Temporary Piping 1) Steam Blowing 2) Chemical Cleaning**	**1) Castable & Pourable 2) Iron Components 3) Wool mattresses 4) Aluminium sheeting**
I	**PRO RATA PAYMENTS (85%)**											
1.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION)	20	20	25		15	15	15	20	15		--
1.2	PLACEMENT IN POSITION	15	10	10		20	20	10	20	25		50
1.3	ALIGNMENT	15	15	10		20	15	15	10	15		15
1.4	WELDING/BOLTING/FIXING	15	20	15		20	20	30	15	30		20
1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)	5	10	--		--	--	--	5			--
~~1.6~~	~~On Drum Lifting~~	~~0~~										
1.7	COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS		5									

1.8	COMPLETION OF ROOF SKIN CASING		5									
1.9	INSTALLATION OF TEMPORARY PIPING										60	
1.10	DISMANTLING OF TEMPORARY PIPING, EDGE PREPARATION AND RETURN TO BHEL STORES, AREA CLEANING										25	
1.11	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG		--	25		--	--	15	10			--
1.12	COMPLETION OF FURNACE ALIGNMENT AND FIRE BALL CHECKING	5										
1.13	COMPLETION OF BACK PASS ALIGNMENT	5										
1.14	COMPLETION OF VIBRATION SNUBBERS, MECHANICAL SPACERS, CASSETTE BAFFLES, STEAM COOLED SPACERS	5										
1.15	COMPLETION OF HOPPERS ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS, ETC		--	0		--	5		--			--
1.16	COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC		--	--		--	5	--	--			--
1.17	ERECTION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES		--	--		--	5	--	--			--
1.18	EQUIPMENT TRIAL OPERATION					10						
1.19	HYDRAULIC TEST OR PNEUMATIC TEST								3			

1.20	FLOATING OF LINES, FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES (if not applicable, this portion to be clubbed along with hydraulic test/pneumatic test)								2			
1.21	**AIR PRE HEATERS (PG 52)From the total amount payable for the PGMA weight at tonnage rates, payment will be regulated as under:**											
1.21.1	Completion of Support steel squareness and levelling, Expansion arrangement, Housing panel erection and alignment, Erection, alignment and welding of pedestals				11							
1.21.2	Completion of Erection, alignment and welding of Support Bearing, Guide Bearing, Rotor post, Bottom and Top centre sections, Hot and cold end connecting plates				14							
1.21.3	Completion of erection and alignment of modules				15							
1.21.4	Completion of erection, alignment and welding of Pin Rack assembly and Drive assembly				12							
1.21.5	Completion of seals setting				17							
1.21.6	Erection, alignment and welding of Lube oil systems, Cleaning Device, Fire sensing device, Deluge and water wash lines, Observation port and lighting assemblies and other accessories				13							
1.21.7	Completion of PGMA				1							
1.21.8	Air preheater Trial Run				2							

	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	**85**	**85**	**85**	**85**	**85**	**85**	**85**	**85**	**85**	**85**	**85**
II	**STAGE/MILESTONE PAYMENTS (15%)**											
2.1	AIR & GAS TIGHTNESS TEST		--	5		--	1	5	--			--
2.2	GAS DISTRIBUTION TEST		--	--		--	1	--	--			--
2.3	CHARGING OF ESP FIELDS		--	--		--	4	--	--			--
2.4	COMPLETION OF AIR & GAS TIGHTNESS TEST FOR FURNACE		2									
2.5	BOILER HYDRAULIC TEST (DRAINABLE)	0	2									
2.6	BOILER HYDRAULIC TEST (NON DRAINABLE)		1									
2.7	Reheater Coils Hydraulic Test		2									
2.8	Clean Air Flow test					1						
2.9	Boiler Light Up	0	1		2	1			1	1		1
2.10	ABO		1	1	2	1		1	1	1		1
2.11	Steam Blowing	0		2	1	1			1	1		1
2.12.	SVF		2		2				1	1		1

2.13	Oil Flushing (TG)											
2.14	Barring Gear (TG)											
2.15	Rolling and Synchronization	0								1		
2.16	Coal Firing			2	2	2	2	2		1		1
2.17	Full Load					1			1	1		1
2.18	Trial Operation of Unit					2	1	2	2	2		2
2.19	Completion of sheet covering for Boiler roof, burner roof, lift shaft cladding, completion of gutters	3										
2.20	Completion of all drains and vents to respective locations and placement of instrument sensors after steam blowing								2			
2.21	Painting	6	0	1	1	2	2	1	2	1		0
2.22	Area cleaning, temporary structures cutting/removal and return of scrap	1	1	1	1	1	1	1	1	2		3
2.23	Punch List points/pending points liquidation	2	1	1	2	1	1	1	1	1		1
2.24	Submission of 'As Built Drawings'											
2.25	Material Reconciliation	2	1	1	1	1	1	1	1	1	15	2
2.26	Completion of Contractual Obligation	1	1	1	1	1	1	1	1	1		1

	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
	TOTAL I + II	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	NOTE: The terms of payment is only for enabling release of payment through RABs and is not indicative of the actual quantum or value of work.											

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 02 dated 20/09/2012)

8.1. For All types of works excepting works covered under sl no 8.2

8.1.1

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

However, provisions regarding Service Tax and Value Added Tax (VAT) on output services and goods shall be as per following clauses.

8.1.2 Service Tax & Cess on Service Tax

Contractor's price/rates shall be exclusive of Service Tax and Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate (presently 12.36 %) on the admitted bill value.

Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,

1. **The name, address and the registration number of the contractor,**
2. **The name and address of the party receiving taxable service,**
3. **Description, classification and value of taxable service provided and,**
4. **The service tax payable thereon.**

All the Four conditions shall be fulfilled in the invoice before release of service tax payment.

Wherever, more than one route/option are available for discharge of service tax liability under a particular service, (e.g. "works contract Service"), contractor shall obtain prior written consent from BHEL site before billing the amount towards Service Tax.

8.1.3 VAT (Sales Tax /WCT)

As regards Value Added Tax (VAT)/CST on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) applicable as per local laws, the price quoted by the contractor shall be inclusive of the same and in no case input or output VAT/CST will be reimbursed extra.

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of

VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

Deduction of tax at source shall be made as per the provisions of law and is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made.

Further, if BHEL, at the instance of customer or otherwise adopts the specific route for discharging output VAT liability itself, benefit of the reduction in liability of the contractor will be passed on to BHEL.

In case, BHEL is forced to pay any VAT liability on behalf of contractor, the same will be recovered from contractor's bill or otherwise as deemed fit

8.2 'Enabling Works'

~~The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.~~ **~~(i.e. rates quoted by bidder shall be inclusive of Service Tax, VAT/WCT and all other taxes and duties)~~**

~~However, Since the proposed work is in the nature of 'Works Contract service' as per Service tax law, Hence, For non-corporate contractors being Individual, HUF, Proprietary Firm, Partnership Firm or Association of Persons (AOP), BHEL shall recover the applicable Service Tax under reverse charge mechanism from the contractor and remit the same with the Government as per the provisions of Law. Necessary advice/confirmation of remittance shall be issued to the contractor. The contractor shall not be eligible for any refund/reimbursement of such service tax from BHEL. It shall be the responsibility of the contractor to submit proper invoice giving all the requisite details as per Service Tax Law for the determination of the service tax liability of BHEL under reverse charge mechanism. BHEL reserves the right to determine such liability based on the invoice submitted by the contractor or otherwise independently and remittance of the same with the Government.~~

8.3 New Taxes/Levies

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on input goods/services/work shall be made. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

8.4 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.

In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-

i. It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.

ii. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on the extant of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.

iii. It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.

iv. It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.

SPECIFIC INCLUSIONS

SUPPLY OF PRIMER & PAINTS AS PER PAINTING SPECIFICATION MENTIONED IN ANNEXURE-III OF TECHNICAL SPECIFICATION.

10.0 EXCLUSIONS

The following works are specific exclusions from the scope of work under erection, testing & commissioning of tender specification-

i) Sub-delivery items and electrical components such as push-buttons, junction boxes etc.
ii) E&C work of cable trays, cables and earthing etc
iii) Control panels, EPMS, MCC etc.
iv) Electrical & C&I items of handling system (PG 99)
v) All electrical and control & instrumentation items except those specified elsewhere in these specifications.
vi) Civil works except to the extent specifically indicated elsewhere in this tender.
viii) Pneumatic copper tubing and fittings thereof.
ix) Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
x) Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications.

APPENDIX -1
LIST OF APPLICABLE PGMA'S FOR ONE UNIT

TRICHY SUPPLY

Sl No.	PGMA	Description	Weight (in Kg)
Structures (Rate Schedule Identifier Sl No. 1.1 of Rate Schedule)			
1	35-010	Foundation Materials-Boiler	32,000.000
2	35-111	Main Columns Left 1st Pass	5,99,000.000
3	35-112	Main Columns Lert 2nd Pass	3,34,000.000
4	35-121	Maincolumns Right 1st Pass	5,30,000.000
5	35-122	Main Columns Right 2nd Pass	3,34,000.000
6	35-130	Main Columns Middle	4,33,000.000
7	35-140	Auxiliary Columns-Left Side	3,40,000.000
8	35-150	Auxiliary Columns-Rightside	3,40,000.000
9	35-190	Girder Pin Connections	20,000.000
10	35-211	Ceiling Structuremain Girders 1st Pass	4,43,000.000
11	35-212	Ceiling Structuremain Girders 2nd Pass	4,03,500.000
12	35-213	Ceil Struct -Cross Welded Beams 1st Pass	1,11,000.000
13	35-214	Ceil Struct -Cross Welded Beams 2nd Pass	95,000.000
14	35-221	Ceiling Structure Rolled Beam 1st Pass	58,000.000
15	35-222	Ceiling Structure Rolled Beam 2nd Pass	56,000.000
16	35-231	Ceiling Structure Horbracing 1st Pass	9,000.000
17	35-232	Ceiling Structure Horibracing 2nd Pass	8,500.000
18	35-311	Horizontal Bracing I Pass I Mbl	18,000.000
19	35-312	Horiz Bracing Ii Pass Imbl	25,250.000
20	35-321	Horiz Bracing I Pass Ii Mbl	22,000.000
21	35-322	Horiz Bracing Ii Pass Ii Mbl	35,000.000
22	35-331	Horiz Bracing I Pass Iii Mbl	27,000.000
23	35-332	Horiz Bracing Ii Pass Iii Mbl	43,000.000
24	35-341	Horiz Bracing I Pass Iv Mbl	24,500.000
25	35-342	Horiz Bracing Ii Pass Iv Mbl	28,000.000
26	35-351	Horiz Bracing I Pass V Mbl	21,000.000
27	35-352	Horiz Bracing Ii Pass V Mbl	34,000.000
28	35-361	Horiz Bracing I Pass Vi Mbl	22,000.000
29	35-362	Horiz Bracing Ii Pass Vi Mbl	28,500.000
30	35-381	Land Platform Lower	35,700.000
31	35-382	Land Platform Middle	35,700.000
32	35-383	Land Platform Upper	35,700.000
33	35-384	Land & Conn Plat Tier-4	35,700.000

34	35-385	Land & Conn Plat Tier-5	35,700.000
35	35-386	Land & Conn Plat Tier-6	35,700.000
36	35-387	Land & Conn Plat Tier-7	35,700.000
37	35-390	MISC STRUCTURES	96,500.000
38	35-441	Horizontal Beams-Lower	52,140.000
39	35-442	Horizontal Beams Middle	52,140.000
40	35-443	Horizontal Beams-Upper	52,140.000
41	35-444	Fbhe Piping Supports	52,140.000
42	35-445	Ash Cooler Supports	52,140.000
43	35-446	External Critical Piping Supports	52,140.000
44	35-447	Horil Beams First Pass-Tier-7	52,140.000
45	35-451	Horizontal Beams - Lower 2nd Pass	42,000.000
46	35-452	Horizontal Beams - Middle - 2nd Pass	42,000.000
47	35-453	Horizontal Beams - Upper - 2nd Pass	42,000.000
48	35-454	Hor Beam-Second Pass- Tier-4	42,000.000
49	35-455	Hor Beam-Second Pass- Tier-5	42,000.000
50	35-456	Hor Beam-Second Pass- Tier-6	42,000.000
51	35-457	Hor Beam-Second Pass- Tier-7	42,000.000
52	35-511	Front Bracing-Lower	18,860.000
53	35-512	Front Bracing Middle	18,860.000
54	35-513	Front Bracing-Upper	18,860.000
55	35-514	Deaerator Front Bracing	18,860.000
56	35-515	Front Bracing-Tier-5	18,860.000
57	35-516	Front Bracing-Tier-6	18,860.000
58	35-517	Front Bracing-Tier-7	18,860.000
59	35-521	Side Bracing-Lower	65,285.000
60	35-522	Side Bracing Middle	65,285.000
61	35-523	Side Bracing-Upper	65,285.000
62	35-524	Deaerator Side Bracing	65,285.000
63	35-525	Side Bracing-Tier-5	65,285.000
64	35-526	Side Bracing-Tier-6	65,285.000
65	35-527	Side Bracing-Tier-7	65,285.000
66	35-531	Rear Bracing-Lower	30,715.000
67	35-532	Rear Bracing- Middle	30,715.000
68	35-533	Rear Bracing-Upper	30,715.000
69	35-534	Rear Bracing-Tier-4	30,715.000
70	35-535	Rear Bracing-Tier-5	30,715.000
71	35-536	Rear Bracing-Tier-6	30,715.000
72	35-537	Rear Bracing-Tier-7	30,715.000

73	35-700	Bulk Bps Com Pg35,36	45,000.000
74	35-701	Hsfg Fasteners	10,000.000
75	35-811	Floor Grills And Guard Plate	1,64,500.000
76	35-821	Stairs - Lower	11,000.000
77	35-822	Stairs - Middle	8,900.000
78	35-823	Stairs - Upper	9,500.000
79	35-851	Hand Rails And Posts	35,000.000
80	35-993	Consumablesanderectionmaterials	9,500.000
81	35-995	Chute Pipe And Ladders	31,000.000
82	36-110	Columns Near Air Pre Heaters	2,83,000.000
83	36-130	Middle Columns In Boiler	55,000.000
84	36-150	Beamsandbracings Near Air Pre Heater	3,60,500.000
85	36-311	Main Floor I Mbl 1st Pass	13,000.000
86	36-312	Main Floor I Mbl 2nd Pass	53,000.000
87	36-313	Non-Mbl Floor Between Mbl Iandii	31,000.000
88	36-314	Non-Mbl Floor Between Mbl Iandii	48,000.000
89	36-315	Non-Mbl Floor Between Mbl Iandii	8,000.000
90	36-316	Non-Mbl Floor Between Mbl Iandii	15,000.000
91	36-321	Main Floor Ii Mbl Ist Pass	6,500.000
92	36-322	Main Floor Ii Mbl 2nd Pass	1,00,000.000
93	36-323	Non-Mbl Floor Between Mbl Iiandiii	1,02,000.000
94	36-324	Non-Mbl Floor Between Mbl Iiandiii	45,500.000
95	36-325	Non-Mbl Floor Between Mbl Iiandiii	55,000.000
96	36-326	Non-Mbl Floor Between Mbl Iiandiii	49,000.000
97	36-331	Main Floor Iii Mbl 1st Pass	40,000.000
98	36-332	Main Floor Iii Mbl 2nd Pass	1,49,500.000
99	36-333	Non-Mbl Floor Between Mbl Iii and iv	53,000.000
100	36-334	Non-Mbl Floor Between Mbl Iii and iv	1,02,000.000
101	36-335	Non-Mbl Floor Between Mbl Iii and iv	47,000.000
102	36-336	Floor In Ii Pass	42,500.000
103	36-337	Floor In I Pass	41,000.000
104	36-338	Floor In Ii Pass	1,29,000.000
105	36-341	Main Floor Iv Mbl 1st Pass	25,500.000
106	36-342	Main Floor Iv Mbl 2nd Pass	31,000.000
107	36-343	Non-Mbl Floor Between Mbl Ivandv	14,000.000
108	36-344	Non-Mbl Floor Between Mbl Ivandv	76,000.000
109	36-345	Non-Mbl Floor Between Mbl Ivandv	11,500.000
110	36-346	Non-Mbl Floor Between Mbl Ivandv	37,000.000
111	36-351	Main Floor V Mbl Ist Pass	19,000.000

112	36-352	Main Floor V Mbl Ii Nd Pass	27,000.000
113	36-353	Non-Mbl Floor Between Mbl Vandvi	76,000.000
114	36-354	Non-Mbl Floor Between Mbl Vandvi	82,000.000
115	36-355	Non-Mbl Floor Between Mbl Vandvi	82,000.000
116	36-356	Floor In I & Ii Pass	67,500.000
117	36-361	Main Floor Vi Mbl 1st Pass	18,000.000
118	36-362	Main Floor Vi Mbl 2ndpass	11,000.000
119	36-363	Non_Mbl Floor Above Mbl Vi	64,500.000
120	36-364	Non Mbl Floor Above Mbl Vi	63,000.000
121	36-365	Non Mbl Floor Above Mbl Vi	10,000.000
122	36-366	Floor In I & Ii Pass	6,200.000
123	36-391	Miscellaneous Platforms-Part I	1,57,000.000
124	36-392	Miscellaneous Platforms-Part Ii	64,000.000
125	36-393	Miscellaneous Platforms Part Iii	76,125.000
126	36-394	Miscellaneous Platforms Part Iv	28,000.000
127	36-395	Miscellaneous Platforms Part V	80,500.000
128	36-610	Boiler Roof Structure	2,03,000.000
129	36-611	Boiler Roof Sheeting	35,500.000
130	36-613	Rain Water Pipes And Gutter	30,000.000
131	36-620	Boiler Side Cladding Structure	1,00,000.000
132	36-621	Boiler Side Cladding Sheeting	20,500.000
133	36-740	Posts And Hangers	65,000.000
134	36-811	Floorgrillsandguardplates-Lower	1,64,000.000
135	36-812	Floorgrillsandguardplate Middle	1,73,000.000
136	36-813	Floorgrillsandguardplates-Upper	2,24,000.000
137	36-814	Floorgrillsandguardplate Miscellaneous	87,000.000
138	36-820	Stairs And Ladders	20,500.000
139	36-851	Handrails And Posts Lower	15,000.000
140	36-852	Handrails And Posts Middle	15,000.000
141	36-853	Handrails And Posts Upper	63,000.000
142	36-993	Consumablesanderecition Materials	8,500.000
143	38-210	Inter Conn Platformsbetn Boiler/Elevat	4,500.000
144	38-299	Mill Handling Monorails	2,48,000.000
145	38-310	Conn Platforms To Mill Deaerator Bay	2,57,000.000
146	38-381	Eco Handling Structure	67,000.000
147	38-410	Mill Maintanance Platforms	1,17,000.000
148	38-510	Lift Beams And Bracings	86,000.000
149	38-610	Elevator Cladding Structure	54,000.000
150	38-611	Elevator Cladding Sheeting	38,000.000

151	38-710	Lift Machine Room Detailsandmisc Struct	43,000.000
152	38-810	Floorgrills And Guard Plate	1,09,500.000
153	38-820	Stairs And Ladders	1,600.000
154	38-850	Hand Rails And Hand Rail Posts	31,000.000
155	38-993	Consumables And Erection Materials	4,500.000
156	08-001	Furnace Upper Buckstay-Frontand Rear	64,000.000
157	08-003	Furnace Upp.Inter Buckstay- Side	1,17,500.000
158	08-006	Furnace Inter.Buckstay	4,21,500.000
159	08-007	Furnace Lower Buckstays	53,000.000
160	08-111	Furnace Rear Arch Buckstay	18,125.000
161	08-380	Furnace Bottom Support	1,85,000.000
162	08-382	Furnace Bottom Support Rear	1,85,000.000
163	08-501	Furnace Backpassbuckstayfrontand Rear	1,96,000.000
164	08-503	Furnace Back Pass Buckstayside	1,97,000.000
165	08-901	Furnace Key Buckstay Upper	11,500.000
166	08-907	Furnace Key Buckstay Lower	1,100.000
167	08-910	Ex.Movement Measurement Components.	1,050.000
		SUB TOTAL (STRUCTURES - TRY SUPPLY)	1,32,99,250

Pressure Parts (Rate Schedule Identifier Sl No. 1.2 of Rate Schedule)			
Sl No.	**PGMA**	**Description**	**Weight (in KG)**
1	04-147	Supprts for Collectr & Separatr Vessel	22,700.000
2	04-321	Sep Vessels With Intern And Attach	22,100.000
3	04-323	Coll Vessels With Intern And Attach	37,800.000
4	05-137	Inlet Front Lower Ww Header	14,700.000
5	05-147	Inlet Rear Lower Ww Header	14,700.000
6	05-155	Inlet Side Lower Ww Header	8,900.000

7	05-227	Waterwall Rear Hanger Outlet Header	11,500.000
8	05-231	Outlet Front Upper Ww Header	9,800.000
9	05-251	Outlet Side Upper Ww Header	17,500.000
10	05-327	Rear Intermediate Hanger Header	11,100.000
11	05-330	Front Intermediate Header	11,100.000
12	05-350	Side Inter Header	19,800.000
13	06-400	Burner Panels	47,300.000
14	06-500	SOFA panel opening	9,300.000
15	06-731	Front Upper Ww Pnl + Atch	83,400.000
16	06-734	Front Intermediate Ww Pnl + Atch	1,65,400.000
17	06-737	Front Ww Lower Panel	62,200.000
18	06-741	Rear Upper Ww Pnl + Atch	41,800.000
19	06-744	Rear Intermediate Ww Pnl + Atch	1,65,400.000
20	06-747	Rear Lower Ww Pnl + Att	62,200.000
21	06-751	Side Upper Ww Pnl + Atch	1,66,800.000
22	06-753	Side Intermediate Ww Pnl + Atch	2,47,700.000
23	06-755	Side Lower Ww Pnl + Atch	49,600.000
24	07-110	Separator Collectg Vessel Connctg Link	42,500.000
25	07-125	Mixing Sphere	2,200.000
26	07-215	Relief Tubes From Side Wall Outlet Hea	39,400.000
27	07-216	Relief Tubes From Rear Hanger Header	21,800.000
28	07-218	Relief Tubes From Front Outlet Header	6,800.000
29	07-223	Furnace Screen Tubes	73,600.000
30	07-231	Lower Corner Transition Tubes	2,400.000
31	07-232	Upper Corner Transition Tubes	10,400.000
32	07-402	Ww Front Header Suspension	3,000.000
33	07-403	Ww Side Header Suspension	1,400.000
34	07-405	Ww Screen Header Suspension	27,200.000
35	07-409	Furnace Wall Supports Front	30,500.000
36	07-431	Riser Tube Support	3,100.000
37	07-460	Furnace Spiral Wall supports Misc items	22,700.000
38	07-461	Furnace wall Supports rear	20,500.000
39	07-462	Furnace wall Supports Sides L & R	31,800.000
40	07-993	Consumables & Erection Materials	1,300.000
41	09-001	Seal Boxes For Furnace Opening	17,200.000
42	09-002	Seal Boxes For Instrument Inserts	1,800.000

43	09-003	Material For Instrument Inserts	600.000
44	10-174	Vertical Spaced Sh Centre Inlet Header	14,900.000
45	10-178	Vertical Platen Sh 1nlet Header	13,000.000
46	10-182	Sh Rear Wall Inlet Header	14,100.000
47	10-183	Sh Frontwall Inlet Header	21,600.000
48	10-184	Sh Extended Side Wall Inlet Header	10,700.000
49	10-185	Sh Rear Roof Inlet Header	15,900.000
50	10-191	Sh Radiant Wall Roof Inlet Hdr	13,700.000
51	10-194	Stm cooled furnace arch Supprt Inlet Hdr	13,200.000
52	10-274	Vertical Spaced Sh Centre Outlet Heade	34,800.000
53	10-278	Vertical Platen Sh Outlet Header	17,300.000
54	10-283	Sh Frontwall Outlet Header	19,100.000
55	10-284	Sh Extended Side Wall Outlet Header	9,000.000
56	10-285	Front Wall Sh Outlet Hdr	15,600.000
57	10-291	Sh Radiant Wall Roof Outlet Hdr	35,200.000
58	10-294	Stm cooled Furn Arch Supprt Outlet Hdr	14,000.000
59	10-687	Sh Radiant Wall Junction Header	14,800.000
60	11-074	Sh Vert Spcd Front Coil Assy-Left	2,35,000.000
61	11-078	Sh Vertic1l Platen Coil Left	2,47,100.000
62	11-374	Sh Vertical Spaced Coil + Header	2,26,600.000
63	11-378	Sh Vertical Platen Coil + Header	16,900.000
64	11-606	Sh Front Upper Panels	35,700.000
65	11-608	Sh Front Lower Panels	28,800.000
66	11-684	Sh Extended Side Wall Panels	25,800.000
67	11-694	S.H.Extended Bottom Panels	13,800.000
68	11-716	Sh Rear Upper Pnl + Atch	40,400.000
69	11-718	Sh Rear Lower Pnl + Atch	28,300.000
70	11-767	Sh Stm Cool Side Wall Panel Upper Left	40,500.000
71	11-769	Sh Stm Cool Side Wall Ponel Lower Left	42,300.000
72	11-787	Sh Rear Roof Panel + Attachment	22,900.000
73	11-791	Sh Radiant Wall Roof Panel + Attachmen	32,200.000
74	11-918	Sh Stm Cool Rear Wall Panel Lower Righ	22,700.000
75	11-967	Sh Stm Cool Side Wall Panel Upper Righ	40,500.000
76	11-969	Sh Stm Cool Side Wall Panel Lower Righ	42,300.000
77	11-987	Sh Stm Cool Rear Roof Panel Right	19,200.000
78	11-991	Sh Radiant Roof Panel Right	29,200.000

79	12-178	Sh Vertical Platen Inlet Pipe	43,400.000
80	12-184	Roof Inlet Sh Pipes	48,500.000
81	12-187	Sh Inlet Rear Roof Pipe	31,500.000
82	12-515	Sh Rear Hanger Tube	1,88,000.000
83	12-619	Sh Horizontal Support Tubes	68,800.000
84	12-803	Sh Steam Cooled Spacer Tubes	1,500.000
85	12-805	Super Heater Hanger Tubes	45,100.000
86	12-850	Sh Conn Pipes-Saturated	19,800.000
87	12-852	Sh Desh Links	27,300.000
88	12-900	Sh Desh	7,100.000
89	12-903	5h Miscl Components	8,400.000
90	12-906	Sh Suprts For Lines & Links	2,000.000
91	12-914	Suspension Of Sh Radiant Roof Headers	4,900.000
92	12-917	Suspension Of Radiant Roof	15,800.000
93	12-924	Suspension Of Sh Back Pass Headers	30,500.000
94	12-927	Suspension Of Rear Roof	12,500.000
95	12-928	Suspension Of Sh Rear Wall	68,400.000
96	12-944	Suspension Of Sh Platen Headers	4,300.000
97	12-948	Suspension Of Vertical Spaced Assembly	44,700.000
98	12-954	Suspension Of Vertical Spaced Headers	5,800.000
99	12-968	Suspension Of Platen Assembly	29,500.000
100	12-991	Indegenous Electrodes	1,000.000
101	12-992	Imported Electrodes	2,100.000
102	12-993	Consumables & Erection Materials	3,400.000
103	15-136	Ltrh Inlet Header	10,300.000
104	15-177	Rh Vertical Spaced Rear Inlet Header	12,500.000
105	15-236	Ltrh Outlet Header	13,300.000
106	15-279	Rh Vertical Platen Front Outlet Header	31,800.000
107	16-079	Rh Ver Platen Front Coil Asy Left	87,500.000
108	16-201	RH Upper coil + Atch	1,57,900.000
109	16-202	RH Inter coil + Atch	2,89,300.000
110	16-203	RH Lower coil + Atch	87,300.000
111	16-379	Rh Ver Platen Front Coil Asy Right	72,800.000
112	17-174	Rh Vertical Spaced Inlet Pipe	35,500.000
113	17-776	Rh Ver Spaced Centre Cross Over Tube	1,14,100.000
114	17-807	Rh Steam Cooled Spacers	200.000

115	17-903	Rh Miscellaneous Components	69,100.000
116	17-904	Rh Hdr Suprts & Suspensions Above Roof	6,200.000
117	17-906	Rh Suprts For Lines & Links	2,200.000
118	17-919	Rh Front Suspension	23,500.000
119	17-991	Indegenous Electrodes	600.000
120	17-992	Rh Site Electrodes Imported	900.000
121	19-701	Inlet Eco Headers	17,700.000
122	19-702	Outlet Eco Headers	24,400.000
123	19-814	Economisercoil Assy Upper Left	2,31,500.000
124	19-824	Economiser Coil Assy Lower Left	3,15,100.000
125	19-850	Eco Feed Pipe	99,400.000
126	19-851	Eco Links To Drum	74,800.000
127	19-852	Hp Economiser-I To Economiser-Ii Link	19,500.000
128	19-884	Eco.Coil Assy Intermediate Left	2,52,000.000
129	19-903	Eco. Miscellaneous Components	1,42,700.000
130	19-905	Eco Suprts & Suspensions Below Roof	400.000
131	19-906	Eco Suprts For Lines & Links	27,400.000
132	19-907	Eco Supports/Feed Pipe Suspension	13,400.000
133	19-914	Econ-Miser Coil Assy Upper Right	2,29,300.000
134	19-924	Economiser Coil Assy Lower Right	2,84,800.000
135	19-984	Economiser Coil Middle Right	2,49,600.000
136	19-991	Indegenous Electrodes	100.000
137	19-992	Imported Electrodes	100.000
138	21-600	Soot Blower Piping And Fittings	22,700.000
139	21-601	Sootblower Piping Supports	12,450.000
140	21-700	Bulked Bps Components For Sb Piping	500.000
141	21-800	Sb Valves (Bhel)	3,700.000
142	21-825	Sb Valves (Sub Delivery)	1,000.000
143	21-850	Soot Blower Safety Valve (Bhel)	60.000
144	21-992	Imported Electrodes	135.000
145	24-316	Rh Desh	3,600.000
146	24-805	Link To Boiler Recircu System	49,000.000
147	24-807	Recircu Pump Suction Line	13,500.000
148	24-808	Recircu Pump Discharge Line	11,250.000
149	24-809	Boilr Recircu Link From Bf Line	6,250.000
150	24-810	H And S For Startup System	26,400.000

151	24-811	Furnace Link To Flash Tank/ Hwl1 & Hwl2	48,200.000
152	24-812	Trim Piping - Import	6,000.000
153	24-815	Desuperheater Pipes	35,350.000
154	24-855	Recirculating Pumb Comp	13,200.000
155	24-860	Valves (Bhel)	29,800.000
156	24-865	Valves Subdelivery	3,800.000
157	24-866	Valves For Boiler Piping-Sd	28,700.000
158	24-867	Valves For Startup Recircu Sys	15,100.000
159	24-880	Safety Valves	2,100.000
160	24-881	Safety Valves And Erv - Sd	4,200.000
161	24-882	Safety Values Sub_Dely	3,600.000
162	24-885	Silencers	43,600.000
163	24-886	Silencers - Sd	1,000.000
164	24-950	Special Tools	150.000
165	24-955	Lapping Tools For Sv&Erv	50.000
166	24-960	Lapping Tools For Conventional Valves(	30.000
167	24-992	Imported Electrodes	900.000
168	24-993	Consumables & Erection Materials	30.000
169	24-994	Name Plates	275.000
170	28-220	Doors	13,000.000
171	31-010	Skin Casing Comps Welded To Pressure P	1,000.000
172	31-104	Furnace Rear Arch Skin Casing	2,500.000
173	31-993	Erection Materials	2,000.000
174	32-010	Fixing Comp For Blr Pr Parts Insul	12,000.000
175	32-110	Fixing Comp For Blr Mountings Insul	4,500.000
176	32-120	Fixing Comp For Sb Pipes Insul	1,500.000
177	32-310	Fixing Comp For Air Ducts Insul	97,000.000
178	32-410	Fixing Comp For Ah And Gas Ducts Insul	28,000.000
179	32-510	Fixing Comp For Id Ducts Insul	1,45,000.000
180	32-710	Fixing Comp For Oil System Insul	3,000.000
181	42-001	Pneumatic Fittings	250.000
182	42-002	Steam Blow Materials	2,500.000
183	42-005	Instrument Fittings	550.000
184	42-010	Lfo Pump Set	7,000.000
185	42-020	Hfo Pump Set	12,200.000
186	42-030	Hfo Heater Set	35,500.000

187	42-046	Drain Oil Pump-Motor Assy	2,200.000
188	42-065	Drain Oil Tank	5,510.000
189	42-070	Burner Station Skid Assembly	7,100.000
190	42-120	Piping, Pump House-Fuel Oil	14,500.000
191	42-128	Piping,Pump House Steam - Ibr	2,000.000
192	42-150	Piping, Operating Floor Hfo & Tracer	8,800.000
193	42-152	Piping,Opr'G Floor Lfo	1,600.000
194	42-154	Piping,Opr'G Floor Drain Oil	2,200.000
195	42-157	Piping,Opr'G Floor Atm Air	2,100.000
196	42-158	Piping,Opr'G Floor Steam-Ibr	4,700.000
197	42-200	Subdelivery Fuel Oil System	3,900.000
198	42-300	Bhel Valve F.O. System	1,300.000
199	42-358	Bhel Valve,Opr'G Floor Stm-Ibr	650.000
200	42-700	Bps Fasteners	1,400.000
201	42-992	Imported Electrodes	50.000
202	45-801	Windbox And Sofa - Tube Attachment Assy	28,000.000
203	45-802	Windbox Assembly - 32" Width	75,000.000
204	45-804	Windbox - Sofa Assembly	24,000.000
205	45-805	Windbox Suprt and Air Cylinder Mounting	49,000.000
206	97-297	Mtm Clamps And Pads	100.000
207	18-001	Furnace Roof Skin Casing	18,100.000
208	18-002	First Pass Roof Skin Casing	200.000
209	18-010	Pr Pts Attachmnts In Furn Roof Skn Cas	400.000
210	20-051	Long Retractable Soot Blower T30 Mk Ii	69,720.000
211	20-054	Wall Box Non Pressurised For Lrsb Mk I	1,203.000
212	20-201	Wall Deslagger Rw5e	13,978.000
213	20-204	Wall Box Non Pressurised For Rw5e	2,118.000
214	20-511	Da Head Valve Assy	113.000
215	20-794	Wall Box Non 7ressurised For Temp Prob	63.000
216	20-962	Temp Probe Duplex With Power Trcack&Ac	1,960.000
217	20-998	Special Tools For Soot Blowers	7.000
		SUB TOTAL (Pressure Parts -TRY SUPPLY)	79,37,702.000

NON Pressure Parts (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)

Sr. No.	PGMA	PGMA description	Weight (kg)
1	30-103	Seal Plate Assy	4,500.000

2	30-105	Furnace Bottom Enclosure Framing	53,000.000
3	30-211	Furnace Rear Arch Enclosure Framing	5,300.000
4	30-215	Main Boiler	40,000.000
5	30-219	Vertical Roof Enclosure Framing	95,000.000
6	30-223	Gas Distribution Baffles	500.000
7	30-233	First Pass Deck Sprt And Seal	34,000.000
8	30-234	Second Pass Deck Sprt And Seal	32,000.000
9	30-235	Enclosure Support Steel	47,000.000
10	41-350	Air Cooled Oil Gun Assy,	700.000
11	41-390	Oil Gun Vice Assy And Rack	1,500.000
12	41-500	High Energy Arc Ignitor	800.000
13	43-004	Assy Comp Scanner & Gun Air System	1,200.000
14	43-005	Assy Comp Mill Seal Air System	12,400.000
15	43-104	M/C Comp Scanner & Gun Air System	21,300.000
16	43-105	M/C Comp Mill Seal Air System	1,03,500.000
17	43-200	Subdel,Ignitor&Scanner Air System	8,800.000
18	47-261	Fuel Pipe Supports	57,100.000
19	47-263	Fuel Pipe Coupling Coller & Orifice	51,000.000
20	47-266	Fuel Pipe St Pipes For Mill A & B	94,100.000
21	47-267	Fuel Pipe St Pipes For Mill C & D	1,04,300.000
22	47-268	Fuel Pipe St Pipes For Mill E & F	1,72,700.000
23	47-269	Fuel Pipe St Pipes For Mill G & H	1,06,100.000
24	48-012	Rect Duct Bet F.D Fan And Airheater	2,05,000.000
25	48-014	Expn Piecesbet F.D Fan And Airheater	9,000.000
26	48-015	Supportsetcbet F.D Fan And Airheater	10,800.000
27	48-019	Foundation Materials	2,500.000
28	48-112	Rect Ducts Pri Fan To Airheater Prisid	1,98,000.000
29	48-114	Expn Piecespri Fan To Airheater Prisid	3,700.000
30	48-115	Supportsetcpri Fan To Airheater Prisid	13,000.000
31	48-141	Seal Air Hag And Id Fan Outgate	7,000.000
32	48-142	Rect Duct Coldairbus(Temp Air To Mill	62,700.000
33	48-144	Expn Piecescoldairbus(Temp Air To Mill	4,000.000
34	48-145	Supportsetccoldairbus(Temp Air To Mill	4,000.000
35	48-200	Instrument Tappings On Ducting	6,000.000
36	48-202	Rect Ductsairheater To Windboxduct	2,34,000.000
37	48-204	Expn Piecesairheater To Windboxduct	44,500.000

38	48-205	Supportsetcairheater To Windboxduct	39,100.000
39	48-207	Flowmeters For Secondary Air Flow	29,700.000
40	48-212	Wind Box Connecting Ducts - Rectangula	63,300.000
41	48-214	Expn Pieceswindbox Connecting Duct	6,300.000
42	48-222	Rect Duct-Airheater Prisidetohotair B	1,07,000.000
43	48-224	Expn Piecesairheater Prisidetohotair B	10,900.000
44	48-225	Supports For Hot P.A (Ah To Hot Bus)	13,400.000
45	48-232	Rect Ducts Hot Air Busduct(Hotairtomil	88,300.000
46	48-234	Expn Pieceshot Air Busduct(Hotairtomil	22,400.000
47	48-235	Support Hot Air Bus	16,100.000
48	48-262	Rect Duct Airhtr Toprinozzle And Seca	47,200.000
49	48-264	Expn Piecesairhtr Toprinozzle And Seca	8,700.000
50	48-265	Supportsetcairhtr Toprinozzle And Seca	7,600.000
51	48-382	Rect Duct Economiser To Airheater2nop	2,51,000.000
52	48-384	Expn Pieceseconomiser To Airheater2nop	87,000.000
53	48-385	Supportsetceconomiser To Airheater2nop	60,500.000
54	48-386	Duct Below Divertor	82,000.000
55	48-388	Sq Duct,Economiser-Pri Ah	24,000.000
56	48-432	Rect Duct Airheater Boiler Outlet-Gas	2,50,000.000
57	48-434	Expn Piecesairheater Boiler Outlet-Gas	49,300.000
58	48-435	Supportsetcairheater Boiler Outlet-Gas	15,600.000
59	48-462	Rect Duct Boiler Outlet To Elec Precp	3,50,000.000
60	48-464	Expn Piecesboiler Outlet To Elec Precp	4,85,000.000
61	48-465	Bof To Ep Ducting Supports	79,300.000
68	48-662	Rect Duct Hot Air Bus To Mills	1,20,000.000
69	48-664	Expn Pieceshot Air Bus To Mills	3,900.000
70	48-665	Supports For Hot Pa To Mills	12,100.000
71	48-667	Venturi-Primary Air Flow	27,000.000
72	48-700	Bulked Bps Components	8,500.000
75	48-993	Erection Materials	19,500.000
76	99-300	Cir.Pump,Feed Pump,Handling Equipment	4,000.000
77	99-400	Airheater,Steamcoil Airheater Handlg E	7,000.000
78	99-512	Furnace Cradle 2 Wall Covrage Electr	3,000.000
79	99-600	Fo System Handling Equipment	1,500.000
80	30-103	Seal Plate Assy	4,500.000
81	30-105	Furnace Bottom Enclosure Framing	53,000.000

82	30-211	Furnace Rear Arch Enclosure Framing	5,300.000
83	30-215	Main Boiler	40,000.000
84	30-219	Vertical Roof Enclosure Framing	95,000.000
85	30-223	Gas Distribution Baffles	500.000
86	30-233	First Pass Deck Sprt And Seal	34,000.000
87	30-234	Second Pass Deck Sprt And Seal	32,000.000
88	30-235	Enclosure Support Steel	47,000.000
89	37-010	Blr Outer Casing Components	52,000.000
90	37-810	Blr Outer Casing	58,000.000
91	97-593	Elevator & Accessories	22,000.000
92	97-599	Pneumatic Actuator In Air&Flue Gas Sys	2,500.000
93	96-588	Electrical Actuators	6000.000
		Sub total (non pressure part up to ESP inlet funnel) TRY SUPPLY	4703000.000
Rotating Machine (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)			
Sr. No.	**PGMA**	**PGMA description**	**Weight (kg)**
1	65-736	36 Inch Gravimetric Feeder	67,000.000
2	67-204	Raw Coal Gates Needle Type	4,100.000
3	67-272	Coal Valve-36 Inch Motor Operated	8,000.000
4	67-276	Raw Coal Gate Chain Op 36" Circular	8,900.000
5	67-283	Feeder Outlet Isolation Gate	11,100.000
6	67-801	Down Spout	10,100.000
7	67-802	Bunker Emptying Chute	27,200.000
8	67-803	Feed Pipe To Mill	20,000.000
9	48-891	Primary Air Preheater	5,60,000.000
10	48-892	Secondary Air Preheater	10,00,000.000
		SUB TOTAL TRICHY	17,16,400.000
Handling Equipment of Rotating Machines (Rate Schedule Identifier Sl No. 2.2 of Rate Schedule)			
Sr. No.	**PGMA**	**PGMA description**	**Weight (kg)**
1	99-099	Misc Chain Pully Blocks	100.000
2	99-100	Fan Handling Equipment	23,000.000
		SUB TOTAL (Handling Equipment of Rotating Machines - TRY SUPPLY)	23100.00
Non Pressure Parts (ESP Outlet funnel to chimney)(Rate Schedule Identifier Sl No. 3.2 of Rate			

Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	39-012	Foundation Materials I.D.Duct Supports	41,000.000
2	39-101	Columns Frames Before Esp- Left	2,55,000.000
3	39-102	Columns Frames Before Esp -Right	4,38,000.000
4	39-141	Cols Frames Near Id Fan-Left	2,20,000.000
5	39-142	Cols Frames Near Id Fan - Right	4,29,000.000
6	39-150	Col Frames Betn I.D.Fan And Chimney	2,33,500.000
7	39-300	Platforms - External Structure	3,76,000.000
8	39-301	Struc And Platform For Fans	3,500.000
9	39-302	Struc For Motor Hood Covering	7,000.000
10	39-304	Fan Handling Structure For Fd Fan	16,000.000
11	39-305	Fan Handling Structure For Pa Fan	34,000.000
12	39-306	Fan Handling Structure For Id Fan	61,000.000
13	39-700	Hsfg Fasteners For Pg 39	1,500.000
14	39-810	Floor Grill	1,25,000.000
15	39-820	Stairs	20,000.000
16	39-850	Hand Rail And Hand Rail Posts	35,500.000
17	39-993	Consumables And Erection Materials	9,600.000
18	48-482	Rect Ducts-Elec Prptr/M.S To Inddraftf	49,400.000
19	48-484	Expn Pieceselec Prptr/M.S To Inddraftf	36,000.000
20	48-485	Supports etc elec Prptr/M.S To Inddraftf	47,700.000
21	48-492	Rect Duct Ind Draft Fan To Chimney	4,95,000.000
22	48-494	Expn Piecesind Draft Fan To Chimney	17,000.000
23	48-495	I.D.System Duct Supports	66,000.000
		SUB TOTAL (Non Pressure Parts (ESP Outlet funnel to chimney)- TRY SUPPLY	30,16,700.000
Piping - CS (Rate Schedule Identifier Sl No. 4.4 of Rate Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	24-350	Boiler Filling Piping	2,750.000
2	24-351	Hangers And Supports Of Blr Filling Pipe	720.000
3	24-801	Supports For Trim Piping	27,500.000
4	24-820	Exhaust Pipe For Safety Valves	42,200.000
5	24-821	Safety Val Pipe & Drain Import	7,500.000
6	24-825	Silencer Supports	21,300.000
		Total	1,01,970.000

Piping –Hanger Support (Rate Schedule Identifier Sl No. 4.6 of Rate Schedule)			
Sr. No.	**PGMA**	**PGMA description**	**Weight (kg)**
1	24-700	Bulked Bps Components For Trim Pipes	360.000
2	24-800	Boiler Trim Piping	35,000.000
3	24-802	Trim Piping Support - Import	3,200.000
4	24-806	Mixing Vessel	6,850.000
5	24-835	Startup Vent Diffuser Silen Supp	9,900.000
6	24-840	Sample Cooler And Supports	915.000
		Total	56,225.000

Insulation - Insulation (Rate Schedule Identifier Sl No. 5.1 of Rate Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	33-924	Misc Eqpts Asbestos Materials	200.000
2	33-975	Misc Eqpts Sealing Compound	500.000
		SUB TOTAL TRICHY SUPPLY	700.00

Insulation - Insulation (Rate Schedule Identifier Sl No. 5.2 of Rate Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	33-210	Main Blr Castable Refractory Gr A	2,00,000.000
2	33-230	Main Blr Pourable Insulation	65,000.000
		SUB TOTAL TRICHY SUPPLY	265000.00

Insulation - Insulation (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	33-970	Misc Eqpts Expanded Metal	5,000.000
2	33-971	Misc Eqpts Woven Wire Cloth	1,300.000
		SUB TOTAL TRICHY SUPPLY	6300.00

Insulation - Insulation (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)			
Sr. No.	PGMA	PGMA description	Weight (kg)
1	33-021	Blr Pr Parts Mineral Wool	4,25,000.000
2	33-121	Blr Mountings Mineral Wool	8,000.000
3	33-126	Sb Pipes Mineral Wool	2,800.000
4	33-321	Air Ducts Mineral Wool	3,25220.000
5	33-421	Air Heater And Gas Ducts Mineral Wool	1,10,000.000
6	33-521	Id Ducts Mineral Wool	1,02,000.000

7	33-721	Oil System Mineral Wool	5,300.000
		SUB TOTAL TRICHY SUPPLY	978320.000
~~ESP (Rate Schedule Identifier Sl No. 3.1 of Rate Schedule)~~			
~~Sr. No.~~	~~PGMA~~	~~PGMA description~~	~~Weight (kg)~~
~~1~~	~~95-088~~	~~Fsss Flame Scanner~~	~~300.000~~
~~2~~	~~95-089~~	~~Fsss Local Gun Maintenance Switch Box~~	~~100.000~~
~~3~~	~~95-091~~	~~Fsss Field Interconnecting Equipments~~	~~50,000.000~~
~~4~~	~~95-092~~	~~Fsss Control Cables~~	~~75,000.000~~
~~5~~	~~95-485~~	~~Gravimetric Feeder Remote Power Cabine~~	~~4,000.000~~
~~6~~	~~95-487~~	~~Gravi.Feeder Electronic Package~~	~~400.000~~
~~7~~	~~95-488~~	~~Feeder Mounted C&I Equipments~~	~~2,000.000~~
~~8~~	~~95-489~~	~~Coal Flow Moniter~~	~~500.000~~
~~9~~	~~95-495~~	~~Gravimetric Feeder Field Int.Con.Equpt~~	~~12,000.000~~
		~~SUB TOTAL TRICHY~~	~~1,44,300.000~~
		~~TOTAL TRICHY~~	~~3,24,45,967.000~~

BAP RANIPET

Sl No.	PGMA	Description	Weight (in Kg)
PRESSURE PARTS (Rate Schedule Identifier Sl No. 1.2 of Rate Schedule)			
1	52011	LARG AH-ROTOR POST	30000
2	52012	LARG AH-ROTORPINRACK	5610
3	52013	LARG AH-ROTORSEALS	6000
4	52030	LARG AH-ROTORHOUSING	29500
5	52041	HOT END CONN PLATE	42000
6	52042	COLD END CONN PLATE	65500
7	52054	LARG AH-AXIAL SEAL	400
8	52055	LARG AH-BY PASS SEAL	1430
9	52211	LARG AH-AIRSEAL PIPE	790
10	52220	LARG AH-GENS DETAILS	1940
11	52301	WASH MANIFLD GAS INL	1275
12	52302	WASH MANIFLD GAS OUT	1195
13	52326	CLEANG EQPT GAS OUT	400
14	52329	CLE EQPT DRIVE UNIT	800
15	52401	WASH MANIFLD GI(SEC)	1470

16	52402	WASH MANIFLD GO(SEC)	1245
17	52411	ROTOR POST (SEC)	35000
18	52412	ROTOR PIN RACK (SEC)	7210
19	52413	ROTOR SEALS (SEC)	9950
20	52426	CLEANG EQPT GO(SEC)	450
21	52429	CLEAN EQPT DRIVE-SEC	825
22	52430	ROTOR HOUSING (SEC)	42500
23	52441	HOT END CONN PLATE-S	56500
24	52442	COLDEND CONN PLATE-S	108000
25	52454	AXIAL SEAL (SEC)	520
26	52455	BY PASS SEAL (SEC)	2520
27	52511	AIR SEAL PIPING (SEC	890
28	52520	AH GENRL DETAILS-SEC	1940
		SUB TOTAL (RANIPET)	455860
Sl No.	**PGMA**	**Description**	**Weight (in Kg)**
Non Pressure Parts (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)			
1	57010	GATE-FD FAN OUTLET	24834
2	57013	DAMPER-FD FAN OUTLET	17538
3	57033	DAMPER-SA SCAPH INLET	10702
4	57063	DAMPER-SA SCAPH OUTLET	19352
5	57110	GATE-PA FAN OUTLET	22482
6	57113	DAMPER-PA FAN OUTLET	10626
7	57133	DAMPER-PA SCAPH INLET	7760
8	57141	SEAL AIR HAG AND ID FA	15306
9	57143	DAMPER-COLD AIR TO MIL	5000
10	57160	GATE-COLD AIR TO MILLS	17061
11	57163	DAMPER-PA SCAPH OUTLET	12309
12	57203	DAMPER-SA APH OUTLET	26488
13	57209	MTG BKT FOR CL DAMPER	6524
14	57223	DAMPER-PA APH OUTLET	29853
15	57270	GATE-HOT AIR TO MILLS	28939
16	57273	DAMPER-HOT AIR TO MILL	11011
17	57380	GATE-GAS SAH INLET	71086
18	57390	GATE-GAS PAH INLET	35738
19	57403	DAMPER-GAS SAH OUTLET	13393
20	57423	DAMPER-GAS PAH OUTLET	21954
21	57433	DAMPER-GAS APH OUTLET	35387
22	57460	GATE-ESP INLET	60096
23	57466	PLATFORMS AND LADDERS	66176

24	57491	BLOWER WITH MOTOR	7440
25	57497	KNIFE GATE VALVE	7760
26	57577	ELECT ACTUATOR FOR GAT	29988
27	57988	DUCTS COMMISSIONING SP	34
		SUB TOTAL (RANIPET)	614837
Sl No.	PGMA	Description	Weight (in Kg)
RM (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)			
1	50510	STEAM COIL A P H	10000
2	50610	SCAPH-HORIZONTAL TYPE	15000
3	55000	AXL FAN TOOL & FIXTURES	1200
4	55011	FD FAN FOUNDATION MATL	1500
5	55017	FD FAN C&I ITEMS	51
6	55021	AXL IDFAN FDN MATL	3250
7	55024	ID SEALING/COOLING FAN	3300
8	55027	ID FAN C&I ITEMS	51
9	55031	PA FAN FOUNDATION MATL	1700
10	55037	PA FAN C&I ITEMS	51
11	55091	FISRT FILL LUBRICANTS	5500
12	55216	1REAC FDFAN 2500-300	38000
13	55227	1 REACT ID FAN	140000
14	55334	2 REACT PA FAN	23000
15	55810	AXIAL FDFAN COUPLING	1800
16	55820	AXIAL IDFAN COUPLING	4000
17	55830	AXL PAFAN COUPLING	1200
18	55910	AXL FDFAN ACCESSORY	2700
19	55911	AXIAL FDFAN SILENCER	79000
20	55920	AXL IDFAN ACCESSORY	4400
21	55930	AXL PAFAN ACCESSORY	2900
22	55931	PA FAN SILENCER	60000
23	56077	SEAL AIR FAN C&I ITEMS	39
24	56161	BAC 1 SUC SA FAN	1600
25	56173	BAC 1 SUC IGNTR FAN	7000
26	56670	IGNITR FAN MOTOR	1800
27	56870	SEAL AIR FAN COUPLING	350
28	56988	RADIAL FAN COMMG SPA	100
		SUB TOTAL (RANIPET)	409492
Sl No.	PGMA	Description	Weight (in Kg)

ESP (Rate Schedule Identifier Sl No. 3.1 of Rate Schedule)			
1	79501	ROLL/SLIDE SUPPORTS	35754
2	79505	ESP-SUB-DELIVERY COMPO	713.8
3	79506	INSULATOR HOUSING AS	92200.074
4	79508	GAS DIST. ASSY	91985.25
5	79509	GD-RAPPING MECHANISM	15798.948
6	79510	GD_DRIVE ARRANGEMENT	1373.16
7	79511	GAS SCREEN-EP	47751.288
8	79513	EMIT SYST SUSPENSION	29543.304
9	79514	SUPPORT INSULATORS	12960
10	79515	EMITTING ELECTRODES	36659.7
11	79516	EMIT ELECT RAPP MECH	51136.92
12	79517	DRIVE ARGT. FOR EMIT.	57326.427
13	79519	COL ELEC SUSPENSION	177548.492
14	79520	COLLECTING ELECTRODE	1689864.814
15	79521	EMIT SYS FRAME-TOP	151600.94
16	79522	EMIT SYS FRAME BOTOM	215534.996
17	79523	INSPECTION DOORS	22269.36
18	79524	SHOCK BARS	133189.985
19	79525	COLL ELECT RAPP MECH	123480.3
20	79526	COLL ELEC RAPP DRIVE	12358.44
21	79528	ESP ROOF PANELS	335968.632
22	79530	ELECTRICAL SD COMPTS	24840
23	79531	GEARED MOTORS FOR RAPP	32700
24	79532	EMIT SYS FRAME-MIDLE	281056.95
25	79537	JUNCTION BOX & PUSH BU	2178
26	79542	OUTER ROOF-EP	333308.856
27	79543	HOPPER RIDGES	98066.466
28	79544	HOPPER UPPER PART	360035.136
29	79545	HOP MLD&LOWER PART	596494.584
30	79546	INSULATOR SUPP PANEL	145542.576
31	79547	ROOF PANEL ASSY	199760.4
32	79548	CASING STRUCTURE	555353.499
33	79549	CASING SHELL/PANEL	840442.768
34	79550	INLET-OUTLET FUNNEL	211673.904
35	79555	PENT HOUSE FOR E P	200800
36	79557	SPLITTER&GUIDE VANES	39639.84
37	79559	CONTROL ROOM-INSERTS	35000

38	79560	CABLE-CABLE RACKS	204000
39	79561	EP PERF TEST EQUIPT	1500
40	79562	EARTHING,CABLE TRAYS,S	159000
41	79563	ASH LEVEL INDICATOR	1700
42	79565	APP PLATFORM-HOPPER	107841.953
43	79566	WATER WASHING SYSTEM	9201.784
44	79568	FIXING COMP. FOR ESP I	117700
45	79572	INTERLOCKS-EP	2835
46	79573	ELECTRICALLY OPERTD HO	9600
47	79574	OPACITY MONITOR & ACCE	1000
48	79578	BAPCON & ACCESSORIES	581
49	79580	FOUNDATION MATLS FOR E	16621.776
50	79581	SUPPOTING STRUCTURES F	944674.086
51	79590	HEATING ELEMENTS	1410
52	79591	PANEL TYPE HOPPER HEAT	50000
53	79592	AUXILIARY CONTROL PANE	62000
54	79593	RAPPER CONTROL PANEL	3600
55	79594	STATCON PANEL	1800
56	79595	IOS PANEL	300
57	79888	E-SHOP COMMISSIONING S	30
58	79988	COMMISSIONING SPARES	650
59	79996	TOOLS & TACKLES	215.948
		SUB TOTAL	8988173.356

Non Pressure Parts (Rate Schedule Identifier Sl No. 3.2 of Rate Schedule)			
Sl No.	PGMA	Description	Weight (in Kg)
1	89610	EP GALLERIES&STAIRS	97301.373
2	89611	ESP ROOF HANDRAILS	14066.16
3	89612	FLOOR GRILL AND STEP T	89205.505
4	89613	FLOOR GRILL AND MOBILE	69719.75
5	89614	PENT HOUSE ROOFING SHE	59200
6	57470	GATE-ESP OUTLET	60096
7	57480	GATE-ID FAN INLET	64121
8	57490	GATE-ID FAN OUTLET	67825
		SUB TOTAL	521534.788

Insulation -Aluminium Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)			
Sl No.	PGMA	Description	Weight (in Kg)

1	89615	INSULATION CLADDING SH	90324
Insulation - Wool mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)			
	79567	MIN WOOL FOR ESP INSUL	381495
SUB TOTAL (Insulation - Wool mattress - BAP RANIPET SUPPLY)			381495
TOTAL RANIPET			**11461716.14**

HYDERABAD SUPPLY

Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)			
Sl No.	PGMA	Description	Weight (in Kg)
1	61910	Foundation Fastners and Mounting plates	93870
2	61010	Journal Assembly	282150
3	61110	Mill Drive Assembly	383400
4	61210	Mill Side and Liner Assembly	171900
5	61310	Separator Assembly	473400
6	61410	Mill Discharge Valve Assembly	37620
7	67400	Seal Air Assembly	3600
8	61710	Mill Motor Coupling Assembly	2880
9	61810	Mill Handling system and Tools and Accessories (WT/UNIT)	54500
10	61810	Lubricating Oil (For Gearbox)	12960
		TOTAL (HYDERABAD SUPPLY)	1516280

BHOPAL SUPPLY

Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)			
Sl No.		Description	Weight (in Kg)
1		ID FAN MOTOR	57000
2		PA FAN MOTOR	32000
3		FD FAN MOTOR	24000
4		MILL MOTOR	72000
		TOTAL	185000

JHANSI SUPPLY

ESP (Rate Schedule Identifier Sl No. 3.1 of Rate Schedule)		
1	HVR 95KVp 1200mA	414200
2	ELECTRONIC CONTROLLERS	95040
TOTAL JHANSI SUPPLY		509240

CBU BANGALORE SUPPLY

Non Pressure Parts (Upto ESP Inlet Funnel) (Rate Schedule Identifier Sl No. 1.3 of Rate Schedule)		
	Description	Weight (in Kg)
1	Ceramic Lined Coal Pipe Bends and Pipes under CBU, Bangalore	325000.00
TOTAL CBU BANGLORE SUPPLY		

PC Chennai

Piping - P91 (Rate Schedule Identifier Sl No. 4.1of Rate Schedule)				
Sl No.	PGMA	Description	Weight (in Kg)	IBR
1	80300	MS FROM SUPERHEATER TO BOILER STOP VALVE	45,000	I
2	80301	MS FROM BOILER STOP VALVE TO ESV	2,32,000	I
3	80303	MS HEADER TO AUX PRDS	16,000	I
4	80304	MS HEADER TO HPBP VALVE	32,000	I
5	80310	HRH FROM REHEATER TO INTERCEPTOR VALVE	2,96,000	I
6	80312	LPBP VALVE UPSTREAM & DOWNSTREAM	1,12,000	I
		SUB TOTAL (PC CHENNAI)	7,33,000	

Piping - AS (Rate Schedule Identifier Sl No. 4.2 of Rate Schedule)				**IBR**
Sl No.	PGMA	Description	Weight (in Kg)	IBR
1	80303	MS HEADER TO AUX PRDS	16,000	I
2	80901	SUB DELIVERY VALVES FOR LIGHT UP	6,000	N
3	80992	IMPORTED ELECTRODES	4,500	N
4	80307	HP & LP BYPASS WARM UP	850	I
5	80329	EXTRACTION STEAM TO BFP DRIVE TURBINE	14,000	I
6	80336	EXTRACTION STEAM TO HP HEATER NO.1	7,500	I
7	80339	AUX STEAM TO BFD TURBINE	3,500	I
8	80992	IMPORTED ELECTRODES	600	N
9	80320	CRH FROM TURBINE TO REHEATER	1,57,000	I

10	80321	HPBP VALVE TO CRH PIPING	12,000	I
11	80451	BOILER INTEGRAL PIPING DRAINS	19,000	I
12	80452	HP PIPING DRAINS - SG SCOPE	12,000	I
		SUB TOTAL	252950	

Piping - CS (HP) (Rate Schedule Identifier Sl No. 4.3 of Rate Schedule)

SL NO	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	80324	CRH HEADER TO AUX.PRDS	2,000	I
2	80340	AUX STEAM HEADER	5,600	I
3	80341	AUX STEAM HEADER INTERCONN BETWEEN UNITS	56,000	I
4	80342	AUX STEAM TO SCAPH	18,000	I
5	80343	AUX STEAM TO AH SOOT BLOWERS	5,500	I
6	80344	AUX STEAM TO FO SYSTEM TP	40,000	I
7	80351	AUX STEAM TO UNLISTED USERS - SG SCOPE	18,000	I
8	80355	STEAM TRACING PIPING	6,000	I
9	80395	AUX STEAM TO FUEL OIL ATOMISING	1,500	I
10	80418	ERECTION MATERIALS FOR INSTRUMENTS	2,500	N
11	80431	SPRAY WATER TO AUX PRDS	3,500	I
14	80454	SCAPH DRAINS	9,300	N
13	80322	CRH PIPING TO DEAERATING HEATER	15,000	I
14	80323	STEAM TO BFP DRIVE TURBINE	7,000	I
15	80331	EXTRACTION STEAM TO LP HEATER-2	6,500	I
16	80332	EXTRACTION STEAM TO LP HEATER-3	7,500	I
17	80335	EXTRACTION STEAM TO DEAERATING HEATER	16,500	I
18	80337	EXTRACTION STEAM TO HP HEATER-2	6,500	I
19	80338	EXTRACTION STEAM TO HP HEATER-3	8,000	I
20	80345	AUX STEAM TO DEAERATING HEATER	10,000	I
21	80349	AUX STEAM TO GLAND SEALS - TG SCOPE	1,600	I
22	80424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	84,000	I
23	80425	BFD FROM FINAL HPH TO SG TP	96,000	I
24	80430	SPRAY WATER TO HPBP	11,000	I
25	80432	SPRAY WATER TO BOILER DESH UPTO SG TP	4,500	I
26	80433	SPRAY WATER FROM BFP INTERSTAGE	13,500	I
27	80452	HP PIPING DRAINS - TG SCOPE	21,000	I
		SUB TOTAL (PC CHENNAI)	4,76,500	

Piping - CS (LP) (Rate Schedule Identifier Sl No. 4.4 of Rate Schedule)

SL NO	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	80373	AUX STEAM HEADER SV EXHAUST	4,300	N
1	80373	AUX STEAM HEADER SV EXHAUST	4,300	N
2	80453	LP PIPING DRAINS - SG SCOPE	9,000	I
3	80455	DRAIN FROM UNLISTED EQPT/VESSEL-	10,500	N

		SG SCOPE		
4	80460	SG AUX COOLING WATER UNIT SYSTEM	78,000	N
5	80477	SERVICE WATER PIPING	7,000	N
6	80480	FIRE WATER-OTHER AREAS	32,500	N
7	80612	SERVICE AIR FOR INDIVIDUAL UNITS	20,000	N
8	80616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	14,000	N
9	80650	FUEL OIL SUPPLY AND RETURN	75,000	N
10	81110	COOLING WATER PUMP	400	N
11	81412	DIRECT GAUGES FOR NON-STEAM LINES	1,200	N
12	81414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	500	N
13	81415	TEST THERMOWELLS	700	N
14	81416	PERFORMANCE GUARANTEE TEST MATERIALS	1,800	N
15	80471	BOILER WATER WASH TO & FROM UNIT	26,000	N
16	80940	AUX STRUCTURE FOR CRITICAL PIPING-SG	2,85,000	N
17	81042	MAKE UP WATER STORAGE TANK BELOW 300 CUM	8,000	N
18	81060	SPECIAL TANKS AND VESSELS	42,000	N
19	81100	CONDENSATE TRANSFER PUMP	4,000	N
20	81318	FIX COM FOR MISCELLANEOUS PPG INSULATION	30,000	N
21	81417	INSTRUMENTATION FOR STARTUP SYSTEM	1,000	N
22	81421	SENSING ELEMENTS FOR STEAM LINES	4,000	I
23	81422	SENSING ELEMENTS FOR NON-STEAM LINES	3,300	I
24	81435	JUNCTION BOXES	50	N
25	81440	LOCAL INSTRUMENT RACKS	19,500	N
15	80471	BOILER WATER WASH TO & FROM UNIT	26,000	N
16	80940	AUX STRUCTURE FOR CRITICAL PIPING-SG	2,85,000	N
17	81042	MAKE UP WATER STORAGE TANK BELOW 300 CUM	8,000	N
18	81060	SPECIAL TANKS AND VESSELS	42,000	N
19	81100	CONDENSATE TRANSFER PUMP	4,000	N
20	81318	FIX COM FOR MISCELLANEOUS PPG INSULATION	30,000	N
21	81417	INSTRUMENTATION FOR STARTUP SYSTEM	1,000	N
22	81421	SENSING ELEMENTS FOR STEAM LINES	4,000	I
23	81422	SENSING ELEMENTS FOR NON-STEAM LINES	3,300	I
24	81435	JUNCTION BOXES	50	N
25	81440	LOCAL INSTRUMENT RACKS	19,500	N
26	80363	EXHAUST STEAM FROM PRIME MOVERS-	40,000	N

		TG SCOPE		
27	80371	DRAIN FLASH TANK VENT TO CONDENSER	6,000	N
28	80375	UNLISTED SV EXHAUSTS - TG SCOPE	3,000	N
29	80379	HPH SV EXHAUST TO FLASH TANK	3,200	N
30	80381	HP HEATER VENTS - TG SCOPE	5,500	N
31	80382	LP HEATER VENTS	2,500	N
32	80385	VENT FROM UNLISTED PPG/EQPT TO COND	9,500	N
33	80388	CONDENSER AIR EVACUATION PIPING	3,000	N
34	80400	CONDENSATE SUCTION	10,000	N
35	80401	CD FROM PUMP TO LPH1/DC INLET TEE&RECIR	51,000	N
36	80402	CD FROM LPH1/DC INLET TEE TO TG TP	28,000	N
37	80403	CD FROM TG TP TO DEAERATING HEATER	21,500	N
38	80407	CONDENSATE FOR SEALING OF VACUUM	4,000	N
39	80408	CONDENSATE DUMP FROM HEADER	2,000	N
40	80412	CONDENSATE TRANSFER	3,500	N
41	80419	DEAERATOR SAFETY VALVE EXHAUST TO ATM	4,500	N
42	80436	SPRAY WATER TO LPBP DESH	5,500	N
43	80439	TURBINE FLASH TANK DRAIN TO CONDENSER	300	N
44	80442	GLAND STEAM COOLER DRAINS	400	N
45	80443	LP HEATER-1 TO CONDENSER	8,000	N
46	80444	LP HEATER-2/3/4/5 DRAINS&DRIP PUMP INCL	16,000	N
47	80446	DEAERATING HEATER OVER FLOW AND DRAIN	9,000	N
48	80447	HP HEATER DRAINS	47,000	N
49	80448	DRAIN FROM UNLISTED EQPT/VESSEL-TG SCOPE	9,500	N
50	80449	TG CYCLE PIPING DRAINS & VENTS	36,000	N
51	80457	MANIFOLDS FOR HP FLASH BOX & CONDENSER	3,500	N
52	80459	HP FLASH TANK DRAIN TO CONDENSER	3,100	N
53	80463	TG AUX COOLING WATER	1,42,000	N
54	80468	MAIN CIRCULATION WATER PIPING	1,80,000	N
55	80473	DEMINERALISED WATER SYSTEM	7,500	N
56	80493	HP FLASH TANK VENT TO CONDENSER	2,500	N
57	80494	LP FLASH TANK VENT TO CONDENSER	4,000	N
58	80495	LP FLASH TANK DRAIN TO COND	3,000	N
59	80610	SERVICE AIR-COMP SUCT & DIS TO RECEIVER	7,000	N
60	80614	INST AIR COMP SUC & DIS TO RECEIVER	7,500	N

61	80673	LUBE OIL PIPING SYSTEM	7,000	N
		SUB TOTAL	13,73,750	

Piping- SS (Rate Schedule Identifier Sl No. 4.5 of Rate Schedule)					IBR
SL NO	PG	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	80	80601	LOW PRESSURE DOSING PIPING	2,000	

Piping- Hangers and Supports (Rate Schedule Identifier Sl No. 4.6 of Rate Schedule)					IBR
SL NO	PG	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	80	80920	H&S FOR HYDRO TEST	15,000	N
2	80	80921	H&S FOR LIGHT UP STEAM LINE	2,75,000	N
3	80	80993	MISC ERECTION MATLS	500	N
4	81	81036	CW STORAGE TANK 16-25 CUM	5,500	N
5	80	80334	EXTRACTION STEAM TO LP HEATER-4	8,500	I
6	80	80420	BOILER FEED PUMP SUCTION	50,000	N
7	80	80421	BOILER FEED PUMP RECIRCULATION	62,000	I
8	80	80423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	2,35,000	I
9	80	80453	LP PIPING DRAINS - TG SCOPE	18,000	I
10	80	80928	H&S FOR BOILER LIGHT UP - TG	1,60,000	N
11	80	80930	H&S FOR SYNCHRONISATION - TG	76,000	N
12	80	80933	H & S FOR LP PIPING	15,000	N
			SUB TOTAL (PC CHENNAI)	9,20,500	

Insulation - Insulation (Rate Schedule Identifier Sl No. 5.1 of Rate Schedule)					IBR
SL NO	PG	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
48	81	81341	SEALING COMPOUND FOR INSL	1,000	N

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT FOR VARIOUS SYSTEMS IN SCOPE OF WORK

Insulation - Iron Parts (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule)				IBR
SL NO	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	81318	FIX COM FOR MISCELLANEOUS PPG INSULATION	30,000	N

Insulation -Aluminium Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)				IBR
SL NO	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
1	81350	ALUMINIUM CLADDING FOR INSULATION	1,60,000	N

Insulation - Wool mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)				IBR
SL NO	PGMA	DESCRIPTION	WT/BOILER(kgs)	IBR
47	81325	MINERAL WOOL MATTRESS	4,00,000	N

HERP VARANASI SUPPLY

Rotating Machines (Rate Schedule Identifier Sl No. 2.1 of Rate Schedule)			
1	61904	Foundation Fastener Assembly	52000
2	67400	Seal Air Header Assembly	24000
3	61804	Tools and Accessories (per Unit)	2220
SUB TOTAL (Rotating Machines - HERP VARANASI SUPPLY)			**78220**
TOTAL - HERP VARANASI SUPPLY			**78220**

PEM SUPPLY

Sl no.	Item	Weight (in KG)
Insulation - Wool Mattress (Rate Schedule Identifier Sl No. 5.5 of Rate Schedule)		
1	Bonded mineral (Rock) wool mattresses Tonnage	600000
Insulation - Aluminium Cladding Sheets (Rate Schedule Identifier Sl No. 5.4 of Rate Schedule)		
1	Al sheets Tonnage	85000
Insulation - Iron Parts (Rate Schedule Identifier Sl No. 5.3 of Rate Schedule)		
1	Ancillary Material Tonnage	50000
2	Vibration Isolation System FOR FANS FOUNDATIONS (To be covered under Sl 2.2 RM 'Handling Eqpt of Rate Schedule)	12000
		747000.000
TOTAL PEM SUPPLY		

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I ESTIMATED WEIGHT FOR VARIOUS SYSTEMS IN SCOPE OF WORK

*** Rate Schedule Identified for PGMAs of Piping and Insulation are Indicative only and based on envisaged material specification. It may very up & down wards. Payment shall be made on the basis of material specification of actual material received and erected at site.**

Estimated Weight (In KG) of Various System in The Scope of Work for One Unit

SN	Package	Trichy	PC - Chennai	BAP - RPT	Hyderabad	HERP - Varanasi	CBU	Jhansi	IS - Motor	PEM	**Total**
1.1	Structure	13299250	0	0	0	0	0	0	0	0	**13299250**
1.2	Pressure Parts	7937702	0	455860	0	0	0	0	0	0	**8393562**
1.3	Non Pressure Parts (Upto ESP Inlet Funnel)	4703000	0	614837	0	0	325000	0	0	0	**5642837**
2.1	Rotating Machines	1716400	0	409492	1516280	78220	0	0	185000	0	**3905392**
2.2	Handling Equipment of Rotating Machines	23100	0	0	0	0	0	0	0	0	**23100**
3.1	ESP	144300	0	8988173	0	0	0	509240	0	0	**9641713**
3.2	Non Pressure Parts (ESP Outlet Funnel to Chimney)	3016700	0	521535	0	0	0	0	0	0	**3538235**
4.1	Piping - P91	0	733000	0	0	0	0	0	0	0	**733000**
4.2	Piping - AS	0	252950	0	0	0	0	0	0	0	**252950**
4.3	Piping - CS (HP)	0	476500	0	0	0	0	0	0	0	**167900**
4.4	Piping - CS (LP)	101970	1373750	0	0	0	0	0	0	0	**779720**
4.5	Piping - SS		2000	0	0	0	0	0	0	0	**2000**
4.6	Piping - Hangers and Support	56225	920500	0	0	0	0	0	0	0	**352225**
4.7	Piping - Temporary (Steam Blowing)	0	0	0	0	0	0	0	0	0	**0**
4.8	Piping - Temporary (Chemical Cleaning)	0	0	0	0	0	0	0	0	0	0
5.1	Insulation	700	1000	0	0	0	0	0	0	0	**1700**

5.2	Pourable and Castable	265000		0	0	0	0	0	0		**265000**
5.3	Iron Parts	6300	30000	0	0	0	0	0	0	50000	**86300**
5.4	Aluminium Cladding Sheets		160000	90324	0	0	0	0	0	85000	**335324**
5.5	Wool Mattress	978320	488500	381495	0	0	0	0	0	600000	**2448315**
Total =		**32248967**	**4436200**	**11461716**	**1516280**	**78220**	**325000**	**509240**	**64500**	**735000**	**51497623**

TENTATIVE LIST OF HP ERECTION JOINTS FOR ONE UNIT OF 660 MW PROJECT			
	Material *	Quantity per Boiler	
Sr. No.		TUBE JOINTS	PIPE JOINTS
1	CARBON STEEL	4060	86
2	SA 213T11/T12/SA 312 P12	11782	155
3	SA 213T22/SA 213 P22	18462	0
4	SA 213T23	3606	0
5	SA213T91/P91	8601	22
6	SA213TP 347 H (SS)	3555	0
	TOTAL NUMBER OF HP JOINTS	50066	263
	FOR ESTIMATION PURPOSE +5%	52569	276

PAINTING SPECIFICATION ATTACHED SEPARATELY AS ANNEXURE-III AT THE END OF THIS DOCUMENT

GENERAL REQUIREMENTS – COMMON TO ALL WORK

11.1
The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the Contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

11.2
The terminal points decided by BHEL shall be final and binding on the Contractor for deciding the scope of work and effecting payment for the work done.

11.3
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Contractor and his personnel shall cooperate with personnel of BHEL, BHEL'S Customer, Customer's consultants and other Contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

11.4
The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The Contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The Contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

11.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

11.6
All necessary certificates and licenses, permits & clearances required including IBR certificates/license/clearances to carry out this work from the respective statutory/ local authorities are to be arranged by the Contractor at his cost in time to ensure smooth progress of work.

11.7
The boiler shall be erected as per relevant provisions of latest Indian Boiler Regulations (IBR) and amendments/addendums thereof, if any.

11.8
The work shall confirm to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to Contractor's fault, the Contractor shall dismantle and re-do the work duly replacing the defective

materials at his cost, failing which the work will be got done by BHEL and recoveries will be effected from the Contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL as per GCC.

11.9
The Contractor shall perform any services, tests etc, which may not be specified but nevertheless, required for the completion of work within quoted rates.

11.10
All necessary certificates and licenses required for carrying out this work are to be arranged by the Contractor expeditiously.

11.11
The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

11.12
BHEL reserves right to recover from the Contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes due to Contractor's lapse during any stage of work. Any loss to BHEL due to Contractor's lapse shall have to be made good by the Contractor as per GCC.

11.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.

11.14
During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc may become necessary on account of feed back / revision of drawing etc. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the Contractor for such reworks. Claim of Contractor if any, for such works will be governed by relevant clauses of 'General Conditions of Contract'.

11.15
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the Contractor as part of the work within the quoted rates.

11.16
The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel for such usage. ~~Only the steel for making temporary structure (cat head) for drum lifting will be provided by BHEL in random sizes materials available at site.~~

11.17
The Contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

11.18
The distance between storage area and erection site is approx 2 KM**.** Storage yard located at two different places and both are about 1-2 KM from Boiler area. Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

11.19
Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc.

11.20
The details of equipments to be erected under this contract are generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the Contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

11.21
Hangers & suspensions, supports etc for tubes, piping, & ducts etc will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

11.22
Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

11.23
Layout of field routed/ small bore piping shall be done as per 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 pipe lines even after completion of erection.

11.24
Welding of necessary instrumentation tapping points, thermowell, thermocouple pad, metal temp pad and clamps, root valve, condensing vessel, flow metering & measurement devices, and control valves to be provided on boiler & its auxiliaries and piping are covered within the scope of this specification. The installation of all the above items will be Contractor's responsibility even if:

a) Items are not specifically indicated under the respective product groups as given in the technical specifications.
b) Items are supplied by an agency other than BHEL.

Pre-heating, NDE, and Post weld heat treatment for above shall be done as per the specifications as part of work.

11.25
Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C & I erection agency will do storage / re-erection calibration etc.

11.26
Fixing and seal welding of thermowells & plugs before Hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermowells after hydro test/steam blowing of lines as part of work.

11.27
Actuators/drives of valves, dampers, gates, powered vanes etc may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

11.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

11.29

In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free - returnable basis which shall be returned to BHEL after the use.

11.30
The work shall be carried out strictly in accordance to the "Field Quality Plan" approved by BHEL/client. Contractor, jointly with BHEL, shall prepare all necessary records of measurements/readings/ protocols etc.

11.31
All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per the general engineering practice and as per BHEL engineers instructions at site, cutting, weld desposing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection work and necessary to complete the work satisfactorily shall be carried out by the Contractor as part of the work.

11.32
Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

11.33
Contractor shall regulate flow of material to and from site in such a manner and sequence that material accumulation at site does not lead to congestion at site. In case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.

11.34
It may so happen that certain components like manhole doors, hanger etc may be supplied in loose items. They need to be assembled as per relevent drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

11.35
The Contractor shall have total responsibility for all equipment and materials in his custody at Contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

11.36

BHEL is operating web based computerized E-store system that includes, inter-alia, issue of materials, daily progress reporting, Contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work.

In the event the computerized E-store/SOMS is inoperative for any reasons, the Contractor shall take delivery of materials from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. All these records however shall be updated in the E-store/SOMS as and when the E-store/SOMS is reactivated/ normalized.

11.37
Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost. For T-91 material site weld joints argon as per grade-3 of is 5760: 1998 with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the Contractor. The supply should accompany test certificate for the batch indicating individual element 'ppm' level and overall purity level.

11.38
Nitrogen gas, if required, for preservation of boiler and nitrogen capping during chemical cleaning process, will be provided by BHEL free of charge. Contractor shall arrange necessary connector, nipple, regulator, header and piping for usage of such gas from cylinders.

11.39
All lubricants and chemicals required for testing, preservation, chemical cleaning / acid cleaning, oil flushing, and the lubricants for trial runs of the equipments and trial operation of the unit will be supplied by BHEL free of charges.

12 DETAILS OF SCOPE OF WORK FOR BOILER & AUXILIARIES & PIPING

The scope of work is further detailed in the specifications hereinafter.

12.1 PRESSURE PARTS

A) Pressure parts components like headers, panels, coils, loose tubes etc have to be flushed/blown with compressed air, checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks/ steel pedestals. Necessary steel, concrete blocks shall be arranged by the Contractor. bed shall be fabricated as per BHEL requirement.

B) 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. No gas cutting will be permitted. All fittings like “T” pieces, weld neck flanges, reducers, etc shall be suitably matched with pipes for welding (This is applicable to piping work also).

C) Welding of all attachments on pressure parts including those required for insulation work is in the scope of work.

D) Surfaces inside seal box and other areas that are to be applied with castable refarctory lining shall be painted with black bitumen paint before boxing up and application of refractory. Seal boxes need to be partially cut open in order to pour refractory. Contractor shall carry out necessary cutting and seal welding of such cutouts. Contractor shall provide the black bitumen paint of required specification for such applications.

E) Furnace area and heat recovery area of flue gas passage has to be made leak proof by seal welding. Air leak test by pressurization has to be conducted to prove effectiveness of the seal weld and soap bubble or any other similar test will have to be carried out for the entire seal welds to ascertain the effective sealing is achieved. The tests may have to be repeated till satisfactory result is achieved.

F) If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall erect the piping & valves and provide necessary assistance for the same. Required piping, valves and preservative (gas / chemicals) will be provided by BHEL as free issue.

G) Superheater and/or reheater system will have HP butt weld joints of T-91 material. Welding of these HP joints shall involve pre-heating and post heating by resistance heating, argon purging of joints during welding process and full TIG weld. Contractor should follow required procedure for T91 welding NDT, etc.

H) Corrections in the profiles of scalloped plates/bars, skin casing, seal plates etc. for proper matching with mating parts, wherever required, shall be done as incidental to the work.

12.2 TRIM & INTEGRAL PIPING OF BOILER AND POWER CYCLE PIPING

12.2.1
The work on various piping systems will include cutting to required length, edge preparation, laying, fixing & welding of the pipes / elbows / fittings/ valves etc. in the pipeline, fixing & adjustment of supports / anchors / shock absorbers and carrying out all other activities / work to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL Engineers instructions and / or as per approved drawings / documents.

12.2.2
Tubes or pipes wherever deemed convenient, will be sent in random lengths. These shall be cut and edge prepared to suit the site conditions and the layouts. Fittings like bends tees, elbows, reducers, flanges etc will be supplied as loose items. However, bends of tube size up to NB. 65 mm will have to be formed at site as incidental to work.

12.2.3
All drains / vents / relief/ escape / safety valve exhaust piping etc to various tanks / sewage / drain canal / flash box / sump / atmosphere etc from the stubs on the piping and equipments are covered in the scope of work.

12.2.4
Connection (either flanged, bolted or welded) of piping to the terminal points/equipments etc is in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any, are also within the scope of work/specification. The terminal points work is inclusive of cutting of existing lines, if required, edge preparation, welding/blanking and hook up work.

12.2.5
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the other equipments. Necessary protocols have to be prepared for such fit-up alongwith BHEL/customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, is also within the scope of work/ specification.

12.2.6
Mechanical freeness of valves has to be ensured prior to erection.

12.2.7
The above provisions shall be applicable, mutatis - mutandis, to other piping systems e.g. Fuel oil piping, Lub oil piping of rotating M/c ACW lines etc.

12.2.8
Main steam piping upto turbine stop valve released in PG 80 is included in the scope of work. The material will be SA-335 P-91. Bidder shall follow BHEL approved procedure for welding, pre

heating, PWHT & NDT of SA-335 P-91 material. Detailed procedure will be issued to the Contractor.

12.2.9 Following items of work shall also form part of piping erection:

a. Installation & removal of isolating devices/ NRVs and removal & re-fixing of internals required for hydraulic testing, pre-commissioning and commissioning activities. Required gaskets will be supplied by BHEL free of cost.

b. Matching of flanges for achieving parallelism and alignment resorting to heat correction or other suitable methods as per instructions of BHEL Engineers.

c. To locate the cause of vibrations in pumps or other auxiliaries and to carry out necessary corrections in piping and its supports. This may involve cutting, fresh edge preparation, welding, radiography, stress relieving, etc., of suction, discharge, re-circulating and other connected piping and its supports at a number of places.

d. Fabrication and erection of racks and steel supports for all the piping including critical piping. Steel for this purpose will be supplied by BHEL.

e. Erection, welding, NDE and stress relieving of certain equipments, e.g. flow nozzles, control valves etc, after completion of certain activities e.g. chemical cleaning, steam blowing etc is part of work. This may involve removal of portions from the already erected pipelines in order to introduce these equipments and resultant edge preparation etc shall be incidental to work. No separate/ additional payment is envisaged for cutting, welding and edge preparation in this regard. The removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.

f. Welding of root valves with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.

g. Opening of valve actuators, dismantling of actuators from the valves, refitting and rendering assistance connected with the electrical and mechanical problems.

h. Fixing and welding including due NDE & PWHT etc of carrier plates on to the pipes.

12.2.10
As far as possible pre-assy of piping on ground is to be done. The erection of various piping may have to be started from any random reference instead of the terminal points inorder to meet certain completion commitments.

12.2.11
The location of drain headers, valves, stations, steam traps of piping as indicated in the BHEL drawings are suggestive only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, it has to be erected so as to provide

easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be changed as per the site conditions. All such works shall be carried out expeditiously as per the instructions of BHEL Engineer. The decision of BHEL Engineer is final and binding on the Contractor.

12.2.12
The rate quoted in rate schedule is also inclusive of pre-heating, welding, post heating, post weld heat treatment/ stress relieving and NDE of piping.

12.2.13
Erection of piping systems shall involve co-ordination with the erection of the turbine, turbo-generator, condenser, boiler, boiler feed pumps and other major equipments. Wherever required, approval of concerned BHEL Engineer/other erection agency must be obtained prior to making piping interface connections to such equipments. Sequence of work shall be carefully planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of BHEL Engineer and BHEL Engineer may direct the Contractor to reschedule his work to suit the status of the site work.

12.2.14
While erecting the field run pipes, the Contractor shall check the accessibility of valves, instruments tapping points and maintain minimum head room requirement and other necessary clearance from the adjoining work areas to avoid interferences.

12.2.15
All pipelines shall be given proper slope towards the drain points during erection. For maintaining the slopes as given in the drawings for larger thickness and larger dia pipelines, edge preparation for welding may have to be altered suitably to achieve the slope.

12.2.16
All pipelines shall be provided, as per the instructions of BHEL Engineer, with suitable Vent and the drain points with valve (s) on the highest and lower points of the pipe run although may not be specifically mentioned in the drawing.

12.2.17
It may become necessary to make & install temporary spool pieces for certain process requirements. Contractor's scope shall include preparation, erection, fit-up, welding, NDE etc and dismantling of such spool pieces at appropriate stage without any additional payment.

12.2.18
In pipelines like CRH lines, extraction lines, etc., the NRVS, strainers etc will be erected by other erection agency. Alignment of these valves to match the pipe ends (both sides), welding, heat treatment and NDE etc is in the scope as incidental to work.

12.2.19
Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of job. Hanger

settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

12.3 ROTATING MACHINERY

a Specifications covered under the following para and also other relevant specifications contained in other paras elsewhere in this tender document will be applicable for rotating machines like FD / ID / PA fans, Air pre heaters, Seal air fans, Blowers, Coal mills, Fuel Feeders, HP & LP dosing pump skids and other similar auxiliaries.

b All lubricants for testing, preservation and lubricants for Trial runs of the equipments shall be supplied by BHEL as free issue. All services including labour shall be provided by the Contractor for drawing these from BHEL / customer's stores, transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled / leaking lubricants thoroughly, consumables for such cleaning will be in Contractor's scope.

c All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. Also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.

d Trial run of the drives in un-coupled state and then coupled with equipment has to be done after necessary alignment.

e Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc are in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.

f Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may necessitate disconnection of cabling, removal of certain instruments etc and restoration thereafter.

g Protective lubricant coats / fill provided on / in the critical area of equipments have to be removed at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied. Cleaning / flushing agents / oils will be provided by BHEL.

h Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system has to be carried out wherever required as per instruction manuals / drawings. Chemicals, suiting BHEL specification, for such chemical cleaning is in the scope of Contractor.

i Eventhough rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.

j) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.

k) There are 9nos of XRP 1043 Mills per Unit with Planetary Gear Box

12.4 ERECTION OF ELECTROSTATIC PRECIPITATOR

12.4.1
Wherever called for, pre-assembly of supporting structures, casing walls, inlet outlet funnels, hoppers etc have to be done, on ground.

12.12
Loading of collecting electrodes either from top or bottom, to be decided suiting site conditions, shall be done with due care as per instructions.

12.4.3
Straightness of all collecting electrodes has to be checked on ground prior to loading in to the field.

12.4.4
Bundle of collecting electrodes should be handled only with special lifting beam and slings supplied for the purpose.

12.4.5
Huck bolting M/c with necessary auxiliaries is under the scope of Contractor. Electrical connections, operation etc shall also be arranged by the Contractor.

12.4.6
Clearances as prescribed amongst collecting electrodes and with casing walls have to be maintained. spot heating of collecting electrodes, wherever called for, shall be done as part of work to achieve the required clearances.

12.4.7
Erection, alignment/ fixing in final position, of high voltage rectifiers of ESP is in the scope of work. However testing & commissioning will be done by other agency.

12.4.8
Installation of high voltage interlocks (excepting rotary switch interlock of switchgear panels) is in the scope of work.

12.4.9
Complete erection, alignment, testing, pre-commissioning and commission etc for drive motors of collecting electrodes and emitting electrode rapping mechanism is in the scope of work.

12.4.10 **AIR LEAK TEST**

After erection of ESP and before clearing for insulation, air leak test has to be carried out. Necessary equipment like, air blower, ventury and instrumentation etc. will be provided by BHEL free of charges. Handling at stores, transport, erection, commissinoning and carrying out the leakage test, attending to the leakages till satisfactory sealing / leak proofness shall be in scope of the work. Contractor shall dismantle the test equipments and return to BHEL stores in good condition after due reconciliation, cleaning and servicing. No separate/ additional payment is envisaged for the above.

12.5 MAIN SUPPORTING STRUCTURES, EXTERNAL STRUCTURES, ELEVATOR STRUCTURES, STAIRWAYS, GALLERIES & PLATFORMS & HANDLING ARRANGEMENT

12.5.1

Contractor shall supply and erect one number passenger cum goods elevator of 1.5 MT capacity to reach up to the highest level to facilitate erection, movement of person and goods etc. the arrangement shall confirm to applicable safety norms. Contractor shall dismantle and take the elevator back after completion of work. The elevator shall be made ready at the time of drum lifting.

12.5.2

Boiler main supporting structures have to be erected in a sequential manner.

12.5.3

Quality norms with regard to verticality of column, inter-alia, have to be adhered to strictly, at various stages of erection.

12.5.4

Stiffening / strengthening of main supporting structure, if any, due to deviation in verticality of columns post drum lifting, shall be carried out, including fabrication, if any. Necessary steel for this will be provided in random sizes by BHEL as free issue. Payment for such stiffening/ strengthening shall be made for weight certified by BHEL engineer at the item rate applicable to structures, provided the deviation has occured for the reasons not attributable to the Contractor.

If the deviations are attributable to Contractor, the materials required for Rectification / Stiffening / Strengthening, fabrication, erection of the same shall be to the Contractors account.

12.5.5

Each of the **ceiling girders will be sent in 2 to 3 pieces and will have to be assembled, welded** and NDE & PWHT (SR) done on ground prior to their erection in position.

12.5.6

It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, which may necessitate temporary installation of some structural

steels at appropriate locations to keep the stability of structure intact. such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the Contractor to suit the requirement.

Payment for such installations shall be made on the accepted tonnage rate of structures. No separate payment will be made for fabrication, removal & return of the materials to BHEL stores.

12.5.7
In some cases, the structural material will be supplied in random lengths, which have to be fabricated to suit the requirement as incidental to work. Also, it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger/ pre-assembled equipments. In such cases, the removal and re-erection of such members as agreed by the BHEL Engineer, will have to be done by the Contractor as incidental to work.

12.5.8
Contractor shall arrange materials required for temporary cat ladders & working platforms during erection of columns, platforms and other structural components. Such arrangements shall, as far as possible, be only of clamping & bolting type, as welding on columns etc will not be permitted. After the completion of work these shall be removed.

12.5.9
All the hand rails and toe guards shall be provided as per drawings and site requirement. hand rails supplied in running lengths shall be suitably cut, edge prepared and welded. Also, hand rails/ guards may have to be provided from the safety point of view in certain places though not indicated in the erection drawings. The weld joints of hand rails shall be ground smooth to flush finish.

12.5.10
Electroforged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters **and not by gas cutting**. Cold galvanizing compound is to be applied on the cut surface/edge. Cold galvanizing paint supply is in Contractor scope.

Fixing of floor grills shall be done by self-tapping screws **and not by weldable studs.** Special purpose electrically operated hand tools are available in the market for this, which drills, taps and fixes the screws in a single operation. Supply of necessary self-drilling-cum-tapping screws and fixing clips are in contractor scope. Contractor shall deploy the **drilling cum fixing machine** required for this purpose as a regular scope of work.

12.5.11
The Contractor shall also install additional platforms of permanent nature for approaching different equipment as per the site requirement and to meet O&M requirements, though these may not indicated in the erection drawings. Materials required for such platforms will be supplied by BHEL in random sizes on free issue basis. These have to be fabricated to suit the requirement. Payment only for erected weight as certified by BHEL engineer shall be made at the rate applicable for structures. No payment is envisaged for fabrication of structures.

12.5.12
All relevant provisions as above shall apply, mutatis-mutandis, to the work of external structures, interconnecting structures, elevator structures, ESP stairways and gallaries & equipment handling system etc.

12.6 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS

a) The ducting covered under this scope of work is flue gas ducting up to boiler outlet flange, boiler outlet flange to ESP, ESP to ID fans to chimney, hot and cold secondary air ducting from FD fans outlet to wind box, hot and cold primary air ducting from PA fans to mills including interconnections, flowmeters, dampers/gates and their drives, supports and suspensions etc for these systems.

b) Ducts / expansion bellows (metallic & non-metallic) are normally supplied in loose components / segments and these are to be assembled and welded/ jointed at site before erection. The fabric portion of non-metallic expansion joints (NMEJ) namely bolster, fabric belt and canopy shall be installed by Contractor under supervision/guidence of equipment supplier/BHEL for the first few cases. Contractor shall ensure that all subsequent NMEJ are assembled with due care and proper procedure. In simillar manner all joints, connecting ducts, expansion pieces and dampers shall be seal welded. These welds have to be made leak proof and tested as per technical instruction / requirement.

c) Certain structural items like silencer supports, roof cladding structure, platform etc will be supplied in running lengths which shall be cut to required suitable sizes and adjusted/trimmed as part of work.

d) Contractor has to make canopies for motors, actuators, lub oil units, control valves, etc. material for this will be supplied in random lengths / sizes. No separate payment for fabrication is envisaged. Only the erection tonnage rate applicable for structure will be paid for this work.

e) ~~Boiler roof sheets shall be erected on boiler roof structure. Payment shall be made as per the tonnage rate quoted for boiler non pressure part.~~

f) ID fans are provided with **variable frequency drives.** Contractor has to erect & commission the only the motor and other mechanical components like coupling etc. Panels, transformers, cabling etc are not in this work specification.

g) Actuator / drives of dampers, gates etc may have to be serviced, lubricated before erection, during precommissioning and commissioning, including carrying out adjustments required as incidental of the work.

h) All welded joints should be painted with anticorrosive paint / primer immediately after completion of all work. Necessary paints and other consumables for the above work are in the scope of the Contractor.

i) Spring suspension / constant load hangers may have to be preassembled for required load and erection carried out as per instruction of BHEL adjustments, removal of temporary arrests / locks, cutting of excess thread length of hanger, tie rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents / instructions, during various stages of erection and testing and after floating of piping / ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.

j) Hangers and suspensions, support steels for ducts and other equipments, piping etc will be supplied in running/random lengths/ sizes, which shall be cut to suitable sizes and adjusted as required.

k) Touch up and preservative painting of all components issued to and/or erected by Contractor shall form part of scope of work. The Contractor shall arrange all paints, primer and consumables, T&P and facilities.

l) **PAINT SUPPLY FOR ALL ERECTED MATERIALS UNDER SCOPE OF BOILER PACKAGE IS IN THE SCOPE OF** Contractor.

13 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT OF BOILER & AUXILIARIES

13.1
Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL / Customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits have to be checked and logged by the Contractor. The permanent benchmark / reference marks will have to be transferred to new locations with sufficient care to maintain the accuracy and protected / preserved with adequate care (to enable rechecking at later dates) as per BHEL instruction.

Minor adjustment of foundation level, dressing and chipping of foundation surfaces and blue-matching (wherever required) for of all equipments as per BHEL Engineers instructions, should be done by the Contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto **20 m**m for achieving proper levels will be within the scope of work/specification.

13.2
All temporary foundations and anchor points required for installing erection Equipments and winches, foundations for pumps, tanks etc are in the scope of Contractor. All building materials like cement, steel including re-inforcement bars, grits cements etc for such temporary foundations shall have to be arranged by the Contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.

Neutralisation pit for EDTA cleaning is to be made by the Contractor. After completion of job pit has to be dismantled and area is to be levelled before handing over of area to owner.

Effluent has to be disposed off safely from neutralising pit to a safe area as per instruction of BHEL Engineer.

13.3
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the leveling of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact between the two surfaces.

13.4
BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting / chiseling / grinding and de-burr the same. However, machining of the packers wherever necessary, shall be arranged by contaractor.

13.5
Complete grouting of structures equipments, including anchor/ foundation bolts, beneath base, base hollows etc, as may be applicable, is included in the scope of Contractor. Arranging all labour, building materials including cement, ordinary portland as well as quick setting – free flow

- non-shrink grout mix (e.g. conbextra gp1/gp2), form work, shuttering, and any other requirements is in the Contractor's scope. Contractor shall obtain approval of BHEL for cement (Ordinary Portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.

13.6
After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

14 WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT

14.1 WELDING

14.1.1
Installation of equipment involves good quality welding, NDE checks, post weld heat treatment etc. Contractor's personnel engaged should have adequate qualification on the above works.

14.1.2
The method of welding (viz) arc, TIG/MIG or other method will be indicated in the detailed drawing/documents. BHEL Engineer will have the option of changing the method of welding as per site requirement.

14.1.3
Welding of high pressure joints shall be done by IBR certified high pressure welders who have been permitted by CIB (Chief Inspector of Boiler) of state concerned for deployment at the site of work.

14.1.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

14.1.5
Before any welder is engaged on work, he shall be tested and qualified by BHEL/ customer, though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason. All the expenditure in testing/qualification of the Contractor's welder shall be borne by Contractor.

14.1.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

14.1.7
The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. For this consumables like paint /primer etc will be in the Contractor's scope.

14.1.8
HP joint fit-up, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The Contractor shall arrange consumables like protective paints/tapes etc.

14.1.9
The Contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability of the welds shall be final.

14.1.10

In the case of P-91 pipe welding, Contractor shall deploy welders having experience in welding of P-91 material. The welders engaged by Contractor if not qualified for P-91 welding will be trained by BHEL at BHEL welding research institute (WRI) trichy and allowed to work only after passing the required test arranged by BHEL. All the expenditure towards such qualification including cost of training, traveling expenses, stay etc., shall be borne by the Contractor.

14.1.11
Joint fit up will be a stage of inspection. Where required, joints shall be offered for visual inspection after root run. Subsequent welding should be made only after the approval of root run.

14.1.12 SOCKET WELDING

In execution of this work, considerable number of socket weld joints is involved. The exact quantity of such socket welds or probable variation in the quantum cannot be furnished. The tenderer shall take notice of this while quoting as no extra claim on this account will be entertained. The socket welding on HP parts/ HP piping shall be done by the IBR qualified welders. Contractor has to adhere to the procedures/specification as indicated in the drawing for socket welding.

14.1.13
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangements. This enclosure shall meet BHEL specifications.

14.1.14
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

14.2 HEAT TREATMENT:

14.2.1
For the purpose of temperature recording of stress relieving process, thermocouples have to be attached to the weld joint. The number of temperature measuring points and locations shall be as per the standards of BHEL. Thermocouples have to be attached using capacitor discharge type portable thermocouple attachment unit. Contractor shall arrange sufficient number of thermocouple attachment units.

14.2.2
Contractor should provide temperature indicator / temperature recorder for measuring temperature during pre-heating for welding or for controlling temperature of metal for hot correction etc. The temperature recorders should be preferably of solid state type.

14.2.3
Heat treatment may be required to be carried out at any time (day or night) to ensure the continuity of the process. The Contractor shall make all necessary arrangements including labourer required for the same as per directions of BHEL.

14.2.4
In certain cases only the pre-heating of weld joints may be called for.

14.2.5
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

14.2.6
Checking effectiveness of stress relieving by hardness tests (by digital hardness tester or other approved test methods as per BHEL Engineer's instruction) including necessary testing equipments is within the scope of the work / specification.

14.2.7
Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the Contractor in accordance with BHEL engineer's instructions. Where the electric resistance heating method is adopted Contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

BHEL will provide the induction heating equipment set for SA 335 P-91 materials piping only. The set will comprise of following:

(i) Main panel
(ii) Capacitor panel
(iii) Interconnection power & control cables between above panels
(iv) 185 sq mm special connecting cable from capacitor panel output – 5m length.

Contractor shall provide the input electrical power connection including arrangements such as DB, cables etc, thermocouple pads, thermocouples and compensating cables, induction heating annealing cables (from the capacitor panel to joint and for wrapping around the weld joint) (spec: single core 240 sq mm, 1200a, 3khz), ceramic wool and other consumables etc as may be required. Quantum of annealing cable requirement will depend on many parameters e.g. weld joint size, heat input, type of connection i.e. series or parallel etc.
Likely supplier: Mansfield Cable Co. Noida (UP).

14.2.8
All the recorded graphs for heat treatment shall be handed over to BHEL/ IBR authorities and due clearances obtained.

14.2.9
During welding & post weld heat treatment of main steam piping (P-91 material), the induction heating process shall continue un-interrupted. Therefore, contactor shall arrange back-up DG set to take care of power interruptions during the process.

14.2.10

Results of these processes shall be verified/ validated as per requirements of BHEL/client.

14.3 NON DESTRUCTIVE EXAMINATION:

14.3.1
Contractor shall provide all resources and make all arrangements for the radiographic examination of welds for this work. for reasons of safety, invariably the radiography work will be carried out after the normal working hours and close of other site activities only. in this regard, the Contractor has to adhere to the safety rules / regulations laid by barc authorities from time to time.

14.3.2
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL Engineer. The minimum quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer/Boiler inspecting authority. Bidder shall also arrange the UT equipment with recording facility at his own cost. Usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

14.3.3
All X-Ray / Gamma Ray films of weld joints shall be preserved properly and be handed over to **BHEL/ IBR authorities and requisite clearances shall be obtained by the Contractor.**

14.3.4
The field welded joints shall be subject to Dye-penetrant/MPT/RT/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

14.3.5
Wherever required, surface preparation, like smooth grinding of welded area, prior to Radiography shall be done. It may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/ technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The Contractor shall take all this into account in his offer. The required NDT method/procedure will be provided by BHEL.

14.3.6
Contractor shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found by BHEL Engineers to be satisfactory. Subsequently, subject to consistency in welder's performance, the percentage of radiography will be based on BHEL's standard practice/code requirement. The defects shall be rectified immediately and to the satisfaction of BHEL engineer. The decision of BHEL engineer regarding acceptance / rejecting the joints will be final and binding on the Contractor.

14.3.7
100% radiograph of certain sizes in piping have to be taken as per BHEL standards/ drawings.

14.3.8
For carrying out ultrasonic testing of welding joints of large size tubes and pipes, it will be necessary to prepare surface by grinding and buffing a smooth finish and contour as necessary. The Contractor's scope of work includes such preparation as incidental to work.

14.3.9
After stress relieving 5% of UT for all critical lines and 2% of UT for other alloy steel lines to be taken to ensure soundness of joints particularly stress relieving cracks. No separate payment will be made.

14.3.10
Contractor may have to undertake radiography with cobalt-60 isotope camera in certain cases. However, for any reason if use of Cobalt-60 is not possible then these joints shall be checked by radiography after completion of welding up to suitable part of thickness with IR–192 other suitable source subsequently after completing the joint UT to be done. For this Contractor has to deploy level–II operator certified by BARC.

14.3.11
In the case of P-91 piping wherever radiography is not possible, alternatively ultrasonic test has to be carried out apart from other NDE checks.

14.3.12
For piping of thickness less than 25 mm no radiography plugs will be provided radiography shots to be taken by double wall technique or any other method to be adopted in consultation with BHEL engineer at site.

14.3.13
No separate payment for any NDE activities (including radiography) will be made.

15 LINING AND INSULATION

Application of insulation, finishing, cladding and outer casing etc of the following:

1. Main boiler
2. Boiler auxiliaries including, but not limited to, ESP, ducts, fuel oil Equipments, fans etc
3. Boiler integral piping and tanks & vessels
4. Power cycle piping and critical piping including vessels and tanks & other equipments
5. LP piping and other equipments
6. Other equipments including BOIs, though not listed above but required for completion

15.1
The work shall conform to dimension and tolerances specified in the various drawing and documents that will be provided during the execution. if any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by engaging other agencies or departmentally and recoveries will be deducted from Contractor's bills towards expenditure incurred including 30% departmental charges.

15.2
The terminal points as decided by BHEL shall be final and binding on the Contractor.

15.3
All insulation and refractory materials including iron components and outer sheet casing materials, cladding sheets etc required will be supplied by BHEL and the same have to be erected/ applied as per the drawings and specifications of BHEL by the Contractor.

15.4
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during all stages of work. Scaffolding materials (poles, gratings etc) shall be of light weight construction. Contractor shall arrange steel pipes & clamps with accessories like base plate attachment, fixing pins, struts etc for scaffolding required for this work. However, BHEL's decision in this regard shall be final and binding. Contractor shall arrange the scaffolding materials in sufficient quantity.

The Contractor shall provide the required quantity of wire, nails, and planks for formwork and other materials for shuttering and curing works.

15.5
Contractor shall observe all precaution for laying, curing etc of pourable insulation. the Contractor at his own cost shall redo any defective works found.

15.6
Wool insulation is received at site as loose bonded mattresses in standard sizes. These are to be dressed/cut to suite the equipments. Multiple layers of wool have to be applied as directed and as per drawings and specifications for all equipments/ systems covered under the scope of work.

15.6
Cutting & dressing of insulation bricks to suit the site area of application is incidental to work.

15.7
Removable type of insulation has to be provided for valves fittings, expansion joints etc as per drawing or as directed by BHEL Engineer.

15.8
The cladding and outer casing are aluminium sheets. All relevant specifications and procedures with regards to beading, sealing etc for alunimium sheets have to be adhered to.

15.9
Cladding/outer casing shall be fixed expeditiously, so as to avoid damage to the insulation from the weather.

15.10
The overlapping surface of outer casing/cladding sheet shall be coated with sealing compound, which will be supplied by BHEL free of cost.

15.11
To take care of bimetal corrosion due to variety of metals in contact of each other viz retainer to support, support to outer casing/cladding, cladding-to-cladding etc, suitable paints specified by BHEL, to be applied and/or neoprene rubber packing/strips or any other insert may have to be fixed as required.

15.12
The Contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL Engineer to facilitate inspection by boiler inspector or during commissioning to fix gauges, fittings, instruments etc. these gaps will have to be finished as per drawings at later date by the Contractor at his cost.

Contractor shall cut open works in needed as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

15.13
A log book shall be maintained by the Contractor for the clearance of the area for application of refractory and insulation. Where the Contractor does the work on his own accord without prior permission, the work should be re-done, at his own cost, where necessitated.

15.14
Wastage allowances for the material issued are envisaged as follows:

➢	a	Pourable & castable insulation	-	2%
➢	b	Insulation bricks and motor	-	2%
➢	c	Wool mattresses	-	2%
➢	d	Cladding sheets	-	2%

The wastage allowance will be applicable on the net issued quantity i.e. total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site.

15.15

The following works are also included in the scope of this contract.

Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint will be supplied by Contractor.

Cutting of the wool mattresses in the required shape and application of finishing cement of required thickness wherever required.

15.16

Insulation work of temporary piping for alkali boil out, steam blowing and chemical cleaning has to be carried out at site. The same have to be removed and returned to the BHEL stores after the completion of activity. Rates quoted for application of wool for boiler and auxiliaries will be applicable for this work also. No separate payment will be made for removal of temporary insulation and return of the same to BHEL stores/yard.

15.17

In certain instances, co-ordinated/phased application of castable refractory/ insulation on pressure parts etc may be necessitated in consideration of sequence of activities of other erection agencies. Contractor shall do such phased work as may be directed by BHEL.

15.18

Prior to application of refractory bituminous painting on the pressure parts and other area is under Contractor scope. The bituminous paint will be supplied by Contractor. No separate payment will be made for application of paint.

16 PAINTING

16.1
All exposed metal parts of the equipment including piping, structures, raillings etc. wherever applicable, after installation unless otherwise surface protected, shall be first painted with at least one coat of suitable primer which matches the shop primer paint used, after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping or sand blasting, and the same being inspected and approved by BHEL engineer for painting. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints.

16.2 Touch-up painting on damaged areas -

a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer.

Primer coat of touch-up primer to be applied by brush immediately after the surface preparation.

Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer.

Tentative Painting scheme is enclosed for information at **Annexure-III** of painting specification (attached separately). However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.

16.3
Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc. has been carried out by the bidder.

(a.) clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper.
(b.) painting procedure to be followed as mentioned above for touch-up painting on damaged areas.

16.4

The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/customer engineer at site for the equipments/ components covered in these specifications. Applicable paints and primer shall be supplied by BHEL.

16.5

All exposed metal parts of the equipment including piping, structures, hand railing, grating etc shall be thoroughly cleaned off dust, rust, scales and other foreign materials by manual or mechanised wire brushing, scrapping, sand blasting etc and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

16.6

In certain isolated instances where it is not possible to clean the equipments as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.

16.7

Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents. The Contractor at his own cost shall provide all the consumables and application implements.

16.8

During the preparation of surface, if the shop coat is damage by chemical cleaning or by mechanical means, Contractor shall repair the same free of cost to BHEL. BHEL will make available only the primer and paints free of any charge to Contractor.

16.9

Specified drying time shall be permitted from one to another coat.

16.10

This work requires working at higher altitudes from ground level to as high as 90 m and more. The work spread is also substantial involving substantial run of structures and piping. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. The ropes, ladders, scaffolding materials, clamps etc and climber used should be of standard quality for safe and smooth execution of work.

16.11

Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by Contractor, BHEL shall have the right to recover the cost of such damages from the Contractor.

16.12

Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the Contractor without any extra charges.

16.13
In general, painting of structural parts and colour bands, lettering, marking of direction of flow/rotation etc will be carried out by brush painting. However, areas/equipments inaccessible for manual painting have to be painted by spray painting. The decision of BHEL engineer, in this regard, shall be final and binding on the Contractor. For the purpose of spray painting, air at one point will be made available by BHEL free. Laying of air hose pipe and any other line required shall be done by Contractor at his cost. The Contractor shall provide spray equipment set.

16.14
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during execution of the work.

16.15
Final painting work shall be started after obtaining clearance from BHEL engineers and as per his instructions.

16.16

All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.

16.17 PRIMER AND PAINTS FOR FINAL PAINTING

All primer and paints required for final painting shall be supplied by BIDDER/CONTRACTOR.

Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting.

17.1
Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing e.g. hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/setting various clearances/ parameters, ensuring operation of various equipments free of undue restrictions, chemical **(EDTA)** cleaning & alkali boil out of boiler, steam blowing of the boiler and the critical piping, floating of safety valves, coal firing, trial operation and loading etc are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

Chemical cleaning: All pumps and motors, starter panel, cable, SFU etc as required shall be arranged by contractor. However, piping, fittings & valves material shall be provided by BHEL, erection of the same is in the scope of contractor. Operation and maintenance of chemical cleaning system is under the scope of contractor.

17.2
All these tests should be repeated till all the equipments satisfy the requirement / obligations of BHEL to their client and also the relevant statutory authority.

17.3
Contractor shall lay / install necessary temporary piping, pumps, valves, blanks, gauges, cables, switches etc for conduct of hydraulic / pressure test, chemical cleaning, steam / air blowing etc. this may involve cutting of some portion of existing piping / valves, placing of rubber wedges / blanks in the valves and other openings, fabrication and installation of temporary tanks for chemical mixing, temporary access platforms to mixing tanks etc. Where required, bends have to be fabricated / formed at site from random length / size of pipes / structural steel. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work**.**

No payment will be made for temporary installations made for hydraulic testing of various systems & piping. Similarly no payment will be made for electrical installations made for any temporary system.

17.4
All materials, equipments necessary for installation of temporary system as above will be supplied by BHEL as free returnable issue in random sizes / lengths. However, servicing, fabrication, erection, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the Contractor.

In accounting of materials following wastage allowances are provided:

1. Structural items : 5%
2. Pipes : 3%

No wastage allowance for valves & other equiptments.

17.5

Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

17.6
Overhauling, cleaning, servicing of tanks, pumps, equipments, valves, during erection and commissioning stages are in the scope of work. Gaskets, packing & spares for replacement will be provided free of charges by BHEL.

17.7
After chemical cleaning / pickling of lubricating system (including oil piping, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems as per instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machinery before and after oil flushing is in the scope of work.

17.8
Transportation of oil drums from customer's / BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during trials, tests and commissioning is included in the scope of this contract. The Contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, for various pre-commissioning / commissioning activities / processes mentioned in various clauses, transport of chemicals from BHEL / customer's stores, charging of chemicals into the system and returning of remaining chemicals and the empty containers of the chemicals to customer / BHEL stores is the responsibility of the Contractor.

17.9
During trial runs/ tests, pre-commissioning / commissioning, replacing / changing mechanical / other seals of equipments like pumps, removal and cleaning / replacing of filters etc is within the scope of work. Replacement spares for this purpose will be provided by BHEL.

17.10
In case any defect is noticed during tests, trial runs of all equipments and their auxiliaries, such as interferences, rubbing, loose components, abnormal noise or vibration, strain on connected equipment etc the Contractor shall immediately attend to these defects and take necessary corrective measures. Readjustment and/or realignment, if necessary, shall be done as per BHEL engineer's instructions. Claim, if any, for these works shall be governed by relevant clauses of 'General Conditions of Contract provided the cause of such work is not attributable to the Contractor.

17.11

- ✓ Contractor shall cut / open / dismantle work, if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.

- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors /

agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as relevant clauses of 'General Conditions of Contract

17.12
During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc till such time the commissioned unit undergoes trial operations.

17.13
Commissioning activities will continue till the completion of trial operation. During this period Contractor shall make available the services of separate dedicated workforce comprising of suitable skilled and semi-skilled / un-skilled workmen and supervisory staff alongwith necessary tools and plants, consumables etc.

17.14
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period alongwith BHEL Engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

17.15
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

17.16
At various stages of completion boiler has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out the entire incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc. The boilers have a permanent N_2 blanketing arrangement.

During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc., till such time the commissioned unit is taken over.

17.17
Conducting of performance guarantee test (PG test) is in the scope of work. Contractor shall install all necessary tapping points; instruments etc and provide necessary assistance in this regard**.**

In case PG test is getting delayed beyond the contract period (normal plus extension if any) due to reasons not attributable to the Contractor, PG test issue will be mutually discussed and

decided. However installation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

17.18
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

18.1 PRESERVATION & PROTECTION OF COMPONENTS

At all stages of work, equipments/materials in the custody of Contractor, including those erected, will have to be preserved as per the instructions of BHEL. Necessary preservation agents including the primer & paint, for the above work shall be provided by the Contractor.

18.2
The Contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.

18.3
Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of Contractor in compliance of this requirement, BHEL will make suitable arrangement at Contractor's risk and cost.

18.4
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc shall be returned to BHEL stores by the Contractor.

18.5
The Contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilisation of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the Contractor. Decision of BHEL on this will be final and binding on the Contractor.

18.6
For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.