TENDER SPECIFICATION

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/AMRT1-BLR (Vertical Pkg) U-6,8 & 10 / 851**	270 MW BOILER VERTICAL PKG of **Unit 6, 8 & 10 (Block I)**
2	**BHE/PW/PUR/ AMRT1-BLR(Vertical Pkg) U-7 & 9 / 852**	270 MW BOILER VERTICAL PKG of **Unit 7 & 9 (Block II)**

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 & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE II, Unit No 6 to 10 grouped into Block 1 (Unit 6, 8 &10) and Block 2 (Unit 7 & 9).

AT

ADDITIONAL AMRAVATI INDUSTRIAL AREA,
INDIABULLS POWER LTD NANDGAONPETH, DIST- AMRAVATI MAHARASHTRA

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

CONTENTS			
Volume No	Description	No. of pages	Hosted in website bhel.com as files titled
NIL	Tender Specification Issue Details	1	(Part of **Vol-IA-851-852**)
NIL	Notice Inviting Tender	20	(Part of **Vol-IA-851-852**)
I-A	Technical Conditions of Contract	98	Vol-IA-851-852
I-B	Special Conditions of Contract	47	Vol-IBCD-851-852
I-C	General Conditions of Contract	29	(Part of Vol-IBCD-851-852)
I-D	Forms & Procedures	59	(Part of Vol-IBCD-851-852)
II	Price Bid Specification	5	Vol-II-851-852

Tender Specification Issue Details

Sl No	Tender Specification Number	Unit Number & Project
1	**BHE/PW/PUR/AMRT1-BLR(Vertical Pkg) U-6,8 & 10/851**	270 MW BOILER VERTICAL PKG of **Unit 6, 8 & 10 (Block I)**
2	**BHE/PW/PUR/ AMRT1-BLR(Vertical Pkg) U-7 & 9/852**	270 MW BOILER VERTICAL PKG of **Unit 7 & 9 (Block II)**

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 & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE II, Unit No 6 to 10 grouped into Block 1(Unit 6,8 &10) and Block 2 (Unit 7 & 9)

AT

ADDITIONAL AMRAVATI INDUSTRIAL AREA,

INDIABULLS POWER LTD

NANDGAONPETH, DIST- AMRAVATI

MAHARASHTRA

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 :

851
&
852

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/ AMRT1- BLR/851,852 Date: 13/05/2011

NOTICE INVITING TENDER (NIT)

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

==========

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/AMRT1- BLR (Vertical pkg) /U-6,8 & 10 / 851** ○ **BHE/PW/PUR/AMRT1-BLR(Vertical Pkg)/ U-7 & 9 / 852**	
ii	**Broad Scope of job**	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 & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF **5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE II,** UNIT NO 6 TO 10 GROUPED INTO **BLOCK 1 (UNIT 6,8 &10) AND BLOCK 2 (UNIT 7 & 9).** **(BLOCK 1 and BLOCK 2 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	**SAles of Tender Documents**	***13/05/2011 1to 01/06/2011***	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 02/06/ 2011 , 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/ Sr Manager (Purchase) RK Ranade/ Manager (Purchase) Pratish Gee Varghese / Engineer(Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***1 hour 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 Kanwarjit Singh, IRS(Retd) D-6/12, Ground Floor, Vasant Vihar, New Delhi - 110 05 E-Mail: kanwarfeb@gmail.com	*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 intimated by Fax/E-mail. Bidders to keep themselves updated with all such information	***A****pplicable*

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)

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)	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 No Deviation with respect to tender clauses and no additional clauses/ suggestions/ in Techno-commercial bid/ Price bid shall normally 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 as per the following:

I. **Assigning Weightages (A) for Similar Jobs Under-Execution**: Weightages shall be worked out and assigned based on the average number of Similar Works under execution including works yet to be commenced by the agency, in the following manner:

i). Number of Similar Jobs
- a) No. of jobs in BHEL, PSER : Say 'J'
- b) No. of jobs in BHEL, PSSR : Say 'K'
- c) No. of jobs in BHEL, PSWR : Say 'L'
- d) No. of jobs in BHEL, PSNR : Say 'M'
- e) No. of jobs with other customers* : Say 'N' (*: Other than BHEL PSER, PSSR, PSWR & PSNR)
- f) Average No. of Jobs is 'P'= (J+K+L+M+N) divided by 5

ii) Weightage "A" assigned to bidders based on Average Number of jobs "P";
- a) If 'P' = 0-1, "A" will be equal to '3'
- b) If 'P' = 2-3, "A" will be equal to '2'
- c) If 'P' = 4-5, "A" will be equal to '1'
- d) If 'P' is Above 5, "A" will be equal to '0'

II. **Weightage "B" for Quarterly Performance Reports of Vendors**: This shall be based on the averages of the net weighted score obtained by the bidder for the jobs under execution (excluding works not commenced) for the quarter previous to the last quarter reckoned from the date of latest due date of submission, in all four Regions i.e BHEL PSER, PSSR, PSWR & PSNR, in the following manner.

i). Ratings by Power Sector Region:
- a) PS ER's Rating 'R**e**r' = $(X_1 + X_2 + .. + X_n)$ divided by n
- b) PS WR's Rating 'R**w**r' = $(X_1 + X_2 + .. + X_n)$ divided by n
- c) PS SR's Rating 'R**s**r' = $(X_1 + X_2 + .. + X_n)$ divided by n
- d) PS NR's Rating 'Rnr' = $(X_1 + X_2 + .. + X_n)$ divided by n
- e) **Over all Power Sector Region Rating 'R_{BHEL}'**= (R**e**r+ R**w**r+ R**s**r+ R**n**r) divided by 4

(where "X_1, X_2, X_3,…X_n" is the net weighted score obtained by the bidder as per the "Evaluation of Contractor Performance (Quarterly)" against the various contracts 'n' under execution in the respective Region).

ii) Weightage "B" assigned to bidders based on Overall Power Sector Rating **(R_{BHEL}):**

a) If **R_{BHEL}** is 80% and above, "B" will be equal to '6'
b) If **R_{BHEL}** is > 70% < 80%, "B" will be equal to '5'
c) If **R_{BHEL}** is > 60% < 70%, "B" will be equal to '4'
d) If **R_{BHEL}** is = < 60%, "B" will be equal to '0'

III. Evaluation of Bidders capacity to execute the job under tender: shall be based on the sum of scores obtained in 'A' and 'B', as below:

a) 6 or above : Considered 'Qualified' for the job under tender
b) Less than 6: Considered 'NOT Qualified' for the job under tender

IV. **Explanatory note**:

a) Similar work means Boiler or Turbine or Civil or Electrical or CI, etc irrespective of rating of Plant
b) Quarter shall be as per the quarter defined in the "Evaluation of Contractor performance (Quarterly)". For contracts where annexed Quarterly Evaluation performance was not part of the contract, 'Quarterly Performance Reports' previous to the last quarter reckoned from the date of latest due date of submission, given by the respective project site against the contract will be the basis for evaluation.

c) Vendors who are not executing any jobs presently in the Region and first timers to the Region, may be considered subject to satisfying all other tender conditions

d) 'Under execution' shall mean works in progress upto Boiler Steam Blowing (for Boiler and Auxilliaries) or Synchronisation (for all other jobs including Civil) shall be considered.

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 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. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of above.

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 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 (xi) of 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 pre-qualification evaluation/ techno-commercial bids, approval/ acceptance of customer (as applicable), etc. and date of opening of price bids shall be intimated to only such bidders.

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) or specified otherwise in SCC of tender.

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 In case Consortium Bidding is allowed as per Pre Qualifying Requirement, then Prime Bidder and Consortium Partner shall enter into Consortium Agreement. Validity period of Consortium Agreement shall be 6 months after which the same can be re validated.
'Stand alone' bidder cannot become a '**prime bidder' or a 'consortium bidder' in a consortium 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. .

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 & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, ELECTROSTATIC PRECIPITATOR, FANS, POWER CYCLE PIPING, COAL MILLS AND COAL FEEDERS, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF **5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE II, UNIT NO 6 TO 10 GROUPED INTO BLOCK 1(UNIT 6,8 &10) AND BLOCK 2 (UNIT 7 & 9).**
TENDER NO	○ **BHE/PW/PUR/AMRT1-BLR(Vertical Pkg)U-6, 8 &10 / 851** ⊖ **BHE/PW/PUR/AMRT1-BLR(Vertical Pkg)U-7 & 9 / 852**

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	**APPLICABLE (Bidders shall submit duly filled & Signed Annexure III of NIT)**	
B	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT	**APPLICABLE**	
C	**Technical** **C) Bidder must have, achieved any one of the following:** **C.1)** Bidder must have, in last seven years as on 30/04/2011, executed Erection, Testing and Commissioning (Upto Boiler Light Up of the Unit or beyond) of any one of the following listed works : **c.1.1)** One Unit of Coal Fired Boiler of rating 190 MW or higher OR **c.1.2)** Two Units of Coal Fired Boiler of 100 MW or higher rating **C.2)** Bidder should have been Techno Commercially Qualified for E & C works of Coal Fired Boiler in any of the following jobs in last 3 years as on 30/04/2011 by any power sector region of BHEL: **c.2.1)** 1 unit of 490 MW or higher rated unit, OR, **c.2.2)** 2 units of 190 MW or higher rated unit in a single tender **C.3**) Bidder should be empanelled with BHEL-PSWR for M-VP-3 (Boiler Vertical Package Rating above 300 MW) or M-VP-2 (Boiler vertical Package of Rating		

	between 100 MW to 300 MW) category		
D 1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of **Rs 1410 Lakhs** or more over last three Financial Years (FY) i.e. 2008-2009, 2009-2010, 2010-2011 if Annual Accounts for FY 2010-11 are audited or for, 2007-2008, 2008-2009 and 2009-2010 if not audited		
2	NETWORTH Net worth of the Bidder based on the latest Audited Accounts as furnished for 'D1' above should be positive		
3	PROFIT Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three years defined in 'D1 above based on latest Audited Accounts.		
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	**NOT APPLICABLE**	
	Explanatory Notes for QR 1. The word 'executed' means the bidder should have achieved the criteria specified in the QR even if the total contract has not been completed or closed 2. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as given above along with all annexures		

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

NOTE:

Agencies who have been AWARDED any job of E & C of 'Boiler Vertical Package' in Phase I (Unit 1 to 5) at subject project (Indiabulls Amravati Thermal Power Project) by BHEL PSWR shall not be considered for subject tenders.

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	Applicable	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 - 4

IMPORTANT INFORMATION

There are 5 Units of 270MW Boiler Vertical package, which is divided into 2 Blocks. Block – I comprises of (Unit # 6, 8 & 10) and Block – II comprises of (U # 7 & 9).

1. Tender specification (Volume I) is common for all the 5 units.
2. Both the BLOCKS shall be awarded to separate agencies.
3. Rates for E & C of One unit of 270 MW Boiler Vertical Package has been invited in Volume II price bid specification.
4. Bidders are required to submit their rates/price for One Unit of 270 MW Boiler Vertical Pkg only in Volume II Price bid
5. L-1 bidder shall be considered for award of BLOCK 1 (Unit 6, 8 & 10).
6. For award of BLOCK 2 (Unit 7 & 9), 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 Per unit rate/price, with the Awarded per unit rate/price of BLOCK I. In case none of the bidders agree to match the Awarded per unit rate of BLOCK I, then BHEL may consider awarding the BLOCK 2 (Unit 7 & 9) to L-1 bidder or opt any other suitable method to finalize BLOCK 2 (Unit 7 & 9).
7. In case after award of job, the agency fails to display satisfactory performance in execution of job and BHEL feels it is necessary to make alternate arrangement to execute balance work or any portion of work on risk purchase basis or otherwise, then BHEL reserves the right to exercise the method mentioned in Sl No 6 to finalize another/additional agency.

8. PRICE VARIATION COMPENSATION

Refer Clause 2.17 of Volume I C 'General Conditions of Contract' (Price Variation Compensation): For the purpose of calculating PVC, following 'Commodities shall be reckoned for the respective categories:

Category	Commodity to be Used for PVC Calculation
Electrode	**Welding Rod**(Individual Commodity)
High Speed Diesel	**High Speed Diesel** (Individual Commodity)
Cement	**Grey cement** (Individual Commodity)
Structural & Reinforcement Steel	**a1. Iron & semis** (Group Item)
Materials (Other than Cement & Steel)	**All Commodities**(Group Item)

9. INTEREST BEARING RECOVERABLE ADVANCE

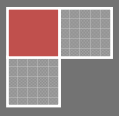
Refer Clause 2.13 of Volume I C 'General Conditions of Contract' (Interest Bearing Recoverable Advance): Following additional points shall be noted:

- **Bank Guarantee towards 'Interest Bearing Advance' shall be atleast 110% of the advance so as to enable recovery of not only principle amount but also the interest portion, if so required.**
- **'Interest Bearing Recoverable Advance' shall not be paid in less than two installments. Contractor shall establish the utilization of advance drawn before the release of next installment.**

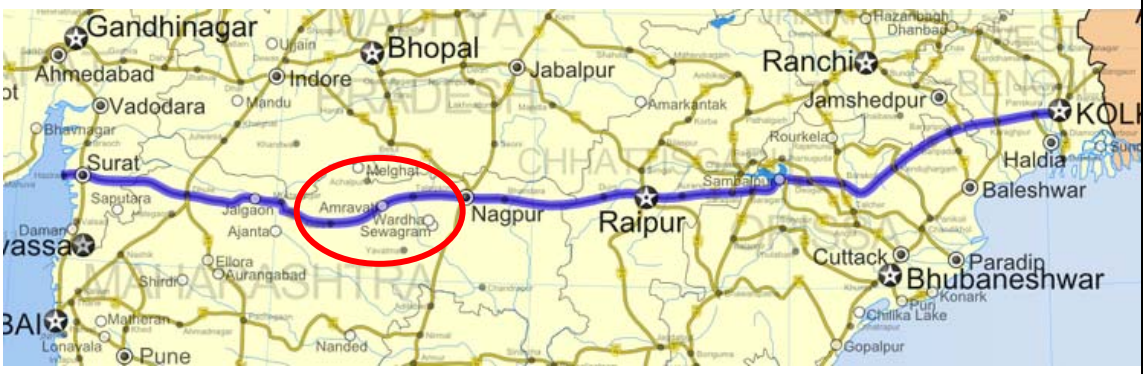
851
&
852

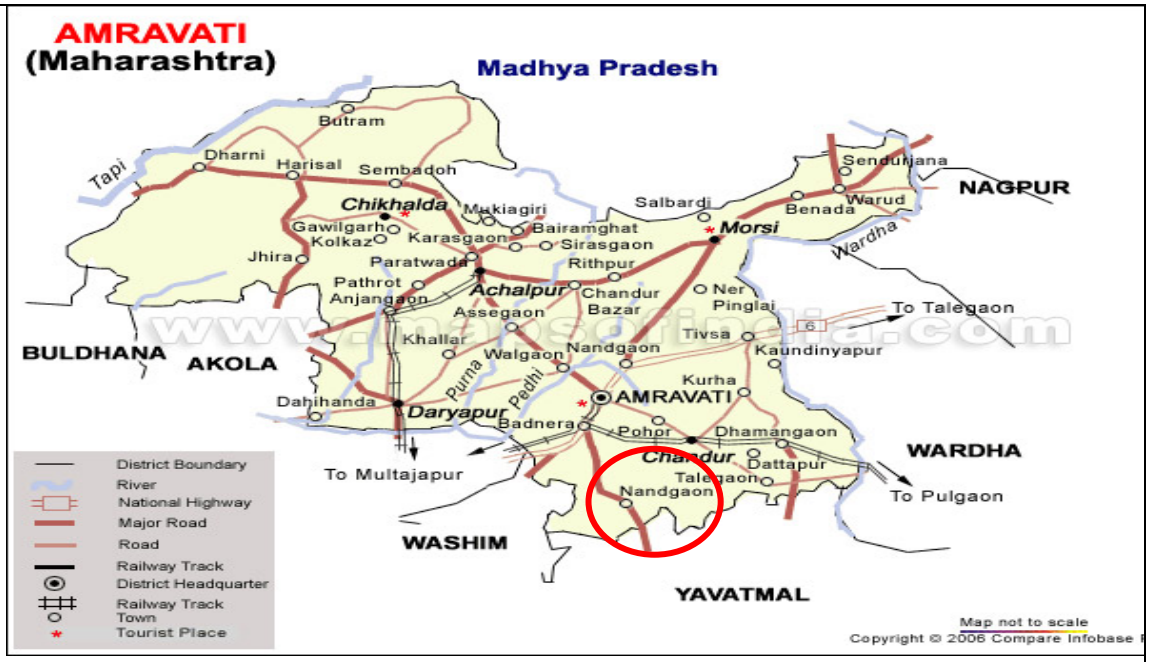
TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

1.0	**Project Information**
1.1	**BACKGROUND** INDIABULLS POWER LTD. is setting up a coal based 5x270 MW Thermal Power Project at Nandgaonpeth, Additional Amravati Industrial Area, Dist: Amravati, Maharashtra. Project Site is located at a distance of 22 KM from Amravati District on NH-6 near Nandgaonpeth. Nearest Railwaiy Station : Badnera about 20 KM from project site. Badnera is located at a distance of 175 KM from Nagpur on Howrah - Mumbai main line of Central Railways passing through Sevagram, Wardha, Pulgaon, Dhamangaon, Badnera. Nearest Highway : National Highway No NH-6 (Surat to Kolkata). Highway passes through Jagaon, Amravati, Nagpur, Raipur 



Nearest Airport : Nagpur 150 KM (By road)

1.2 CLIMATE

Amravati is located between 20°56′N 77°45′E to 20.93°N 77.75°E. It has an average elevation of 343 metres. Amravati has a tropical wet and dry climate with hot, dry summers from March to June, the monsoon season from July to October and warm winters from November to March. As far as the climate of the city is concerned, one can notice extreme variations in the temperatures. The summers in Amravati are very hot. The maximum as well as continuous rainfall is received, from the South Westerly monsoons, in the months of July and August.

Max Temp	:	44.5 Deg. C.
Min Temp	:	12.4 Deg. C
Rainfall	:	841.80 MM (Average)
Seismic Zone	:	Zone III as per IS : 1893

The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder.

2.0 SCOPE OF WORK

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

1) 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 etc of Block 1(Unit 6, 8, & 10) and Block 2 (Unit 7 & 9) of 5x270 MW Phase II India Bulls Amravati Project.

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, Blowers etc. with their drives & Lube Oil System etc.)
- ✓ Pulverised Fuel Piping
- ✓ External structures (e.g. Duct supporting, pipe rack structures etc.) 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 & Gallaries
- ✓ Chemical Dozing System
- ✓ Entire piping supplied by PC Chennai (SG piping, TG piping, LP piping)
- ✓ Deareator along with their structure.

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

4) Transportation / Dragging of boiler drum from unloading bay to inside boiler structures and positioning on ground, erection using Strand Jack Method including final alignment.

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) Surface preparation and Final Painting of erected items

9) Trial Operation and associated tests

10) Making the units ready for PG test and assistance for conductance.

11) Completion of all facilities/systems including completion of all pending works / points.

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**			

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Open space for labour colony (as per availability)	Yes		Space will be provided if available; Location will be finalized after joint survey with owner.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	**ELECTRICITY**			
3.2.1	**Electricity For construction purposes** of Voltage 415/440 V			FREE
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an 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**			CHARGEABLE as per standard rates

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an 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	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**			CHARGEABLE
a	Single point source		**YES**	Power may be drawn from owner's given point within plant boundary.
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:**			FREE

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Making the water available at single point	Yes		In case of inadequate supply / non-availability of construction water from customer, contractor shall have to arrange construction water at his own expenses.
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**			FREE
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**			

Sl.No	Description **PART I**	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
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	
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**			
3.7.0	**Demobilization of all the above facilities**		**YES**	
3.8.0	**TRANSPORTATION**			

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

				FOR EACH UNIT
SN	**DESCRIPTION**	**CAPACITY (MINIMUM)**	***MINIMUM* QUANTITY**	***REMARKS***
1	Mobile Crane	18 MT	2	
2	Pick & Carry Crane	8-10 MT	2	
3	Trailer with Prime Mover	30 MT	2	
4	Trailer with Prime Mover	20 MT	2	
5	Truck	9 MT	1	
6	Passenger cum Goods Elevator	1.5 MT	1	
7	Air Compressor (Electric/Diesel operated)	140 CFM, 7 Kg/cm^2	1	
8	Strand and Jack Arrangements for Boiler Drum Erection	Adequate to erect Boiler Drum	1 set	For Boiler Drum Erection
9	Nose assembly for Huck Bolting machine for ESP	For fastening 12 mm and 16 mm diameter Huck Bolts in ESP	12 mm – 2 sets, 16 mm – 1 set	
10	TIG Welding Set	As required	As required	
11	Plasma Cutting M/c.	For cutting up to 10 mm thick Stainless Steel	As required	
12	3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power	As required	As required	
13	Power Cable for drawl of Construction Power	As required	As required	
14	Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.)	As required	As required	
15	Radiography Arrangement with Radioactive Isotope Source	Iridium-192	2 sets	
16	Radiography Arrangement with Radioactive Isotope Source	Cobalt-60	1 set	
17	Theodolite of Required Accuracy	To ensure verticality of structural columns	1	
18	Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets	As required	2	

19	Chemical circulation pumps to handle acid solution, opr temp 80 deg cel, with drive motors, starter panel, cable, switch fuse unit etc. Suggested rating: 150 m^3, 120 – 150m WC, with 90 KW, 3000 Rpm, 150 amps motor. However, Contractor shall deploy the required capacity pump with accessories after obtaining written approval of BHEL.	As required	4 sets	
20	Arrangement for UT of higher thickness joints with recording facility	Type USN 50 or equivalent/ upgraded type	1 Set	
21	Electro-hydraulic pipe bending machine	Up to 2" Nb and 12 mm thick pipes	3 Sets	
22	Welding Generator (Electrical)	300 Ampere rating	As required	
23	Welding Generator (Diesel Operated)	300 Ampere rating	4 sets	
24	Radiography Film Viewer	As required	As required	
25	Hydraulic Pipe Bending Machine (manual)	For bending of pipes up to 50 mm Nb size	4 sets	
26	Baking Oven with thermostat and temperature gauge for welding electrodes	As required	3	
27	Holding Oven with thermostat and temperature gauge for welding electrodes	As required	2	
28	Portable Oven for welding electrodes	As required	25	
29	Electric Winch	3 Ton Capacity	5	
30	Electric Winch	1 Ton Capacity	5	
31	FILLING PUMP AND PRESSURIZING PUMP FOR HYDRO TEST	600 & 450 Kg per cm^2	01 No EACH	For Hydraulic test of Boiler and HP pipelines.
34	Furnace Maintenance Platform (Sky Climber)	0.5 MT	1	

35	Hand Winch	0.5 Ton Capacity	3	
36	Scaffolding Materials	Suitable for working at various heights	Adequate qty for parallel working in multiple work fronts.	
37	Profile making M/c	for aluminium sheet cladding work	As required	
38	Nibbling M/c		As required	
39	Shearing M/c		As required	
40	Water Pump to lift water to top of boiler	for refractory and other required activities	1 Set	
41	Portable Grinding M/c	As required	As required	
42	Portable Drilling M/c	As required	As required	
43	Chain Pulley Blocks	Up to 15 MT Capacity	As required	
44	Fire retardant Tarpaulins	As required	As required	
45	Fire Extinguisher	As required	As required	

For Block 1(Unit 6,8 &10) other than above T & Ps mentioned for each unit				
SN	**DESCRIPTION**	**CAPACITY (MINIMUM)**	***MINIMUM* QUANTITY**	***REMARKS***
1	Crawler Crane	75 MT	1	From BES of Unit # 6 to SYN of Unit # 6 with coal
2	Crawler Crane	75 MT	1	From BES of Unit # 8 to SYN of Unit # 8 with coal
3	Crawler Crane	75 MT	1	From BES of Unit # 10 to TO of Unit # 10
4	Crawler Crane	100 MT	1	From BES of Unit # 6 + 1 Month to SYN of Unit # 10 with coal.

For Block 2 (Unit 7 & 9) other than above T & Ps mentioned for each unit				
SN	**DESCRIPTION**	**CAPACITY (MINIMUM)**	***MINIMUM* QUANTITY**	***REMARKS***
1	Crawler Crane	100 MT	1	From BES Unit # 7 Plus 1 Month to SYN of Unit # 9 with coal.
2	Crawler Crane	75 MT	01	From BES of Unit # 7 to SYN of Unit # 7 with coal
3	Crawler Crane	75 MT	01	From BES of Unit # 9 to TO of Unit # 9

PASSENGER CUM GOODS ELEVATOR

Contractor, as part of his T&P, shall arrange, install, operate and maintain 1.5 MT capacity passenger-cum-goods elevator in boiler to facilitate access to various platform elevations upto top floor/boiler drum floor. The elevator shall conform to the national standard and industrial safety code as applicable. These shall be deployed at the time of Boiler Drum erection 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.

B: MEASURING AND MONITORING DEVISES (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) ALL THE TOOLS AND PLANTS REQUIRED FOR THIS SCOPE OF WORK, EXCEPT THE TOOLS & PLANTS PROVIDED BY BHEL ARE TO BE ARRANGED BY CONTRACTOR WITHIN THE QUOTED RATES. THE LIST IS SUGGESTIVE IN NATURE. ANY ADDITIONAL T&P REQUIRED TO BE ARRANGED BY THE CONTRACTOR.

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.

LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS: FOR EACH UNIT

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	HEAVY LIFT-HIGH REACH (HLHR) CRANE	01	FOR CEILING GIRDER LIFT
2	INDUCTION HEATING M/C	As required	FOR WELDING OF P-91 pipeline.
3	HUCK BOLTING MACHINE COMPLETE SET	01 SET	For ESP work.
4	AIR LEAK TEST EQUIPMENTS WITH ALL AUXILIARIES	01 SET	For leakage test of ESP.

For Block 1 (Unit 6, 8 & 10) other than above T & Ps mentioned FOR EACH UNIT

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
5	Crawler Crane 150 MT	01	After 2 months from BES of Unit # 6 to LU of Unit # 10
6	Crawler Crane 150 MT	01	After 2 months from BES of Unit # 8 to LU of Unit # 8

For Block 2 (Unit 7 & 9) other than above T & Ps mentioned FOR EACH UNIT

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
7	Crawler Crane 150 MT	01	After 2 months from BES of Unit # 7 to LU of Unit # 9

Note:

For HLHR Crane:

1. The crane at S.N. 1 i.e HLHR crane may be owned or hired by BHEL and will be used for erection of ceiling structures and equipment/components above boiler ceiling structure or components/equipment out of reach of other cranes or non-availability of other BHEL cranes or for activities that essentially 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. Contractor shall make necessary arrangements like lying 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.

Common for All:

2. The cranes may be BHEL owned or may be obtained on hiring basis including operating and maintenance crew.

3. Operator for BHEL owned crane will be provided by BHEL. Operators for hired crane will be provided by the hiring agency.

4. Contractor shall provide the fuel for BHEL provided cranes for his use.

5. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work.

6. Other T&P mention above, Contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.

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. Augmentation of BHEL T & P under special circumstances shall be discretion of BHEL.

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding intitial 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.

11.1.2 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 mobilise further resources (in addition to those required for activities under clause no. 11.1.1) 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.

11.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on it's 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 India Bulls the schedule of important milestones is as follows:

SL No.	Level 1 Milestones	UNIT - 6	UNIT 7	UNIT 8	UNIT 9	UNIT 10
1	**Start Boiler Erection**	**11-Jun-11**	**11-Aug-11**	**11 Oct-11**	**11 Dec -11**	**11-Feb-12**
2	Boiler Drum Lifting MT Tonnage completion)	11-Oct-11	11-Dec-11	11-Feb-12	11-Apr-12	11-Jun-12
4	Boiler Hydro Test	11-July-12	11-Sept-12	11-Nov-12	11-Jan-13	11-Mar-13
5	Boiler Light Up (BLU)	11-Oct-12	11-Dec-12	11 Feb-13	11-Apr-13	11 Jun- 13
6	Acid Cleaning	11-Nov-12	11-Jan-13	11-Mar-13	11-May-13	11-July-13
7	Steam Blowing completion and Safety Valve Floating	11-Dec-12	11-Feb-13	11-Apr-13	11 Jun-13	11 Aug -13
8	Synchronosation with oil	11 Jan-13	11-Mar-13	11-May-13	11-July-12	11-Sept-13
9	Synchronisation with coal firing	11-Feb-13	11-Apr-13	11-Jun-13	11-Aug-13	11-Oct-13
10	Completion of trail run	11-Apr-13	11-Jun-13	11-Aug-13	11-Oct-13	11-Nov-13
11	Completion of all facilities and completion of PG Test	11- July- 13	11-Sept 13	11- Nov -13	11- Jan - 14	11 - Feb14

The milestones above shown is tentative and may change based on the actual site condition. 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.

11.1.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **32 (Thirty Two) months for Block 1(Unit 6, 8 &10) and 29 (Twenty Nine) months for Block 2(Unit 7 & 9)** 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	--	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	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	--	--	--	--	--	--	--	2	--	--	--

	along with hydraulic test/pneumatic test)											
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)	--	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	--	1		2	1	--	--	1	1	--	1
2.10	ABO	--	1	1	2	1		1	1	1		1
2.11	Steam Blowing	--	--	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 Synchronisation	--	--	--	--	--	--	--	--	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	--	1	1	2	2	1	2	1	--	--
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**
	*INCLUDING NDE AND SR/HT WHERE EVER APPLICABLE (IF APPLICABLE, WEIGHTAGE OF 10%)											

8.0 TAXES, DUTIES, LEVIES (Rev 01 dated 15/03/2011)

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

Service Tax and Cess on Service Tax as applicable on Services are excluded from contractor's scope; therefore 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 10.3 %) 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,

I. **The name, address and the registration number of the contractor,**
II. **The name and address of the party receiving taxable service,**
III. **Description, classification and value of taxable service provided and,**
IV. **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) 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 **exclusive** of the same. Where such taxes are required to be paid by the contractor, this will be reimbursed on production of proof of payment made to the authorities by the Contractor. 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. The contractor has to take all necessary steps to **minimize tax on input goods** by purchasing the materials from any registered dealer of the concerned state only. In case contractor opts for composition, it will be with the prior express consent of BHEL. Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is

deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

8.1.4 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.

8.1.5 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.

8.1.6 Submission of Periodical Reports

Contractor shall submit periodical reports in respect of following aspects of operation:

1) Consumption of welding electrodes and gases
2) Consumption of construction power
3) Manpower reports
4) Daily and Monthly Progress reports
5) Field calibration reports

BHEL at site will inform formats for these reports.

8.1.7 It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours

8.2 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.

Dearator along with their structure.

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.
Vii) Supply of primer and paints for final painting
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

TRICHY SUPPLY

S N	PG	MA	PG MA Description	Weight (In MT)	Stage	S N of rate schedule
		1.1	**Structures**			
1	35	110	Main Columns Left	229.00	D	1.1
2	35	120	Main Columns Right	229.00	D	1.1
3	35	130	Main Columns Middle	100.55	D	1.1
4	35	140	Auxiliary Columns-Le	83.00	D	1.1
5	35	150	Auxiliary Columns-Ri	83.00	D	1.1
6	35	160	Airheater Columns	30.00	D	1.1
7	35	190	Girder Pin Connectio	7.00	D	1.1
8	35	210	Boiler Ceiling Struc	314.00	D	1.1
9	35	220	Boiler Ceiling Struc	66.50	D	1.1
10	35	230	Boiler Ceiling Struc	14.40	D	1.1
11	35	310	Horizontal Bracing I	19.80	D	1.1
12	35	320	Horizontal Bracing I	21.20	D	1.1
13	35	330	Horizontal Bracing I	18.50	D	1.1
14	35	340	Horizondal Bracing I	21.00	D	1.1
15	35	350	Horizondal Bracing V	15.60	D	1.1
16	35	360	Horizondal Bracing V	17.60	D	1.1
17	35	380	Landing Platforms	25.20	D	1.1
18	35	381	Land Platform Lower	43.30	D	1.1
19	35	390	Platform At Drum Flo	40.15	D	1.1
20	35	441	Horizontal Beams-Low	134.50	D	1.1
21	35	443	Horizontal Beams-Upp	112.80	D	1.1
22	35	511	Front Bracing-Lower	17.90	D	1.1
23	35	513	Front Bracing-Upper	17.50	D	1.1
24	35	521	Side Bracing-Lower	56.70	D	1.1
25	35	523	Side Bracing-Upper	48.90	D	1.1
26	35	531	Rear Bracing-Lower	38.65	D	1.1
27	35	533	Rear Bracing-Upper	30.25	D	1.1
28	35	700	HSFG Fasteners For P	9.20	D	1.1
29	35	811	Floor Grills And Gua	93.40	D	1.1
30	35	821	Stairs - Lower	25.15	D	1.1
31	35	823	Stairs - Upper	8.60	D	1.1
32	35	851	Hand Rails And Posts	27.45	D	1.1
33	35	993	Consumables And Erecti	20.00	D	1.1
34	36	310	Main Mbl Floor 11Th	36.50	H	1.1
35	36	311	Main Floor I Mbl 1St	38.35	H	1.1
36	36	320	Main Floor 12Th Leve	27.65	H	1.1
37	36	321	Main Floor Ii Mbl Is	41.60	H	1.1
38	36	322	Main Floor Ii Mbl 2N	118.95	H	1.1

39	36	330	Main Floor 13Th Leve	25.40	H	1.1
40	36	331	Main Floor Iii Mbl 1	28.60	H	1.1
41	36	340	Main Floor 14Th Leve	22.00	H	1.1
42	36	341	Main Floor Iv Mbl 1S	45.80	H	1.1
43	36	350	Main Floor 15Th Leve	43.50	H	1.1
44	36	351	Main Floor V Mbl Ist	23.60	H	1.1
45	36	352	Main Floor V Mbl Ii	7.75	H	1.1
46	36	360	Main Floor 16Th Leve	9.10	H	1.1
47	36	361	Main Floor Vi Mbl 1S	32.80	H	1.1
48	36	391	Miscellaneous Platfo	12.70	H	1.1
49	36	392	Miscellaneous Platfo	6.80	H	1.1
50	36	393	Miscellaneous Platfo	8.15	H	1.1
51	36	610	Boiler Roof Structur	68.00	H	1.1
52	36	611	Boiler Roof Sheeting	19.05	H	1.1
53	36	612	Weather Protection F	18.75	L	1.1
54	36	620	Boiler Side Cladding	46.00	L	1.1
55	36	621	Boiler Side Cladding	11.35	L	1.1
56	36	740	Posts And Hangers	35.00	H	1.1
57	36	811	Floorgrillsandguardp	28.70	H	1.1
58	36	813	Floorgrillsandguardp	52.40	H	1.1
59	36	820	Stairs And Ladders	5.70	H	1.1
60	36	851	Handrails And Posts	25.10	H	1.1
61	36	853	Handrails And Posts	10.70	H	1.1
62	38	299	Mill Handling Monora	36.00	L	1.1
63	38	310	Conn Platforms To Mi	30.00	N	1.1
64	38	410	Mill Maintanance Pla	41.50	N	1.1
65	38	810	Floorgrills And Guar	47.50	L	1.1
66	38	820	Stairs And Ladders	3.60	N	1.1
67	38	850	Hand Rails And Hand	16.50	L	1.1
68	38	993	Consumables And Erec	10.50	N	1.1
69	37	010	Blr Outer Csg Comps	17.00	L	1.1
70	37	810	Blr Outer Casing	31.00	L	1.1
Sub Total - 1.1 (Structures)				**3103.40**		
		1.2	**Pressure Parts**			
1	24	225	SV Silencer Support	17.40	L	1.2
2	24	235	Start Vent Sil Suprt	1.20	D	1.2
3	04	126	Upr Drum(Nointl)	133.60	D	1.2
4	04	136	Upr Drum Interls	4.05	D	1.2
5	04	146	Upr Drum Suspensn	12.85	D	1.2
6	05	137	Front Ww Lwr Inl Hdr	13.75	H	1.2
7	05	147	Rear Ww Lwr Inl Hdr	13.75	H	1.2
8	05	155	Side Ww Lwr Inl Hdr	16.75	H	1.2
9	05	175	Ext Side Ww Inl Hdr	1.30	H	1.2
10	05	227	Rear Ww Hang Out Hdr	2.75	H	1.2

11	05	229	Rear Ww Scrn Out Hdr	5.30	H	1.2
12	05	231	Front Ww Upr Out Hdr	3.80	H	1.2
13	05	251	Side Ww Upr Out Hdr	6.85	H	1.2
14	06	400	Burner Panel	15.90	H	1.2
15	06	631	Front Upper Ww Panel	31.10	H	1.2
16	06	634	Front Inter Ww Panel	41.30	H	1.2
17	06	637	Front Lower Ww Panel	23.00	H	1.2
18	06	644	Rear Inter Ww Panel	43.20	H	1.2
19	06	647	Rear Lower Ww Panel	23.00	H	1.2
20	06	651	Side Upper Ww Panel	64.10	H	1.2
21	06	655	Side Lower Ww Panel	57.70	H	1.2
22	06	670	Extd Side Ww Panel	8.30	H	1.2
23	07	108	Downcomer Upper Ppg	64.80	H	1.2
24	07	109	Downcomer Lower Ppg	86.50	H	1.2
25	07	215	Side Relief Tubes	23.60	H	1.2
26	07	216	Hanger Relief Tubes	21.90	H	1.2
27	07	218	Front Relief Tubes	7.57	H	1.2
28	07	223	Furn Screen Tubes	22.50	H	1.2
29	07	225	Furn Rear Hgr Tubes	9.70	H	1.2
30	07	226	Furn Rear Arch Tubes	19.50	H	1.2
31	07	231	Lwr Corner Trns Tube	1.80	H	1.2
32	07	232	Upr Corner Trns Tube	0.50	H	1.2
33	07	401	Ww Hdr Suspension	15.20	H	1.2
34	07	410	Downcomer Suspension	12.00	H	1.2
35	07	420	Dc Seismic Guides	4.60	H	1.2
36	07	431	Riser Tube Support	2.10	H	1.2
37	07	500	Misc Pr.Part Compnts	0.30	H	1.2
38	07	501	Furn Insert Tubes	2.15	H	1.2
39	07	601	Pressure Part Seals	0.80	H	1.2
40	07	700	Bulked BPS Items	0.90	H	1.2
41	07	992	Imported Electrodes	0.10	H	1.2
42	07	993	Erec Matls, Consumes	0.45	H	1.2
43	10	135	Hor Space Sh Inlhdr	7.20	H	1.2
44	10	174	Ver Space Sh Inl Hdr	11.05	H	1.2
45	10	178	Ver Platn Sh Inl Hdr	6.90	H	1.2
46	10	182	Sh Rear Wall In Hdr	3.80	H	1.2
47	10	183	Side Wall Sh Inl Hdr	5.40	H	1.2
48	10	184	Extsidewal Sh In Hdr	0.63	H	1.2
49	10	185	Front Wall Sh In Hdr	3.70	H	1.2
50	10	191	Rad Roof Sh Inl Hdr	2.84	H	1.2
51	10	235	Hor Space Sh Out Hdr	8.60	H	1.2
52	10	274	Ver Space Sh Out Hdr	15.80	H	1.2
53	10	278	Ver Platn Sh Out Hdr	7.80	H	1.2
54	10	283	Side Wall Sh Out Hdr	4.95	H	1.2
55	10	284	Sh Exsidewall Outhdr	1.00	H	1.2
56	10	291	Rad Roof Sh Out Hdr	5.55	H	1.2
57	10	687	Roof Sh Junction Hdr	3.25	H	1.2

58	11	236	Hor Spc Sh Upr Coil	121.40	H	1.2
59	11	237	Sh Horztl Coil +Att	150.00	H	1.2
60	11	274	Ver Spaced Sh Coil	160.00	H	1.2
61	11	278	Ver Platen Sh Coil	96.00	H	1.2
62	11	616	Sh Rear Pnl	14.30	H	1.2
63	11	618	Sh Rear Pnl	6.90	H	1.2
64	11	684	Ext Sidewall Sh Pane	4.60	H	1.2
65	11	686	Sh Roof Pnl	15.40	H	1.2
66	11	687	Rear Roof Sh Panel	11.50	H	1.2
67	11	688	Sh Roof Panl+Hdr	15.10	H	1.2
68	11	691	Rad Roof Sh Panel	20.60	H	1.2
69	11	694	Ext Bottom Sh Panel	3.70	H	1.2
70	12	174	Verspace Sh Inl Link	5.00	H	1.2
71	12	184	Sidewall Sh Inl Tube	2.30	H	1.2
72	12	187	Rearroof Sh Inl Tube	1.50	H	1.2
73	12	535	Hor Spc Sh Terl Tube	34.50	H	1.2
74	12	803	Sh Sc Spacer Tubes	0.90	H	1.2
75	12	805	Sh Front Hanger Tube	5.10	H	1.2
76	12	850	Sh Conn Pipes Satur	5.30	H	1.2
77	12	852	Sh Desh Links	11.50	H	1.2
78	12	900	Sh Desh	2.35	H	1.2
79	12	903	Sh Miscl Components	24.80	H	1.2
80	12	906	Sh Link Supports	4.60	H	1.2
81	12	914	Expn-Sh Rad Roof Hdr	1.00	H	1.2
82	12	917	Suspn Of Radint Roof	3.50	H	1.2
83	12	924	Suspn-Sh Bakpass Hdr	13.90	H	1.2
84	12	927	Suspn Of Rear Roof	1.10	H	1.2
85	12	928	Suspn - Sh Rear Wall	4.70	H	1.2
86	12	944	Suspn-Sh Platen Hdrs	2.00	H	1.2
87	12	948	Susp-Vert Spacd Assy	19.80	H	1.2
88	12	954	Susp-Vert Spacd Hdrs	4.30	H	1.2
89	12	968	Suspn Of Platen Assy	11.20	H	1.2
90	12	992	Imported Electrodes	0.10	H	1.2
91	12	993	Erec Matls, Consumes	0.30	H	1.2
92	15	174	Ver Space Rh Inlhdr	5.00	H	1.2
93	15	274	Ver Space Rh Out Hdr	19.00	H	1.2
94	16	275	Verspc Rh Front Coil	61.50	H	1.2
95	16	277	Verspc Rh Rear Coil	85.50	H	1.2
96	17	904	Rh Hdr Suprt Ab Roof	7.00	H	1.2
97	17	919	Rh Front Suspension	7.80	H	1.2
98	17	929	Rh Rear Suspension	15.00	H	1.2
99	17	992	Imported Electrodes	0.10	H	1.2
100	19	114	Pt Eco Upr Coil&Sup	170.00	H	1.2
101	19	124	Pt Eco Lwr Coil&Sup	134.60	H	1.2
102	19	701	Eco Inlet Headers	5.60	H	1.2
103	19	702	Eco Outlet Headers	4.75	H	1.2
104	19	753	Eco Inter Rear Hdr	2.70	H	1.2

105	19	763	Eco Inter Front Hdr	2.70	H	1.2
106	19	783	Eco Inter Centr Hdr	2.70	H	1.2
107	19	802	Eco Hanger Tubes	20.00	H	1.2
108	19	850	Eco Feed Pipe	5.00	H	1.2
109	19	851	Eco Links To Drum	13.00	H	1.2
110	19	904	Eco Hdr Supt Ab Roof	11.00	H	1.2
111	19	905	Eco Hdr Supt Bl Roof	6.80	H	1.2
112	19	906	Eco Line&Link Suport	0.70	H	1.2
113	19	992	Imported Electrodes	0.05	H	1.2
114	21	600	S.B. Ppg & Fittings	6.61	N	1.2
115	21	601	S.B Piping Supports	5.69	N	1.2
116	21	700	Bulked Bps Comp	0.80	N	1.2
117	21	800	Sb Valves (Bhel)	0.50	N	1.2
118	21	825	Sb Valves (Subdely)	0.33	N	1.2
119	21	850	Sb Safety Valve Bhel	0.03	N	1.2
120	21	992	Imported Electrodes	0.05	N	1.2
121	24	260	Valves Bhel	22.80	H	1.2
122	24	265	Valves & Fittings Sd	7.12	L	1.2
123	24	273	Direct Wtr Lvl Gauge	0.25	L	1.2
124	24	275	Hdrs For Trim Pipe	0.92	H	1.2
125	24	280	Safety Val & Erv-Bhe	4.25	H	1.2
126	24	285	Sv&Erv Silncer Bhel	34.00	D	1.2
127	24	700	Bulked Bps Comp	0.31	H	1.2
128	24	955	Lap Tool SV&ERV	0.10	N	1.2
129	24	960	Lap Tool-Con Val(Bhe	0.05	N	1.2
130	24	987	BHEL-SV/ERV Comgspar	0.01	L	1.2
131	24	989	Bhel Valve Comg Spar	0.03	L	1.2
132	24	992	Imported Electrodes	0.04	L	1.2
133	24	993	Erec Matls, Consumes	0.01	H	1.2
134	24	994	Name Plates	0.25	N	1.2
135	97	297	Mtm Clamps & Pads	0.05	H	1.2
136	08	101	Furnace Upper Buckst	52.00	H	1.2
137	08	104	Furnace Intermediate	43.00	H	1.2
138	08	107	Furnace Lower Buckst	30.00	H	1.2
139	08	111	Furnace Rear Arch Bu	2.20	H	1.2
140	08	380	Furnace Bottom Suppo	33.50	H	1.2
141	08	400	Furnace Guide	12.80	H	1.2
142	08	500	Furnace Back Pass Bu	58.00	H	1.2
143	08	700	Ex.Movement Measurem	0.60	L	1.2
144	08	900	Furnace Key Buckstay	3.10	H	1.2
145	09	001	Seal Box Furn Openg	5.90	H	1.2
146	09	002	Seal Box Inst Openg	1.20	H	1.2
147	09	003	Matl For Inst Tappg	0.20	L	1.2
148	18	001	Fur Roof Skin Casing	10.50	L	1.2
149	18	010	Pr Parts Attach-Casg	2.10	H	1.2
150	18	020	Vibration Snubbers	0.30	H	1.2
151	20	051	Long Retract Sb M11E	23.38	N	1.2

152	20	054	Wall Box Npr Lrsb Mi	0.52	N	1.2
153	20	201	Wall Deslagger Rw5E	8.92	N	1.2
154	20	204	Wall Box Npr-Rw5E	1.11	N	1.2
155	20	511	Da Head Valve Assy	0.11	N	1.2
156	20	794	Wall Box Npr For Tp	0.06	N	1.2
157	20	972	Temp Probe Dupltc	1.55	L	1.2
158	28	220	Doors	5.70	L	1.2
159	28	700	Bps Fasteners	0.70	L	1.2
160	31	010	Comps Welded To Pr	3.50	H	1.2
161	31	102	Fur Bot Skin Csg	1.10	L	1.2
162	31	104	Fur Rear Arch Skin	5.50	L	1.2
163	31	105	Sec Pass Skin Csg	0.30	L	1.2
164	42	001	Pneumatic Fittings	0.13	L	1.2
165	42	002	Steam Blow Materials	2.00	L	1.2
166	42	005	Instrument Fittings	0.75	L	1.2
167	42	010	LFO Pump Set	7.00	L	1.2
168	42	020	HFO Pump Set	7.00	L	1.2
169	42	030	HFO Heater Set	26.50	L	1.2
170	42	046	Do Pump-Motor Assy	0.50	L	1.2
171	42	065	Drain Oil Tank	6.00	L	1.2
172	42	070	Burner Stn Skid Asly	4.50	L	1.2
173	42	120	Piping,Ph Fuel Oil	9.60	L	1.2
174	42	128	Piping,P.House Stm	0.60	L	1.2
175	42	150	Piping, Oflr Hfo/Trc	5.20	L	1.2
176	42	152	Piping,Op.Flr Lfo	1.60	L	1.2
177	42	154	Piping,Op.Flr Do	2.10	L	1.2
178	42	157	Piping,Op.Flr Air	1.20	L	1.2
179	42	158	Piping,Op.Flr Stm	2.50	L	1.2
180	42	200	Sub.Del FO System	3.24	L	1.2
181	42	300	BHEL Valve F.O. Sys	1.50	L	1.2
182	42	358	B.Valve,Op.Flr Stm	0.60	L	1.2
183	42	700	Bulked Bps Component	1.30	L	1.2
184	42	992	Imported Electrodes	0.03	L	1.2
185	45	220	Wbox Assy 22-In	63.00	H	1.2
186	45	221	Wbox Suprt 22-In	6.40	L	1.2
187	32	010	Ficom Blr Pp Insul	7.50	H	1.2
188	32	110	Ficom Blr Mntg Insul	3.70	L	1.2
189	32	120	Ficom Sb Pipes Insul	1.50	N	1.2
190	32	310	Ficom Air Ducts Insu	33.00	L	1.2
191	32	410	Ficom Ah Gas Ducts I	8.00	L	1.2
192	32	510	Ficom Id Ducts Insul	44.00	L	1.2
193	32	710	Ficom Oil Syst Insul	1.50	S	1.2
	Sub Total - 1.2 (Pressure Parts)			**2930.60**		
		1.3	**Non Pressure Parts (Up to ESP inlet funnel)**			

1	30	103	Seal Plate Assy	2.85	L	1.3
2	30	105	Fur Bottom Encl Fram	5.40	L	1.3
3	30	211	Fur Rear Arch Encl	1.90	L	1.3
4	30	212	Fur Extd Bot Encl	8.00	L	1.3
5	30	215	Main Boiler Encl	3.90	L	1.3
6	30	219	Vert Roof Encl	42.00	L	1.3
7	30	220	Deck Sprt And Seals	27.00	L	1.3
8	41	350	Acoil Gun Assy	0.90	L	1.3
9	41	390	Oil Gun Vice&Rack	0.90	L	1.3
10	41	500	Hea Ignitor	0.65	L	1.3
11	43	004	Assy Scnr&Gun Air Sy	1.70	L	1.3
12	43	005	Assy Mill Air System	18.00	L	1.3
13	43	104	M/C Scnr&Gun Air Sys	12.00	L	1.3
14	43	105	M/C Mill Air System	17.00	N	1.3
15	43	200	Subdel,Ignr,Scnr Air	10.00	L	1.3
16	47	221	Fuel Pipe Suprt 22In	20.00	N	1.3
17	47	223	Coupling,Orifice Etc	24.30	L	1.3
18	47	229	St Pipe& Shop Bends	280.00	N	1.3
19	48	012	Sq.Duct-Fdfan To A.H	50.00	L	1.3
20	48	014	Exp.Pcs-Fdfan To A.H	8.00	L	1.3
21	48	015	Support-Fdfan To A.H	12.00	L	1.3
22	48	019	Airduct Sup Fdn Matl	3.00	D	1.3
23	48	022	Sqduct Fdfan Intrcon	30.00	L	1.3
24	48	112	Sq.Duct-Pafan-Pri-Ah	45.00	S	1.3
25	48	114	Exp.Pcs-Pafan-Pri-Ah	5.00	S	1.3
26	48	115	Support-Pafan-Pri-Ah	15.00	S	1.3
27	48	141	Seal Air Hag&Id Gate	5.00	S	1.3
28	48	142	Sq.Duct-Coldairbus	35.00	S	1.3
29	48	144	Exp.Pcs-Coldairbus	6.00	S	1.3
30	48	145	Support-Coldairbus	5.00	S	1.3
31	48	200	Ins Tappings On Duct	5.00	L	1.3
32	48	202	Sqduct Ah-Wind Box	60.00	L	1.3
33	48	204	Exppcs Ah-Wind Box	15.00	L	1.3
34	48	205	Suport Ah-Wind Box	8.00	L	1.3
35	48	207	Flowmtr-Sec Airflow	8.00	L	1.3
36	48	212	Sqduct Wind Box Conn	15.00	L	1.3
37	48	214	Exppcs Wind Box Conn	5.00	L	1.3
38	48	222	Sqduct Ah-Hotairbus	28.00	L	1.3
39	48	224	Exppcs Ah-Hotairbus	7.00	L	1.3
40	48	225	Suport Ah-Hotairbus	8.00	L	1.3
41	48	382	Sq Duct Eco-Airheatr	72.00	H	1.3
42	48	384	Expnpcs Eco-Airheatr	15.00	L	1.3
43	48	385	Support Eco-Airheatr	25.00	L	1.3
44	48	432	Sqduct Ah-Blroutfl	50.00	L	1.3
45	48	434	Exppcs Ah-Blroutfl	6.00	L	1.3
46	48	435	Suport Ah-Blroutfl	7.00	L	1.3
47	48	462	Sqduct Blroutfl-Ep	120.00	L	1.3

48	48	464	Exppcs Blroutfl-Ep	16.00	L	1.3
49	48	465	Suport Blr Outfl-Ep	12.00	L	1.3
50	48	662	Sq.Duct Hotbus-Mills	65.00	S	1.3
51	48	664	Expnpcs Hotbus-Mills	9.00	S	1.3
52	48	665	Supports For Hot Pa	8.00	S	1.3
53	48	667	Venturi.Pri Air Flow	9.00	S	1.3
54	48	700	Bulked Bps Component	5.00	L	1.3
55	48	993	Erecton-Materials	4.00	L	1.3
56	99	400	Scaph,Raph Handlg Eq	1.00	N	1.3
57	99	512	Furn Cradl-2Walc	1.50	N	1.3
Sub Total - 1.3 (Non Pressure Parts (Up to ESP inlet funnel))				**1280.00**		
		2.1	**Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)**			
1	67	204	Raw Coal Gates	10.00	N	2.1
2	67	272	Coalvalve-36 Mot Opr	5.76	N	2.1
3	67	276	Rawcoal Gate-Chain36	6.50	N	2.1
4	67	283	Fdr Isolation Gate	7.50	N	2.1
5	67	801	Down Spout	20.00	N	2.1
6	67	802	Bunker Emptyingchute	15.00	N	2.1
7	67	803	Feed Pipe To Mill	10.00	N	2.1
8	65	736	36Gravimetric Feeder	38.20	N	2.1
Sub Total - 2.1 (Non Pressure Parts (Up to ESP inlet funnel))				**112.96**		
		2.2	**Handling Eqipments of Rotating Machines**			
	99	100	Fan Handling Equipt	10.00	N	2.2
Sub Total - 2.2 (Handling Eqipments of Rotating Machines)				**10.00**		
		3.2	**Non Pressure Parts (ESP outlet funnel to Chimney)**			
1	39	101	Columns Frames Befor	45.75	L	3.2
2	39	102	Columns Frames Befor	57.30	L	3.2
3	39	140	Cols Frames Near I.D	233.80	L	3.2
4	39	150	Col Frames Betn I.D.	37.15	L	3.2
5	39	300	Platforms - External	77.70	L	3.2
6	39	301	Struc And Platform F	6.40	L	3.2

7	39	302	Struc For Motor Hood	9.15	L	3.2
8	39	303	Monorail Beams For F	65.60	L	3.2
9	39	304	Fan Handling Structu	29.70	L	3.2
10	39	305	Fan Handling Structu	23.15	L	3.2
11	39	700	HSFG Fasteners For P	0.65	L	3.2
12	39	810	Floor Grill	19.00	L	3.2
13	39	820	Stairs	4.20	L	3.2
14	39	850	Hand Rail And Hand R	10.25	L	3.2
15	39	993	Consumables And Erec	12.50	L	3.2
16	48	482	Sq.Duct-Ep/Mp-Idfan	95.00	L	3.2
17	48	484	Expnpcs Ep/Mp-Idfan	17.00	L	3.2
18	48	485	Support Ep/Mp-Idfan	15.00	L	3.2
19	48	492	Sq.Duct Idfan-Chimny	118.00	L	3.2
20	48	494	Expnpcs Idfan-Chimny	14.00	L	3.2
21	48	495	Suport Idfan-Chimney	20.00	L	3.2
	Sub Total - 3.2 (Non Pressure Parts (ESP outlet funnel to Chimney)			**911.30**		
		4.2	**Piping -AS**			
1	24	200	Trim Pipes&Fittings	34.40	H	4.2
2	24	215	Sprwat Syst Rh Uty	2.35	L	4.2
3	24	316	Rh Desh	2.00	L	4.2
	Sub Total - 4.2 (Piping -AS)			**38.75**		
		4.4	**Piping -CS(LP)**			
1	24	220	Sv Escape Pipes	18.90	L	4.4
2	24	240	Sample Cooler&Suprt	0.55	L	4.4
3	24	350	Blr Filling Piping	2.00	H	4.4
	Sub Total - 4.5 Piping -CS(LP)			**21.45**		
		4.6	**Piping -Hangers and supports**			
1	24	201	Trim Piping Supports	6.70	H	4.6
2	24	351	H&S Blr Filling Ppg	2.00	H	4.6
	Sub Total - 4.6 Piping -Hangers and supports			**8.70**		
		5.1	**Insulation- Insulation**			
1	33	924	Misc Eqpts Asb Matls	0.20	S	5.1
2	33	975	Misc Eqpts Seal Comp	0.20	L	5.1
	Sub Total - 5.1 Insulation- Insulation			**0.40**		

		5.2	**Insulation- Pourable and castable**			
1	33	201	Main Blr Ref Is8	0.50	L	5.2
2	33	212	Main Blr Cast Ref Gr	72.00	L	5.2
3	33	230	Main Blr Pour Insul	150.00	L	5.2
	Sub Total - 5.2 Insulation- Pourable and castable			**222.50**		
		5.3	**Insulation- Iron Parts**			
1	33	970	Misc Eqpts Exp Metal	8.00	L	5.3
2	33	971	Misc Eqpts Ww Cloth	0.70	L	5.3
	Sub Total - 5.3 Insulation- Iron Parts			**8.70**		
		5.5	**Insulation-Wool Mattress**			
1	33	021	Blr Pp Minrl Wool	96.00	L	5.5
2	33	121	Blr Mntngs Minrl Woo	5.00	L	5.5
3	33	126	Sb Pipes Minrl Wool	3.50	N	5.5
4	33	321	Air Ducts Minrl Wool	105.00	L	5.5
5	33	421	Ah Gas Ducts Minrl W	22.00	L	5.5
6	33	521	Id Ducts Minrl Wool	35.00	L	5.5
7	33	721	Oil Syst Minrl Wool	4.00	S	5.5
	Sub Total - 5.5 Insulation-Wool Mattress			**270.50**		
Total (1.1+1.2+1.3+2.1+2.2+3.2+4.2+4.4+4.6+5.1+5.2+5.3+5.5)				**8919.26**		

BAP RANIPET SUPPLY

S N	PGMA	Description	Weight (In MT)	Stage	S N of rate schedule
	1.2	**Pressure Parts**			
1	50510	STEAM COIL A P H	5.00	BLU	1.2
2	52000	SPECIAL TOOLS/CONTRA	0.43	BLU	1.2

3	52010	LARG AH-ROTOR ASSY	345.20	BLU	1.2
4	52011	LARG AH-ROTOR POST	15.56	BLU	1.2
5	52012	LARG AH-ROTORPINRACK	3.80	BLU	1.2
6	52013	LARG AH-ROTORSEALS	4.58	BLU	1.2
7	52030	LARG AH-ROTORHOUSING	42.77	BLU	1.2
8	52041	HOT END CONN PLATE	39.67	BLU	1.2
9	52042	COLD END CONN PLATE	58.00	BLU	1.2
10	52054	LARG AH-AXIAL SEAL	0.42	BLU	1.2
11	52055	LARG AH-BY PASS SEAL	0.88	BLU	1.2
12	52100	LARGE AH ROTOR DRIVE	3.54	BLU	1.2
13	52211	LARG AH-AIRSEAL PIPE	0.68	BLU	1.2
14	52220	LARG AH-GENS DETAILS	2.25	BLU	1.2
15	52261	LARG AH-GUIDE BEARNG	2.93	BLU	1.2
16	52262	LARG AH-SUPRT BEARNG	4.26	BLU	1.2
17	52271	OIL PIPING GUIDE BRG	0.52	BLU	1.2
18	52272	OIL PIPING SUPRT BRG	0.54	BLU	1.2
19	52274	LUB OIL CIRCULATION UN	1.11	BLU	1.2
20	52301	WASH MANIFLD GAS INL	0.60	BLU	1.2
21	52302	WASH MANIFLD GAS OUT	0.57	BLU	1.2
22	52326	CLEANG EQPT GAS OUT	0.34	BLU	1.2
23	52329	CLE EQPT DRIVE UNIT	1.57	BLU	1.2
24	52600	LARGE AH E,C&I COMPONE	0.15	BLU	1.2
	Sub Total - 1.2 (Pressure Parts)		**535.35**		
	1.3	**Non Pressure Parts (Up to ESP inlet funnel)**			
1	57013	DAMPERS BET FD FAN & A	8.20	BLU	1.3
2	57033	SA SCAPH INLET DAMPER	2.60	BLU	1.3
3	57063	SA SCAPH OUTLET DAMPER	3.20	BLU	1.3
4	57110	GUILLOTENE GATE PA FAN	11.30	SYN	1.3
5	57113	DAMPERS BETWEEN PAFAN	3.90	SYN	1.3
6	57143	DAMPER COLD AIR BUS(TE	1.75	BLU	1.3
7	57160	COLD AIRGATE, AIRBUS T	6.50	BLU	1.3
8	57203	DAMP APH TO WINDBOX DU	7.60	BLU	1.3
9	57209	MTG BKT FOR CL DAMPER	3.36	BLU	1.3
10	57223	DAMP APH PRIMARY SIDE	4.60	BLU	1.3
11	57270	GUILLOTENE GATE DUCT T	17.50	BLU	1.3
12	57273	DAMPER BOILER OUTLET	5.80	BLU	1.3
13	57383	FLUE GAS SAH INLET DAM	14.20	BLU	1.3
14	57433	DAMPER APH BOILER OUTL	17.90	BLU	1.3
15	57460	GUILLOTENE GATE EP INL	16.80	BLU	1.3
16	57466	PLATFORMS AND LADDERS	19.20	BLU	1.3

17	57470	EP OUTLET GATE	16.80	BLU	1.3
18	57480	ID FAN INLET GATE	13.80	BLU	1.3
19	57490	GUILLOTENE GATE ID FAN	14.60	BLU	1.3
20	57491	BLOWER WITH MOTOR	2.00	BLU	1.3
21	57577	ELECT ACTUATOR FOR GAT	8.00	BLU	1.3
			199.61		
	2.1	**Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)**			
1	55011	FD FAN FOUNDATION MATL	1.60	BLU	2.1
2	55017	FD FAN C&I ITEMS	0.03	BLU	2.1
3	55031	PA FAN FOUNDATION MATL	1.60	BLU	2.1
4	55037	PA FAN C&I ITEMS	0.03	BLU	2.1
5	55214	1REAC FDFAN1600-2000	13.60	BLU	2.1
6	55334	2 REACT PA FAN	18.60	SYN	2.1
7	55810	AXIAL FDFAN COUPLING	0.60	BLU	2.1
8	55830	AXL PAFAN COUPLING	1.20	SYN	2.1
9	55910	AXL FDFAN ACCESSORY	2.00	BLU	2.1
10	55911	AXIAL FDFAN SILENCER	24.20	BLU	2.1
11	55930	AXL PAFAN ACCESSORY	2.00	SYN	2.1
12	55931	PA FAN SILENCER	30.30	SYN	2.1
13	56000	TOOLS & FIXTURE/CONT	0.50	BLU	2.1
14	56021	ID FAN FOUNDATION MATL	2.70	BLU	2.1
15	56027	ID FAN C&I ITEMS	0.02	BLU	2.1
16	56077	SEAL AIR FAN C&I ITEMS	0.01	SYN	2.1
17	56091	RAD FAN-FIRST FILL LUB	7.00	BLU	2.1
18	56161	BAC 1 SUC SA FAN	0.90	SYN	2.1
19	56171	SEALAIRFAN BCSS<1000	5.30	BLU	2.1
20	56228	BAC 2 SUC ID FAN	80.20	BLU	2.1
21	56670	IGNITR FAN MOTOR	1.00	BLU	2.1
22	56820	RADL IDFAN COUPLING	12.50	BLU	2.1
23	56870	SEAL AIR FAN COUPLING(	0.04	SYN	2.1
24	56920	RAD IDFAN ACCESSORY	2.50	BLU	2.1
			208.43		
	3.1	**ESP**			
1	78401	ROLL/SLIDE SUPPORTS	14.00	BLU	3.1
2	78405	ESP-SUB-DELIVERY COMPO	0.50	BLU	3.1
3	78406	INSULATOR HOUSING AS	22.00	BLU	3.1
4	78408	GAS DIST. ASSY	52.00	BLU	3.1
5	78409	GD-RAPPING MECHANISM	8.50	BLU	3.1

6	78410	GD_DRIVE ARRANGEMENT	0.50	BLU	3.1
7	78411	GAS SCREEN-EP	5.30	BLU	3.1
8	78413	EMIT SYST SUSPENSION	7.70	BLU	3.1
9	78414	SUPPORT INSULATORS	3.50	BLU	3.1
10	78415	EMITTING ELECTRODES	14.60	BLU	3.1
11	78416	EMIT ELECT RAPP MECH	20.20	BLU	3.1
12	78417	DRIVE ARGT. FOR EMIT.	15.00	BLU	3.1
13	78419	COL ELEC SUSPENSION	72.00	BLU	3.1
14	78420	COLLECTING ELECTRODE	665.00	BLU	3.1
15	78421	EMIT SYS FRAME-TOP	68.00	BLU	3.1
16	78422	EMIT SYS FRAME BOTOM	83.50	BLU	3.1
17	78423	INSPECTION DOORS	6.15	BLU	3.1
18	78424	SHOCK BARS	52.50	BLU	3.1
19	78425	COLL ELECT RAPP MECH	50.00	BLU	3.1
20	78426	COLL ELEC RAPP DRIVE	3.30	BLU	3.1
21	78428	ESP ROOF PANELS	85.00	BLU	3.1
22	78430	ELECTRICAL SD COMPTS	6.50	BLU	3.1
23	78431	GEARED MOTORS FOR RAPP	10.50	BLU	3.1
24	78432	EMIT SYS FRAME-MIDLE	110.00	BLU	3.1
25	78437	JUNCTION BOX & PUSH BU	8.75	BLU	3.1
26	78442	OUTER ROOF-EP	140.00	BLU	3.1
27	78443	HOPPER RIDGES	38.00	BLU	3.1
28	78444	HOPPER UPPER PART	171.00	BLU	3.1
29	78445	HOP MLD&LOWER PART	210.00	BLU	3.1
30	78446	INSULATOR SUPP PANEL	52.50	BLU	3.1
31	78447	ROOF PANEL ASSY	81.00	BLU	3.1
32	78448	CASING STRUCTURE	176.00	BLU	3.1
33	78449	CASING SHELL/PANEL	260.00	BLU	3.1
34	78450	INLET-OUTLET FUNNEL	108.00	BLU	3.1
35	78455	PENT HOUSE FOR E P	120.00	BLU	3.1
36	78457	SPLITTER&GUIDE VANES	10.00	BLU	3.1
37	78459	CONTROL ROOM-INSERTS	24.00	BLU	3.1
38	78460	CABLE-CABLE RACKS	130.00	BLU	3.1
39	78461	EP PERF TEST EQUIPT	0.50	BLU	3.1
40	78462	EARTHING,CABLE TRAYS,S	27.00	BLU	3.1
41	78463	ASH LEVEL INDICATOR	0.90	BLU	3.1
42	78465	APP PLATFORM-HOPPER	70.00	BLU	3.1
43	78466	WATER WASHING SYSTEM	4.00	BLU	3.1
44	78467	MIN WOOL FOR ESP INSUL	108.00	BLU	3.1
45	78468	FIXING COMP. FOR ESP I	95.00	BLU	3.1
46	78472	INTERLOCKS-EP	1.20	BLU	3.1
47	78473	ELECTRICALLY OPERTD HO	5.00	BLU	3.1

48	78477	LT SWITCH BOARD/ESP SW	14.00	BLU	3.1
49	78478	BAPCON & ACCESSORIES	0.40	BLU	3.1
50	78480	FOUNDATION MATLS FOR E	9.00	BLU	3.1
51	78481	SUPPOTING STRUCTURES F	260.00	BLU	3.1
52	78490	HEATING ELEMENTS	1.80	BLU	3.1
53	78492	AUXILIARY CONTROL PANE	14.00	BLU	3.1
54	78493	RAPPER CONTROL PANEL	0.60	BLU	3.1
55	78996	TOOLS & TACKLES	0.30	BLU	3.1
			3517.20		
	3.2	**Non Pressure Parts (ESP outlet funnel to Chimney)**			
1	89610	EP GALLERIES&STAIRS	51.00	BLU	3.2
2	89611	ESP ROOF HANDRAILS	6.50	BLU	3.2
Sub Total - 3.2 (Non Pressure Parts (ESP outlet funnel to Chimney)			**57.50**		
		Total	**4518.09**		

PC CHENNAI SUPPLY

SN	PGMA	DESCRIPTION	Weight (In MT)	IBR / Non IBR	Stage	S N of rate schedule	Remarks
	4.1	**Piping - P 91**					
1	80300	MS FROM SUPERHEATER TO BOILER STOP VALVE	14.00	I	HT	4.1	
2	80301	MS FROM BOILER STOP VALVE TO ESV	58.00	I	SB	4.1	
3	80304	MS HEADER TO HPBP VALVE	5.00	I	SB	4.1	
4	80310	HRH FROM REHEATER TO INTERCEPTOR VALVE	111.50	I	SB	4.1	
5	80311	HRH FROM INTERCEPTOR VALVE TO TURBINE	11.50	I	SB	4.1	
6	80312	LPBP VALVE UPSTREAM & DOWNSTREAM	32.50	I	SB	4.1	
7	80320	CRH FROM TURBINE TO	49.00	I	SB	4.1	

		REHEATER					
Sub Total - 4.1 (Piping - P 91)			**281.50**				
	4.2	**Piping - AS**					
1	80303	MS HEADER TO AUX PRDS	10.50	I	SB	4.2	
2	80307	HP & LP BYPASS WARM UP	1.50	I	SN	4.2	
3	80321	HPBP VALVE TO CRH PIPING	11.50	I	SB	4.2	
4	80336	EXTRACTION STEAM TO HP HEATER NO.1	3.50	I	SN	4.2	
5	80901	SUB DELIVERY VALVES FOR LIGHT UP	1.70	N	LU	4.2	
Sub Total - 4.2 (Piping - AS)			**28.70**				
	4.3	**Piping - CS (HP)**					
1	80322	CRH PIPING TO DEAERATING HEATER	8.50	I	SN	4.3	
2	80324	CRH HEADER TO AUX.PRDS	1.50	I	SB	4.3	
3	80330	EXTRACTION STEAM TO LP HEATER-1	6.30	I	SN	4.3	
4	80331	EXTRACTION STEAM TO LP HEATER-2	3.50	I	SN	4.3	
5	80332	EXTRACTION STEAM TO LP HEATER-3	3.50	I	SN	4.3	
6	80335	EXTRACTION STEAM TO DEAERATING HEATER	5.00	I	SN	4.3	
7	80337	EXTRACTION STEAM TO HP HEATER-2	1.50	I	SN	4.3	
8	80340	AUX STEAM HEADER	4.00	I	LU	4.3	
9	80342	AUX STEAM TO SCAPH	4.20	I	LU	4.3	
10	80343	AUX STEAM TO AH SOOT BLOWERS	1.30	I	LU	4.3	
11	80344	AUX STEAM TO FO SYSTEM TP	10.00	I	LU	4.3	
12	80345	AUX STEAM TO DEAERATING HEATER	2.50	I	LU	4.3	
13	80348	AUX STEAM TO GLAND SEALS - SG SCOPE	1.00	I	SN	4.3	
14	80351	AUX STEAM TO UNLISTED USERS - SG SCOPE	5.30	I	SN	4.3	
15	80355	STEAM TRACING PIPING	4.00	I	LU	4.3	
16	80395	AUX STEAM TO FUEL OIL ATOMISING	0.20	I	LU	4.3	
17	80418	ERECTION MATERIALS FOR INSTRUMENTS	0.30	N	LU	4.3	
18	80420	BOILER FEED PUMP SUCTION	7.00	N	LU	4.3	

19	80421	BOILER FEED PUMP RECIRCULATION	4.00	I	LU	4.3	
20	80423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	33.00	I	LU	4.3	
21	80424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	25.00	I	LU	4.3	
22	80425	BFD FROM FINAL HPH TO SG TP	38.00	I	LU	4.3	
23	80430	SPRAY WATER TO HPBP	0.50	I	LU	4.3	
24	80431	SPRAY WATER TO AUX PRDS	2.00	I	LU	4.3	
25	80432	SPRAY WATER TO BOILER DESH UPTO SG TP	1.50	I	LU	4.3	
26	80450	CBD AND EMERGENCY DRUM DRAIN	2.60	I	LU	4.3	
27	80451	BOILER INTEGRAL PIPING DRAINS	3.40	I	LU	4.3	
28	80452	HP PIPING DRAINS - SG SCOPE	13.00	I	LU	4.3	
29	80454	SCAPH DRAINS	0.90	N	LU	4.3	
30	80992	IMPORTED ELECTRODES	1.80	N	HT	4.3	
31	81128	HIGH PRESSURE DOSING SYSTEM	1.80	N	LU	4.3	
32	81411	DIRECT GAUGES FOR STEAM LINES	0.60	N	LU	4.3	
Sub Total - 4.3 (Piping - CS (HP)			**197.70**				
	4.4	**Piping - CS (LP)**					
1	80364	CBD TANK VENT TO SYSTEM	1.40	I	SN	4.4	
2	80365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	1.10	N	SN	4.4	
3	80366	IBD TANK VENT TO ATMOSPHERE	7.30	N	LU	4.4	
4	80369	HP DRAIN FLASH TANK VENT TO SYSTEM	3.00	I	SN	4.4	
5	80373	AUX STEAM HEADER SV EXHAUST	2.50	N	LU	4.4	
6	80375	UNLISTED SV EXHAUSTS - TG SCOPE	3.00	N	SN	4.4	
7	80381	HP HEATER VENTS - TG SCOPE	1.00	N	SN	4.4	
8	80382	LP HEATER VENTS	1.50	N	SN	4.4	
9	80385	VENT FROM UNLISTED PPG/EQPT TO COND	6.00	N	SN	4.4	
10	80387	CONDENSATE PUMP VENT	1.00	N	SN	4.4	
11	80388	CONDENSER AIR EVACUATION PIPING	3.50	N	SN	4.4	
12	80400	CONDENSATE SUCTION	3.00	N	LU	4.4	
13	80401	CD FROM PUMP TO LPH1/DC	7.00	N	LU	4.4	

		INLET TEE&RECIR					
14	80402	CD FROM LPH1/DC INLET TEE TO TG TP	6.00	N	LU	4.4	
15	80407	CONDENSATE FOR SEALING OF VACUUM	3.50	N	LU	4.4	
16	80408	CONDENSATE DUMP FROM HEADER	2.50	N	LU	4.4	
17	80413	UNLISTED CONDENSATE	2.00	N	LU	4.4	
18	80440	CONDENSER DRAINS	1.00	N	SN	4.4	
19	80442	GLAND STEAM COOLER DRAINS	0.50	N	SN	4.4	
20	80443	LP HEATER-1 TO CONDENSER	2.50	N	SN	4.4	
21	80444	LP HEATER-2/3/4/5 DRAINS&DRIP PUMP INCL	3.50	N	SN	4.4	
22	80446	DEAERATING HEATER OVER FLOW AND DRAIN	2.00	N	LU	4.4	
23	80447	HP HEATER DRAINS	7.00	N	SN	4.4	
24	80449	TG CYCLE PIPING DRAINS & VENTS	12.50	N	SN	4.4	
25	80453	LP PIPING DRAINS - SG SCOPE	1.10	I	LU	4.4	
26	80455	DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE	2.40	N	LU	4.4	
27	80457	MANIFOLDS FOR HP FLASH BOX & CONDENSER	2.50	N	SN	4.4	
28	80460	SG AUX COOLING WATER UNIT SYSTEM	23.00	N	LU	4.4	
29	80463	TG AUX COOLING WATER	80.00	N	LU	4.4	
30	80468	MAIN CIRCULATION WATER PIPING	54.00	N	LU	4.4	
31	80471	BOILER WATER WASH TO & FROM UNIT	3.50	N	LU	4.4	
32	80473	DEMINERALISED WATER SYSTEM	6.00	N	LU	4.4	
33	80477	SERVICE WATER PIPING	15.00	N	LU	4.4	
34	80480	FIRE WATER-OTHER AREAS	4.20	N	LU	4.4	
35	80610	SERVICE AIR-COMP SUCT & DIS TO RECEIVER	7.00	N	LU	4.4	
36	80612	SERVICE AIR FOR INDIVIDUAL UNITS	4.70	N	LU	4.4	
37	80614	INST AIR COMP SUC & DIS TO RECEIVER	7.00	N	LU	4.4	
38	80616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	7.60	N	LU	4.4	
39	80650	FUEL OIL SUPPLY AND RETURN PIPING	36.00	N	LU	4.4	
40	80673	LUBE OIL PIPING SYSTEM	1.50	N	TR	4.4	
41	81412	DIRECT GAUGES FOR NON-STEAM LINES	0.60	N	LU	4.4	

42	81414	LOCAL CONTROL EQPT FOR NON-STEAM LINES	0.10	N	LU	4.4	
43	81415	TEST THERMOWELLS	0.50	N	LU	4.4	
44	81416	PERFORMANCE GUARANTEE TEST MATERIALS	1.00	N	SN	4.4	
Sub Total - 4.4 Piping - CS (LP)			**342.00**				
	4.5	**Piping - SS**					
1	80600	HIGH PRESSURE DOSING PIPING	1.00	N	LU	4.5	
2	80601	LOW PRESSURE DOSING PIPING	1.50	N	LU	4.5	
Sub Total - 4.5 Piping - SS			**2.50**				
	4.6	**Piping - Hangers & Supports**					
1	80920	H&S FOR HYDRO TEST	8.50	N	HT	4.6	
2	80921	H&S FOR LIGHT UP STEAM LINE	18.00	N	LU	4.6	
3	80923	H&S FOR STEAM BLOWING	49.00	N	SB	4.6	
4	80928	H&S FOR BOILER LIGHT UP - TG	95.00	N	LU	4.6	
5	80930	H&S FOR SYNCHRONISATION - TG	6.00	N	SN	4.6	
6	80933	H & S FOR LP PIPING	15.00	N	LU	4.6	
7	80934	STANDARD HANGER COMPONENTS	22.00	N	LU	4.6	
8	80993	MISC ERECTION MATLS	0.50	N	HT	4.6	
9	81003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	2.40	I	LU	4.6	
10	81009	INTERMITTENT BLOW DOWN EXPANDER-D2500 MM	6.50	N	LU	4.6	
11	81432	CONSUMABLES AND ERECTION MATERIALS	0.01	N	LU	4.6	
Sub Total - 4.6 Piping Hangers & Supports			**222.91**				
	5.1	**Insulation- Insulation**					
1	81341	SEALING COMPOUND FOR INSL	0.40	N	LU	5.1	
Sub Total - 5.1Insulation- Insulation			**0.40**				
	5.3	**Insulation- Iron Parts**					
1	81318	FIX COM FOR MISCELLANEOUS PPG INSULATION	0.80	N	LU	5.3	

Sub Total - 5.3 Insulation- Iron Parts			**0.80**				
	5.4	**Aluminum Cladding sheets**					
1	81350	ALUMINIUM CLADDING FOR INSULATION	12.00	N	LU	5.4	
Sub Total - 5.4 Aluminum Cladding sheets			**12.00**				
	5.5	**Insulation-Wool Mattress**					
1	81325	MINERAL WOOL MATTRESS	25.00	N	LU	5.5	
Sub Total - 5.5 Insulation-Wool Mattress			**25.00**				
Total (4.1+4.2+4.3+4.5+4.6+5.1+5.3+5.4+5.5)			**1,113.51**				

HYDERABAD SUPPLY

S N	Item	Weight (In MT)	Stage	S N of rate schedule	Remarks
1.1	**Structures**				
1	Deaerator Approach platform (Str. Steel Lot)	10	BLU	1.1	
Sub Total - 1.1 (Structures)		**10**			
1.2	**Pressure Parts**				
2	Deaerator FST Sections & Heater with associated items	72	BLU	1.2	
Sub Total - 1.2 (Pressure Parts)		**72**			
	Total (1.1+1.2)	**92**			

S N	PGMA	DESCRIPTION	WT. (MT)	Stage	S N of rate schedule	Remarks

	2.1	**Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)**				
1	61088	Journal Assembly	118.10	BLU	2.1	
2	61188	Mill Drive and Bowl Assembly	171.70	BLU	2.1	
3	61288	Mill Side and Liner Assembly	106.34	BLU	2.1	
4	61388	Classifier Assembly	213.65	BLU	2.1	
5	61488	MDV Assembly	36.99	BLU	2.1	
6	61788	Mill Motor Coupling	0.85	BLU	2.1	
7	61888	Mill Handling System (per Unit)	19.35	BLU	2.1	
8	61988	Commissioning Spares(per Unit)	0.63	BLU	2.1	
9	61888	Lubricating Oil **(per Unit)**	9.33	BLU	2.1	
Sub Total - 2.1 Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)			**676.94**			

Notes:

1. PGMA 61-588- Pyrite Hopper Assembly and PGMA 61-688- Tramp Iron
Spout Assembly are not included as it is in PEM's scope.

2. PGMA 61988- Foundation fastener assy (with Sole plates), 61888- Tools and Accessories except Mill Handling system and PGMA 67400- Seal Air Header Assembly are in HERP, Varanasi scope.

2. Total Nos. of Mill per Unit- 6. Total 60 Mills.

JHANSI SUPPLY

S N	Item	Weight / Unit (In MT)	Stage	S N of rate schedule	Remarks
3.1	**ESP**				
1	HVR TRANSFORMER(ESP) WITH ELECTRONOC CONTROLERS	120	BLU	3.1	

	Total (3.1)	**120**			

PEM SUPPLY

S N	Item	Weight / Unit (In MT)	Package	S N of rate schedule	Remarks
5.3	**Insulation- Iron Parts**				
1	PEM Supplied Insulation Iron Parts	15	Boiler/ESP/ Piping	5.3	
Sub Total - 5.3 Insulation- Iron Parts		**15**			
5.4	**Aluminum Cladding sheets**				
1	PEM Supplied Aluminum Cladding materials	25	Boiler/ESP/ Piping	5.4	
Sub Total - 5.4 Insulation- Iron Parts		**25**			
5.5	**Insulation-Wool Mattress**				
1	PEM Supplied Wool Mattress	188	Boiler/ESP/ Piping	5.5	
Sub Total - 5.4 Insulation- Iron Parts		**188**			
	Total (5.3+5.4+5.5)	**228**			

BHOPAL SUPPLY

S N	Item	Weight (In MT)	Stage	S N of rate schedule	Remarks
2.1	**Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)**				
	Motors				

1	ID Fan Motor (2 nos.)	44	BLU	2.1	
2	FD Fan Motor (2 nos.)	18	BLU	2.1	
3	PA Fan Motor (2 nos.)	16	BLU	2.1	
4	Mill Motor (6 nos.)	36	BLU	2.1	
Sub Total - 2.1 Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)		**114**			

Estimated Weight of Various System in The Scope of Work

SUMMARY

S N	Package	Trichy	BAP	PC	Hyd	Jhansi	PEM	Bhopal	Total
1.1	Structure	3,103.40			10.00				3,113.40
1.2	Pressure Parts	2,930.60	535.35		72.00				3,537.95
1.3	Non Pressure Parts (Upto ESP Inlet Funnel)	1,280.00	199.61						1,479.61
2.1	Rotating Machines	112.96	208.43		676.94			114	1,112.33
2.2	Handling Equipment of Rotating Machines	10.00							10.00
3.1	ESP		3517.20			120			3,637.20
3.2	Non Pressure Parts (ESP outlet Funnel to chimeny)	911.30	57.50						968.80
4.1	Piping-P91			281.50					281.50
4.2	Piping-AS	38.75		28.70					67.45
4.3	Piping - CS (HP)			197.70					197.70
4.4	Piping - CS (LP)	21.45		342.00					363.45
4.5	Piping - SS			2.50					2.50
4.6	Piping - Hangers and Support	8.70		222.91					231.61
4.7	Piping - Temporary (Steam Blowing)								0.00
4.8	Piping - Temporary (Chemical Cleaning)								0.00
5.1	Insulation-Insulation	0.40		0.40					0.80
5.2	Insulation- Pourable and Castable	222.50							222.50
5.3	Insulation- Iron Parts	8.70		0.80			15		24.50
5.4	Insulation- Aluminium Cladding Sheets			12.00			25		37.00
5.5	Insulation- Wool Matress	270.50		25.00			188		483.50

	TOTAL	**8,919.26**	**4,518.09**	**1,113.51**	**758.94**	**120.00**	**228.0**	**114.00**	**15,771.80**

NOTES:

1. **The weights given above are for one unit only. These are applicable to all the five units. For Block-1 weight shall be three times and for Block 2 weight shall be two times.**
2. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.
3. The weights given against PGMA's listed above are tentative. It may change after detailed engineering is done. Rate quoted by the Contractor shall not change due to variation in weight.
4. Rate Schedule Identified for PGMAs of Piping and Insulation are Indicative only and based on envisaged material specification. Payment shall be made on the basis of material specification of actual material received and erected at site.
5. BHEL's decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.
6. Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc for carrying out hydraulic test, chemical cleaning, steam blowing and other tests, as stated elsewhere will get added.
7. Electrical & C&I items of handling system is excluded from the scope of work.
8. Weight of valves, fittings, supports etc. are including in weight of piping (for all C.S. A.S. And S.S.) of respective scheme / systems of piping. The site welding of site weld joints and NDT/pre-post heat treatment requirements both for IBR & Non-IBR, CS, AS & SS pipings/system shall be as per BHEL drawings/documents and site requirement.

ANNEXURE - 2

PAINTING SCHEME

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
1	A) HANGER SUPPORTS, B) FURNACE BUCKSTAYS C) PF COAL PIPING, COUPLING, ORIFICES AND SUPPORTS D) GATES ON DUCTS AND RAW COAL PIPES E) PLATFORMS F) STAIR SIDE CHANNEL G) BOILER STRUCTURE, H) FAN HANDLING STRUCTURE, I) FLOOR BEAMS. J) ESP STRUCTURE AND GALLERIES K) OIL GUN MAINTENANCE VICE L) SUPPORTS FOR WIND BOX, DUCTS, FANS M) ESP PENT HOUSE, OUTER ROOF N) LINKAGES FOR DAMPERS P) MANHOLE DOORS IN ESP AND DUCTS	SMOKE GREY	SYNTHETIC ENAMEL AS PER IS:2932
2	A) FLOOR GRILLS, B) HANGERS, HANGER RODS C) DRUM SUSPENSION RODS, D) STAIR CASE STEP TREADS.	BLACK	SYNTHETIC ENAMEL AS PER IS:2932
3	A) LIGHT OIL PIPING B) DIRTY OIL TANK C) LUB OIL FOR AIR HEATERS D) LUB OIL FOR FANS	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
4	A) COOLING WATER PIPING B) AUX COOLING WATER PIPING C) BOILER FILL PIPING D) AIR HEATER WASH MANIFOLD E) AIR HEATER CLEANING EQUIPMENT F) LP PIPING DRAINS G) BOILER WASH WATER H) CONDENSATE PIPING	SEA GREEN	SYNTHETIC ENAMEL AS PER IS:2932
5	A) HAND RAILS AND POSTS B) CHUTE PIPE C) LADDER D) ELECTRICAL AND MECHANICAL HOISTS E) HOISTS FOR AIR HEATER F) FAN HANDLING EQUIPMENTS G) MONORAIL BEAMS	GOLDEN YELLOW	SYNTHETIC ENAMEL AS PER IS:2932
6	TOE GUARD PLATE	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
7	A) SILENCERS FOR SAFETY VALVES AND START UP VENT, B) ACCESS DOORS AND OBSERVATION PORT FOR AIR HEATERS, C) INSPECTION DOORS ON FURNACE AND ESP, D) FURNACE BOTTOM SEAL PLATES ASSEMBLY, E) INSTRUMENT TAPPING POINTS ON FURNACE AND DUCTS	HEAT RESISTENT ALUMINIUM	IS13183 Gr-I
8	STEAM PIPING (BAND - EACH 5MTR)	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
9	EQUIPMENT(MILL, HT & LT MOTORS, SB/WB, FANS, VALVES, ACTUATORS ETC) AND PANELS.	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2932
10	PANELS (TOUCH UP PAINTING)	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2933
11	A) ATOMISING AIR PIPING, B) SCANNER AIR PIPING, C) IGNITOR AIR PIPING D) GUN COOLING AIR PIPING, E) MILL SEAL AIR PIPING F) AIR HEATER AIR MOTOR PIPING G) CONDENSER AIR EVACUATION PIPING H) INSTRUMENT AIR PIPING I) SERVICE AIR PIPING	SKY BLUE	SYNTHETIC ENAMEL AS PER IS:2932
12	AIR HEATER FIRE FIGHTING	FIRE RED	SYNTHETIC ENAMEL AS PER IS:2932
13	LEGEND IN BLOCK LETTER OVER GOLDEN YELLOW BACKGROUND	BLACK	SYNTHETIC ENAMEL AS PER IS:2932

NB : The above scheme is only suggestive. May undergo change during further course of project execution.

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 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 conform 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.

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.

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 1 KM. 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 site operation management system (SOMS) 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 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 SOMS as and when the 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.

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) Installation of temporary structure for drum lifting is in the scope of the Contractor's work. The required steel for the purpose will be provided in random sizes by BHEL free of charge. These shall be fabricated to suit the requirement, erected and welded as part of work. NDT has to be carried out as per instructions. These structures have to be dismantled at appropriate stage and returned to BHEL as per the instructions of BHEL engineer. Also, the relevant areas of permanent structures have to be finished as instructed/ as per relevant codes of practice. Payment for above will be made at the rate accepted for structures; no separate payment will be made for fabrication, dismantling and finishing work and return of materials.

B) 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.

C) 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).

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

E) 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.

F) 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.

G) 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.

H) The drum internals, if already installed, may have to be removed to facilitate inspection by statutory authorities and chemical cleaning. The drum internals are to be preserved properly and re-fitted at appropriate stage as part of work.

I) 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.

J) **BOILER DRUM** : Boiler drum may need to be led from the point of unloading to the cavity of boiler. The same is in the Contractor's scope and shall make all arrangements, including fabrication of saddle if required. Structural materials required for the same will be provided by BHEL on free-returnable basis.

Boiler drum is to be lifted using **strand jack method.** Contractor to engage services of expert agency to lift the boiler drum by this method. Contractor shall make necessary tie up with the agency well in advance and deploy the expert agency and other resources well in time to suit the milestone requirment.

K) 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 place.

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 6 nos of XRP 943 Bowl Mills.

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
BHEL will supply Huck bolting M/c with necessary auxiliaries free of charges. However, electrical connections, operation etc shall 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 upto the boiler drum 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, to facilitate, say crane boom reach to higher elevation, passage of drum during drum lifting etc. this 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 will be supplied by BHEL free of cost.

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. BHEL will supply the necessary self-drilling-cum-tapping screws ans fixing clips. 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.

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.

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 35mm 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 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.

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 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 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 arreage 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 decided by BHEL engineer at site.

14.3.6
Tenderer 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.

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 dedected 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 to 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.

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-II. 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.

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 PRIMER AND PAINTS FOR FINAL PAINTING

All primer and paints required for final painting shall be supplied by BHEL free of charges.

The Contractor , however, shall provide account of all the items issued to him and return all primer, paints etc remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL stores. In case of any misuse or excess use over the normal requirement, BHEL reserves the right to recover the cost of such misuse/ excess use. Decision of BHEL Engineer in this regard will be final and binding on the Contractor.

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.

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 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
Commissioning activities will continue till the completion of trial run, trial operation. During this period Contractor shall make available the services of separate dedicated labor force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

17.18
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

17.19
Conducting of performance guarantee 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.

17.20
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.