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

NO: BHE/PW/PUR/AMRT-BAL BLR U#2/1553

HANDLING & COLLECTION OF MATERIALS AT BHEL/CLIENT'S STORAGE YARD/ STORES, TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING OF *BALANCE WORK OF* BOILER AND ITS AUXILIARIES, ELECTROSTATIC PRECIPITATOR, ROTATING EQUIPMENTS, PIPING & ASSOCIATED VALVES, DUCTS AND DAMPERS, INSULATION, FINAL PAINTING ETC. OF Unit # 2 OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE I.

AT

ADDITIONAL AMRAVATI INDUSTRIAL AREA,

RATTANINDIA POWER LTD

(Formerly known as 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	3	(Part of **Vol-I-1553**)
NIL	Notice Inviting Tender	24	(Part of **Vol-I-1553**)
I-A	Technical Conditions of Contract	63	Vol-IA-1553
I-B	Special Conditions of Contract	47	Vol-IBCD-1553
I-C	General Conditions of Contract	29	(Part of Vol-IBCD-1553)
I-D	Forms & Procedures	71	(Part of Vol-IBCD-1553)
II	Price Bid Specification	6	Vol-II-1553

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

BHE/PW/PUR/AMRT-BAL BLR U # 2/1553

HANDLING & COLLECTION OF MATERIALS AT BHEL/CLIENT'S STORAGE YARD/ STORES, TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING OF *BALANCE WORK OF* BOILER AND ITS AUXILIARIES, ELECTROSTATIC PRECIPITATOR, ROTATING EQUIPMENTS, PIPING & ASSOCIATED VALVES, DUCTS AND DAMPERS, INSULATION, FINAL PAINTING ETC. OF Unit # 2 OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE I.

AT

ADDITIONAL AMRAVATI INDUSTRIAL AREA,
RATTANINDIA POWER LTD
(Formerly known as 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. é é é é é é é é é é é é é é é é

é é é é é é é é é é é é é é é é é é é .

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date:

1553

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/AMRT-BAL BLR U#2/1553 Date: 24/10/2015

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/ AMRT-BAL BLR U#2/1553	
ii	**Broad Scope of job**	HANDLING & COLLECTION OF MATERIALS AT BHEL/CLIENT'S STORAGE YARD/ STORES, TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING OF **BALANCE WORK OF BOILER AND ITS AUXILIARIES**, ELECTROSTATIC PRECIPITATOR, ROTATING EQUIPMENTS, PIPING & ASSOCIATED VALVES, DUCTS AND DAMPERS, INSULATION, FINAL PAINTING ETC. OF **Unit # 2 OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE I** AT ADDITIONAL AMRAVATI INDUSTRIAL AREA, RATTANINDIA POWER LTD (Formerly known as Indiabulls Power Ltd) NANDGAONPETH,DIST- AMRAVATI	
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*	
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :*** ***Start : 24/10/2015 ,*** ***Closes: 02/11/2015 , Time : 16.00 Hrs*** **2. From BHEL website (**www.bhel.com**)** Tender documents will be available for downloading from website till due date of submission	*Applicable*

v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 03/11/2015, Time 15.00 Hrs*** ***Place : <u>BHEL PS Regional office at :Nagpur</u>*** Tenders being submitted through representative shall be submitted at dispatch section of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: • Shubhangi Tembhurne /Engineer (Purchase) • Pratish Gee Varghese / Sr Engineer (Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***1 hours after the latest due date and time of Offer submission*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(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/-. (Rupees Two Lakhs Only)*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Five 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.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**		*Not Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (**www.bhel.com** -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	***<u>Applicable</u>***

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 favor 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 repectively)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
- One set of tender documents shall be retained by the bidder for their reference.

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

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

iv.	AllAmendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

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

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

	OUTER COVER	
	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD	

	TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i	o Envelopes I o Envelopes II o Envelopes III	

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

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

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

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

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

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

i). Total number of Packages
Total number of Packages in hand = P
Where
- 'P' is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced, excepting packages which are on HOLD due to reasons not attributable to Bidder..

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

preceding the month corresponding to the 'latest date of bid submission', in the following manner:

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

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

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

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

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

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

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

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

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

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

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

ii) Calculation of Overall 'Performance Rating' (**R_{BHEL}**) in case 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for ALL the packages, divided by the total number of Package months for which evaluation should have been done. 'R_{BHEL} ' shall be calculated subject to availability of 'performance scores' for at least.6 'package months' in the order of precedence below:

a) 'Period of Assessment.
b) 12 months preceding the cut-off month
c) 24 months preceding the cut-off month
d) 36 months preceding the cut-off month

In case, R_{BHEL} cannot be calculated as above, then Bidder shall be treated as 'NEW VENDOR'. Further eligibility and qualification of this bidder shall be as per definition of 'NEW VENDOR' described in 'Explanatory Notes'

iii) Factor "L" assigned based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions,:

Sl no	Overall Performance Rating (R_{BHEL})	Corresponding value of 'L'
1	=60	NA
2	> 60 and ≤ 65	0.4
3	> 65 and ≤ 70	0.35
4	> 70 and ≤ 75	0.25
5	> 75 and < 80	0.2
6	≥ 80	NA

III. 'Assessment of Capacity of Bidder':

'Assessment of Capacity of Bidder' is based on the Maximum number of packages for which a vendor is eligible, considering the performance scores of similar packages, as below:

Max number of packages P_{Max}= (R_{BHEL}- 60) divided by corresponding value of 'L' i.e. (R_{BHEL}- 60)/L

Note:

i. In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number
ii. For R_{BHEL} = 60 , P_{Max} = '1'
iii. For R_{BHEL} ≥ 80, there will be no upper limit on P_{Max}

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$
(where P is calculated as per clause 9.I)

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

	Civil	Electrical & CI	Mechanical
	i). Enabling works ii). Pile and Pile Caps ii). Civil Works including foundations iv). Structural Steel Fabrication & Erection	i). Electrical ii). CI iii). Others (Elec & CI)	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). LP Piping iv). ESP v). Steam Turbine

	v). Chimney vi). Cooling Tower ii). Others (Civil)		Generator set & Aux vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Handling x). Material Management xi). Material Handling & Material Management xii). Others (Mechanical)

c) Bidders who have not been evaluated for at least six package months in the last 36 months in the online BHEL system for contractor performance evaluation in BHEL PS Regions, wef July'2010 shall be considered "NEW VENDOR".

A 'NEW VENDOR' shall be considered qualified subject to satisfying all other tender conditions

A 'NEW VENDOR' if awarded a job (of package/packages identified under this clause) shall be tagged as "FIRST TIMER" on the date of first LOI from BHEL.

The "FIRST TIMER" tag shall remain till execution of work for a period of not less than 09 months, from the commencement of work of first package

A Bidder shall not be eligible for the next job as long as the Bidder is tagged as "FIRST TIMER" excepting for the Tenders which have been opened on or before the date of the bidder being tagged as 'FIRST TIMER'.

After removal of 'FIRST TIMER' tag, the Bidder shall be considered 'QUALIFIED' for the future tenders subject to satisfying all other tender conditions including 'Capacity Evaluation of Bidders'.

d) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders' or due to non-approval by Customer, then BHEL at its discretion reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating 'R$_{BHEL}$'** only, starting from the upper band.

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

i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries

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

iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.

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

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

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

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

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

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

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

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

16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date

of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

26.0 Order of Precedence

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

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

It may please be noted that guidelines/rules in respect of suspension of business dealings', 'Vendor evaluation format', 'Quality, Safety & HSE guidelines', etc may undergo change from time to time and the latest one shall be followed.

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

1. Annexure-1: Pre Qualifying criteria.
2. Annexure-2: Check List.
3. Annexure-4: Important Information.
4. Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	HANDLING & COLLECTION OF MATERIALS AT BHEL/CLIENTÕS STORAGE YARD/ STORES, TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING OF **BALANCE WORK OF BOILER AND ITS AUXILIARIES**, ELECTROSTATIC PRECIPITATOR, ROTATING EQUIPMENTS, PIPING & ASSOCIATED VALVES, DUCTS AND DAMPERS, INSULATION, FINAL PAINTING ETC. OF **Unit # 2 OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE I** AT ADDITIONAL AMRAVATI INDUSTRIAL AREA, RATTANINDIA POWER LTD (Formerly known as Indiabulls Power Ltd) NANDGAONPETH,DIST- AMRAVATI	
Sl NO	**Tender Specification Number**	BHE/PW/PUR/AMRT-BAL BLR U#2/1553

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. **Bidder must fill up this column as per applicability**
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	**NOT APPLICABLE**	
B	**Technical** **Bidders shall essentially meet Qualifying Requirements in B.1 below, in last seven years as on latest date of bid submission.** B.1 Bidder should have Executed (Erection) / (Erection & Commissioning) / (Overhauling) / (Renovation & Modernization) of ñStructure/Non Pressure Parts/Pressure Parts/Rotary Equipments etc of Boiler (of any rating)ò as per any of the criteria below : B.1.1 Executed One similar work of value not less than Rs. 85 Lakhs against single work order. OR B.1.2 Executed Two similar works each of value not less than Rs.55 Lakhs against maximum two work orders OR B.1.3 Executed Three similar works each of value not less than Rs. 45 Lakhs against maximum three work orders	**APPLICABLE**	

C-1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (audited) of **Rs 32 Lakhs** or more over last three Financial Years (FY) i.e. 2012-2013, 2013-14 and 2014-15.	**APPLICABLE**	
C-2	**NETWORTH** (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.	**APPLICABLE**	
C-3	**PROFIT** Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1 above based on latest Audited Accounts.	**APPLICABLE**	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	**APPLICABLE**	By BHEL
E	Approval of Customer (if applicable) **Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	**APPLICABLE**	BY BHEL
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
F	Technical Tie up criteria (if applicable)	Not applicable	

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

1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures
2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.
3. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant.
4. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)
5. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above
6. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :~~
   1. ~~Bidder should have executed similar work of any one of the following:~~
      a. ~~One (1) work of value not less than Rs XXX~~
      ~~OR~~
      b. ~~Two (2) works of not less than Rs YYY~~
      ~~OR~~
      c. ~~Three (3) works of not less than Rs ZZZ~~

   ~~(Value XXX, YYY, ZZZ shall be as indicated by BHEL~~
   2. ~~'Similar' work for criteria 5 above means~~
      a. ~~Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works~~
      b. ~~Electrical works in respect of 'ELECTRICAL'~~
      c. ~~CI works in respect of 'CI' Works~~
      d. ~~Material Handling and/or Management works in respect of 'MM' works~~

7. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission
8. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed, Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:

   1. ~~"BOILER LIGHT UP" in respect of Boiler & Aux and ESP~~
   2. Term 'Commissioning' indicated in PQR refers to 'assistance to commissioning' / 'commissioning'
   3. ~~"SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG~~
   4. ~~"STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping~~
   5. ~~"HYDRAULIC TEST" of the system in respect of Structures, Pressure~~

	~~parts/IBR Piping~~ ~~6. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears.~~ ~~7. "Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~ ~~8. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~ ~~9. 'Readiness for coal Filling" in respect of Bunker Structure Work.~~ 9. Boiler means HRSG or WHRB or any other types of Steam Generator. ~~10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines~~ 11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation. 12. ~~In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR~~. ~~13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.~~ 14. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR 15. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.

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.

Bidder's Response to BHEL TECHNICAL PQR (WHICHEVER IS APPLICABLE)				
PQR No	**Pre-Qualifying Requirement**	**Credentials based on which bidder is claiming PQR**	**Reference of the documents**	**Page No**
B.1	Bidder should have Executed (Erection) / (Erection & Commissioning) / Overhauling / Renovation & Modernization of "Structure/Non Pressure Parts/Pressure Parts/Rotary Equipments etc of Boiler (of any rating)" as per any of the criteria below:			
B.1.1	Executed One similar work of value not less than **Rs. 85 Lakhs against single work order.** OR			
B.1.2	Executed Two similar works each of value not less than **Rs.55 Lakhs against maximum two work orders.** OR			
B.1.3	Executed Three similar works each of value not less than **Rs. 45 Lakhs against maximum three work orders.**			

NOTE:

BIDDERS MUST CLEARLY INDICATE IN THE TABLE ABOVE, HOW THEY ARE SATISFYING TECHNICAL PQR ALONG WITH THE REFERENCE OF THE SUPPORTING DOCUMENTS AND THE PAGE NUMBER IN WHICH THE REFERRED DOCUMENTS ARE ANNEXED IN THE BID DOCUMENT. BHEL WILL NOT CONSIDER ANY OTHER DOCUMENT OTHER THAN THOSE SPECIFED BY THE BIDDERS IN THE TABLE ABOVE FOR EVALUATION OF TECHNICAL PQR. BIDDER MAY ATTACH SEPERATE SHEET IF NECESSARY

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.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (√) whichever applicable:- ONE TIME EMD / ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY(BY BHEL)	ENCLOSED BY BIDDER
6	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
7	Audited profit and Loss Account for the last three years	Applicable/ ~~Not Applicable~~	YES/NO
8	Copy of PAN Card	Applicable/ ~~Not Applicable~~	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable/ ~~Not Applicable~~	YES/NO
10	Integrity Pact	~~Applicable~~/ Not Applicable	YES/NO
11	Declaration by Authorized Signatory	Applicable/ ~~Not Applicable~~	YES/NO

12	No Deviation Certificate	Applicable/ ~~Not Applicable~~	YES/NO
13	Declaration confirming knowledge about Site Conditions	Applicable/ ~~Not Applicable~~	YES/NO
14	Declaration for relation in BHEL	Applicable/ ~~Not Applicable~~	YES/NO
15	Non Disclosure Certificate	Applicable/ ~~Not Applicable~~	YES/NO
16	Bank Account Details for E-Payment	Applicable/ ~~Not Applicable~~	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable/ ~~Not Applicable~~	YES/NO
18	Tie Ups/Consortium Agreement are submitted as per format	~~Applicable~~/ Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable/ ~~Not Applicable~~	YES/NO
20	Analysis of Unit rates	Applicable/ ~~Not Applicable~~	YES/NO

NOTE : STRIKE OFF 'YES' OR 'NO', AS APPLICABLE. TENDER NOT ACCOMPANIED BY THE PRESCRIBED **ABOVE APPLICABLE DOCUMENTS** ARE LIABLE TO BE SUMMARILY REJECTED.

DATE :

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)

Annexure-3

IMPORTANT INFORMATION

Sealed Tenders shall be submitted at following address to AGM /Purchase BHEL PSWR NAGPUR:
BHEL PSWR, SRIMOHINI COMPLEX, 345 KINGSWAY, NAGPUR 440001, INDIA

All correspondences regarding this tender shall be addressed to AGM / PURCHASE BHEL PSWR at above address. Bidders may also opt to correspond with following BHEL officials regarding this tender through email at following email ids. However please be informed that sealed tenders shall necessarily be submitted in original at above address:

AGM Purchase, Email id: rajeebc@bhelpswr.co.in. Ph: +91 – 712 – 3048633

Sr Engineer Purchase, Email: pgv@bhelpswr.co.in, Ph: +91 – 712 – 3048713

Engineer Purchase, Email id: shubh@bhelpswr.co.in , Ph: +91 – 712 – 3048742

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

2. **Refer Chapter XII of Volume IB Special Conditions of Contract regarding Suspension of Business Dealings: The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/pdf/Suspension-of-Business-Dealings-with-Supplier-issued-Sept13_abridged.pdf**

3. **All Statutory Requirements as applicable for this project shall be complied with.**

4. **BHEL Fraud Prevention Policy, "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."**

5. **Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'**

   "In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract"

6. **Please take note of following Revised Tender Clauses:**

   i. Notice Inviting Tender: Sl No 9

   ii. General conditions of Contract: Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5

7. Following Notes are added to Form F- 15 of Volume I D 'Forms & procedures'

i. It is only indicative and shall be as per the online format issued by BHEL time to time.
ii. No request will be entertained after specified date of the current month w.r.t the changes requested in the scores of immediate previous month.

8. PRICE VARIATION CLAUSE

Price Variation Compensation as per Clause no. 2.17 of Vol I C GCC is NOT APPLICABLE for this Contract:

9. OVER RUN COMPENSATION

Over Run Compensation as per Clause no. 2.12 of Vol I C GCC is NOT APPLICABLE for this Contract:

10. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (V) of Vol I C GCC:

Clause No. 1.10.3 (V) of Vol IC GCC is revised as below:-

"Bank Guarantee issued by:

a. Any of the BHEL consortium bank listed below :

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank
Citi Bank N.A.
Corporation Bank
Deutsche Bank
HDFC Bank Ltd.
The Hongkond and Shanghai Banking Corporation Ltd.
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that it is enforceable at Nagpur, Maharashtra

c. Any private sector banks, with a clause in the text of Bank Guarantee that it is enforceable by being presented at any branch of the bank

Note: "Bank Guarantees issued by Co-operative Banks are not acceptable".

11. The Boiler works in Unit # 2 at 5x270 MW AMARAVATI THERMAL POWER PROJECT Phase I was under execution by other agency. The works from this agency are withdrawn on as is where basis is. The scope of work under this tender specification also include works leftover by the earlier agency on as is where basis.

12. Broad Terms & Conditions of Reverse Auction

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction is given in Annexure V of NIT:

12.1. Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

12.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid‟ in the Reverse Auction. Non-submission of „online sealed bid‟ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

12.3. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

12.4. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit 'online sealed bid' in the Reverse Auction. Non-submission of 'online sealed bid' by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

12.5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

12.6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.

12.7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

12.8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

12.9. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

12.10. Reverse auction will be conducted on scheduled date & time.

12.11. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.

12.12. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.

12.13. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.

12.14. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should

acquaint themselves of the "Business Rules of Reverse Auction" which will be communicated before the Reverse Auction.

12.15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

12.16. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

12.17. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

1553

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

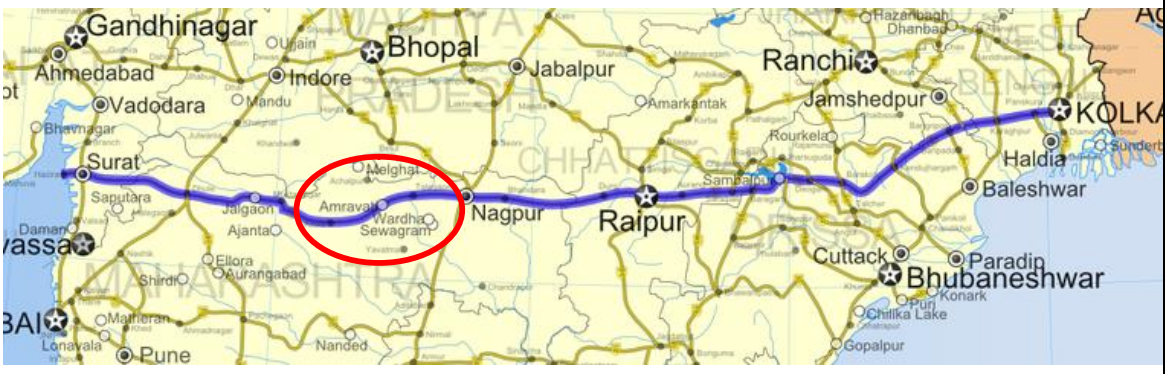
TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

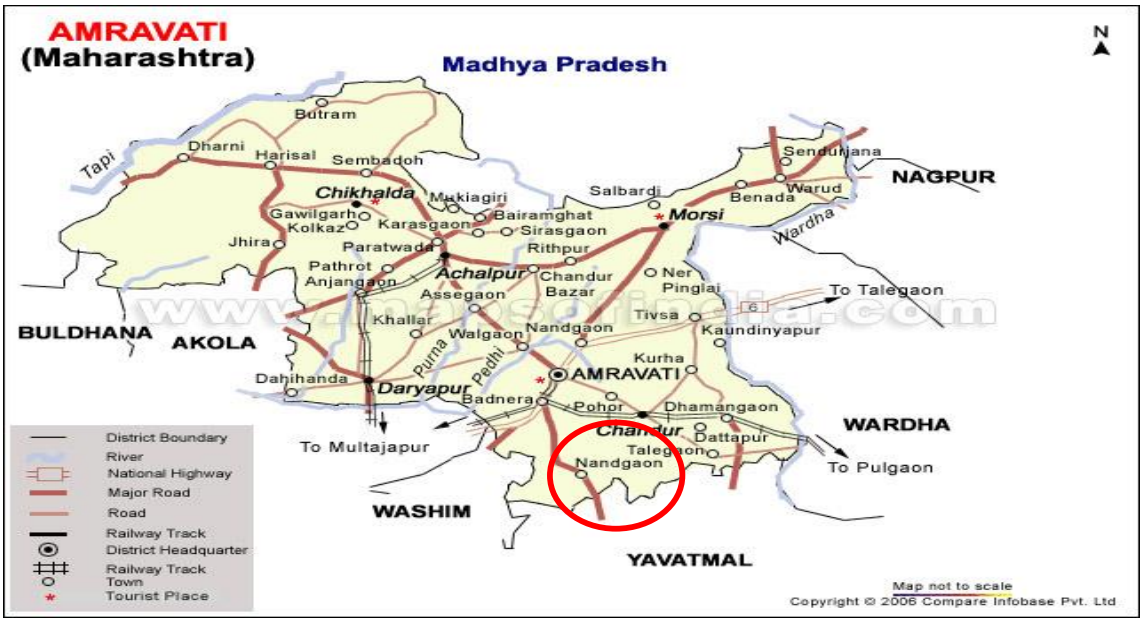
1.0	**Project Information**
1.1	**BACKGROUND**

RATTANINDIA POWER LTD (Formerly known as 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)

CLIMATE

Amravati is located between 20°56N 77°45E to 20.93°N 77.75°E. It has an average elevation of 343 meters. 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:
The Boiler works in Unit # 2 at 5x270 MW AMARAVATI THERMAL POWER PROJECT Phase I was under execution by other agency. The works from this agency are withdrawn on 'as is where is basis'. The scope of work under this tender specification also include works leftover by the earlier agency on as is where basis.

1) HANDLING & COLLECTION OF MATERIALS AT BHEL/CLIENT'S STORAGE YARD/ STORES, TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING OF BALANCE WORK OF BOILER AND ITS AUXILIARIES, ELECTROSTATIC PRECIPITATOR, ROTATING EQUIPMENTS, PIPING & ASSOCIATED VALVES, DUCTS AND DAMPERS, INSULATION, FINAL PAINTING COMPLETION OF PENDING / PUNCH POINTS ETC. OF **Unit # 2** OF 5x270 MW AMRAVATI THERMAL POWER PROJECT PHASE I.

2) Erection, alignment and welding, bolting, fastening, grouting as applicable of :
   - ✓ Boiler Supporting Structures
   - ✓ Boiler Pressure Parts
   - ✓ Non-Pressure Parts, Ducts, Dampers
   - ✓ Rotating Machines
   - ✓ External structures
   - ✓ Handling arrangements for Rotating Machines
   - ✓ Piping
   - ✓ Electrostatic Precipitator and Stairways & Galleries

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

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

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

6) Punching of registration number on Boiler Drum.

7) Scrap removal, Surface preparation and Final Painting of Entire Boiler & Auxiliaries (As per Painting BOQ).

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

9) Completion of all facilities/systems.

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 bidderôs office, canteen and storage building including supply of materials and other services		Yes	
d	Bidderôs all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidderôs staff, supervisors and engineers etc		Yes	
f	Fire fighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
a	Open space for labor colony (as per availability)	Yes		Space will be provided if available; Location will be finalized after joint survey with owner.
b	Labor 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
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary up to 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
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**			
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**			
a	For site personnel of the bidder		Yes	
b	For bidderôs equipments and consumables (T&P, Consumables etc)		Yes	

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 ï where ever deviations observed and executed and also based on the decisions taken at site- example ï routing of small bore pipes		**YES**	ò
d	Shipping lists etc for reference and planning the activities	Yes		ò
e	Preparation of site erection schedules and other input requirements		Yes	ò

f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	ò
g	Weekly erection schedules based on Sl No. e		Yes	ò
h	Daily erection / work plan based on Sl No. g		Yes	ò
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	

Sr No	Description	Capacity	Minimum Qty
1	Hydra Crane	18 MT	2
2	Trailer	20 MT	1
3	Electric Winch M/C (Capacity 03 MT)	As Required	5
4	Double Sheave pulley	As Required	10
5	D Shackles	As Required	As Required
6	Wire rope slings	As Required	As Required
7	Chain pully block	Upto 10 MT	As Required
8	Welding M/C with Cables & Accessories	As Required	As Required
9	Power Cables to draw contstruction Power etc	As Required	As Required
10	Mother oven & Holding Oven	As Required	1
11	Portable oven	As Required	10
12	Gas Cutting set with accessories		As Required
13	Scaffolding materials		As Required
14	NDT Accessories	As Required	As Required
16	Self Drilling Cum Tapping M/c for roof sheets	As Required	2
17	Fire Extinguisers		As Required
18	Painting work accessories		As Required
19	Temporary Construction Lift		1
20	Life lines (safety) for height erection/welding work		As Required
21	Grinding M/c		As Required

MEASURING AND MONITORING DEVICES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE, SHALL MEET THE REQUIREMENTS AS PER FIELD QUALITY PLAN AND OTHER ERECTION, TESTING RELATED ACTIVITIES.

NOTE:

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

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

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

Nil

6. TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 1 week of issue of fax letter of intent or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

6.1.2 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

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

The Contractor has to subsequently augment his resources in such a manner that work of erection & commission are achieved within specified contract period.

Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

6.1.3 VOID

6.1.4 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be 6 months **(Six Months)** from the "start of contract period" as specified earlier.

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

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

- 90 % against prorate basis on per MT basis.
- 5 % against completion of scrap cutting, area cleaning & return of scrap
- 5 % against completion of material re-conciliation.

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 05 dated 13/08/2015)

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

8.1.1
The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.
However, provisions regarding Service Tax and Value Added Tax (VAT) on output services and goods shall be as per following clauses.

8.1.2 Service Tax & Cess on Service Tax

Contractor's price/rates shall be exclusive of Service Tax and Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate (presently 14 %) on the admitted bill value.

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the

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

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

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

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

8.2 'Enabling Works'

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

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

8.3 New Taxes/Levies - For All types of works excepting works covered under sl no 8.2

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

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price duly substantiated by

documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

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

8.4 BOCW Cess - For All types of works excepting works covered under sl no 8.2

The quoted rates shall be exclusive of the BOCW Cess which, if applicable, shall be paid extra by BHEL against Documentary evidence. However, the applicability of the BOCW Cess shall be got confirmed from BHEL in writing, before remitting such Cess/tax.

8.5 GST: For All types of works excepting works covered under sl no 8.2

As and when GST becomes applicable to this contract, the net differential (negative or positive) financial liability of the bidder to the Authorities (as compared to such liability prior to applicability of GST), if any, shall be to the account of BHEL. For this purpose, all available options under the GST shall be explored, and the decision of BHEL in this regard shall be final and binding on the bidder.

1. Final Painting of Entire Boiler & Auxiliaries (As per Painting BOQ).

10.0 EXCLUSIONS

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

I. Civil works except to the extent specifically indicated elsewhere in this tender.
II. Supply of primer and paints for final painting

Amaravati 5x270MW						
Unit # 2 - Balance work						
SN	**PG**	**MA**	**Description**	**Erection (In MT)**	**Allignment, Bolting, Grouting & Welding (In MT)**	**Leak Test, NDT, Heat Treatment, equipment trial run (In MT)**
Structure						
1	30	224	Antivibration baffle*	7.064	7.064	7.064
2	35	390	platform at drum floor	1.500	1.500	1.500
3	35	531	Rear Bracing-Lower	2.701	2.701	2.701
4	35	811	Floor Grills And Gua	11.837	11.837	11.837
5	35	851	Hand Rails And Posts	10.000	15.000	15.000
6	36	310	Main Mbl Floor 11th	20.000	23.000	23.000
7	36	311	Main Floor I Mbl 1st	6.000	11.000	11.000
8	36	321	Main Floor Ii Mbl Is	1.149	1.149	1.149
9	36	322	Main Floor Ii Mbl 2n	0.092	0.500	0.500
10	36	330	Main Floor 13 th floor	2.500	3.000	3.000
11	36	331	Main Floor III MBL I st pass	1.500	3.000	3.000
12	36	350	Main Floor 15 th level	1.000	1.000	1.000
13	36	360	Main Floor 16 th level	1.000	2.000	2.000
14	36	391	Miscellaneous Platfo	2.000	8.000	8.000
15	36	392	Miscellaneous Platfo	4.000	8.000	8.000
16	36	393	Miscellaneous Platfo	7.000	7.000	7.000
17	36	610	boiler roof structure	0.000	20.000	20.000
18	36	611	Boiler Roof Sheeting	3.000	3.000	3.000
19	36	612	Weather Protection F	18.000	20.000	20.000
20	36	620	Boiler Side Cladding	35.952	35.952	35.952
21	36	621	Boiler Side Cladding	10.220	10.220	10.220
22	36	811	Floorgrillsandguardp	10.000	10.000	10.000
23	36	813	Floorgrillsandguardp	10.000	13.000	13.000
24	36	820	Stairs And Ladders	8.937	8.937	8.937
25	36	851	Handrails And Posts	10.000	15.000	15.000
26	36	853	Handrails And Posts	10.000	15.000	15.000
27	38	299	Mill Handling Monora	2.000	15.000	15.000
28	38	310	connecting platform to mill	4.700	5.000	5.000
29	38	410	Mill maintenance platform	1.500	2.000	2.000
30	38	810	Floorgrills And Guar	1.500	3.000	3.000
31	38	820	Stairs And Ladders	0.000	0.648	0.648

32	38	850	Hand Rails And Hand	0.000	10.000	10.000
33	39	101	Columns Frames Befor	25.476	31.919	31.919
34	39	140	Cols Frames Near I.D	16.262	30.019	30.019
35	39	150	Col Frames Betn I.D.	4.189	4.953	4.953
36	39	300	Platforms - External	3.989	3.989	3.989
37	39	301	Struc And Platform F	0.000	2.012	2.012
38	39	302	Struc For Motor Hood	0.075	1.799	1.799
39	39	303	Monorail Beams For F	10.610	10.610	10.610
40	39	304	Fan Handling Structu	15.565	15.565	15.565
41	39	305	Fan Handling Structu	2.569	2.569	2.569
42	39	810	Floor Grill	0.837	1.332	1.332
43	39	820	Stairs	2.282	2.282	2.282
44	39	850	Hand Rail And Hand R	0.745	1.067	1.067
Structure Total				**287.753**	**400.625**	**400.625**
* Completion of work of Anti vibration baffle involves removal of insulation from steam cooled panel, Cutting of steam cooled panel & cutting of baffle into pieces & fitting the baffle on coils. This is in the scope of work.						
Pr part						
1	24	994	Name Plates	0.224	0.224	0.224
			Pr Parts Total	**0.224**	**0.224**	**0.224**
Non - Pr part						
1	42	046	Drain Oil Pump-Motor	0.200	0.200	0.200
2	42	150	Operating floor tracer system	0.100	0.100	0.100
3	42	154	piping opr G floor D	0.500	0.500	0.500
4	42	200	Sub delivery fuel oil system	0.140	0.140	0.140
5	42	300	BHEL VALVE FO system	0.200	0.200	0.200
6	42	358	BHEL valve opr G floor	0.232	0.232	0.232
7	48	115	Supportsetcpri Fan T	0.530	0.530	0.530
8	48	141	Seal Air Hag And Id	0.000	2.050	2.050
9	48	145	Supportsetccoldairbu	0.000	2.021	2.021
10	48	225	Supports For Hot P.A	0.974	2.336	2.336
11	48	432	Rect Duct Airheater	0.000	1.880	1.880
12	48	434	Expn Piecesairheater	0.000	0.895	0.895
13	48	435	Supportsetcairheater	0.667	3.390	3.390
14	48	465	Bof To Ep Ducting Su	0.450	3.665	3.665
15	48	485	Supportsetcelec Prpt	0.000	1.112	1.112
16	48	495	I.D.System Duct Supp	0.000	0.489	0.489
17	48	662	Rect Duct Hot Air B	0.000	2.813	2.813
18	48	664	Expn Pieceshot Air B	0.000	0.000	0.000
19	48	665	Supports For Hot Pa	1.253	1.253	1.253

20	48	700	Bulked Bps Component	0.782	1.559	1.559
21	97	599	Pneumatic Actuator I	0.000	2.086	2.086
22	57	160	GATE-COLD AIR TO MILLS	0.330	2.541	2.541
23	57	270	GATE-HOT AIR TO MILLS	0.332	0.332	0.332
24	57	466	PLATFORMS AND LADDERS	3.186	3.186	3.186
25	99	100	Fan Handling Equipme	11.100	11.100	11.100
26	99	400	Airheater Handling	1.000	1.000	1.000
			Non Pr Parts Total	**21.976**	**45.610**	**45.610**
Rotating parts						
1	56	161	BAC 1 SUC SA FAN	0.500	0.500	0.500
2	BA9755039082		ELE.OPRTD.MILL HNDG.EQP-XRP 883-903	19.350	19.350	19.350
			Rotary Total	**19.850**	**19.850**	**19.850**
Piping						
1	80	351	MILL INERTING LINE ORIFICE ASSLY	0.065	0.065	0.065
2	80	375	UNLISTED SV EXHAUSTS	0.829	0.829	0.829
3	80	453	ROUTING OF MISC PIPING SYSTEM TO COMMON DRAIN	0.700	0.700	0.700
4	80	921	HANGER & SUPPORTS	0.106	0.106	0.106
5	80	928	HANGER & SUPPORTS	0.041	0.041	0.041
6	80	930	HANGER & SUPPORTS	1.470	1.470	1.470
7	80	934	HANGER & SUPPORTS	1.386	1.386	1.386
8	81	412	IBD&CBD LEVEL GAUGES	0.603	0.603	0.603
9		PEM	NaOH DOSING MOTOR & AGITATOR SHAFT	0.100	0.100	0.100
10		PEM	HP & LP DOSING LADDER	0.100	0.100	0.100
11	80	440	CONDENSER DRAINS	0.800	0.800	0.800
12	80	610	SERVICE AIR IN TG AREA	2.000	2.000	2.000
13	80	341	AUX STEAM INTR CONNECTION FINAL CONNECTION	1.000	1.000	1.000
14	80	463	BOILER FILLING INTER CONNECTION B/W U1 & U2	0.722	0.722	0.722
15	PEM/PC		PIPE	0.100	0.100	0.100
			Piping Total	**10.022**	**10.022**	**10.022**
ESP						
1	78	405	ESP-SUB-DELIVERY	0.248	0.248	0.248

			COMPONENTS			
2	78	406	INSULATOR HOUSING ASSEMBLY	1.000	1.000	1.000
3	78	410	GD_DRIVE ARRANGEMENT	0.229	0.229	0.229
4	78	421	EMIT SYS FRAME-TOP	0.355	0.355	0.355
5	78	426	COLL ELEC RAPP DRIVE	0.200	1.000	1.000
6	78	442	OUTER ROOF-EP	0.276	2.208	2.208
7	78	449	CASING SHELL/PANEL	1.130	1.449	1.449
8	78	455	PENT HOUSE FOR E P	6.000	6.000	6.000
9	78	465	APP PLATFORM-HOPPER	0.210	3.327	3.327
10	78	466	WATER WASHING SYSTEM	3.390	3.390	3.390
11	78	472	INTERLOCKS-EP	0.975	0.975	0.975
12	78	473	ELECTRICALLY OPERTD HOIST&ACCE	1.000	1.000	1.000
13	78	490	HEATING ELEMENTS	0.000	1.724	1.724
			ESP Total	**15.013**	**22.906**	**22.906**
Insulation						
1	Piping		Patch up work lagging & cladding	21.000	21.000	21.000
2	Boiler		Patch up work & cladding	12.000	12.000	12.000
3	ESP		Patch up work lagging & cladding	6.000	6.000	6.000
4	Rotating parts		Patch up work lagging & cladding	5.000	5.000	5.000
5	Ducting		Patch up work lagging & cladding	3.000	3.000	3.000
			Insulation Total	**47.000**	**47.000**	**47.000**
Grand Total				**401.837**	**546.237**	**546.237**

Unit #2 - Applicable Final Painting Weight of Boiler & Aux., Piping

SN	PG	MA	DESCRIPTION	Wt (In MT)	Area
1	35	110	MAIN COLUMNS LEFT	228.257	STR
2	35	120	MAIN COLUMNS RIGHT	228.257	STR
3	35	130	MAIN COLUMNS MIDDLE	112.100	STR
4	35	140	AUXILIARY COLUMNS-LE	82.578	STR
5	35	150	AUXILIARY COLUMNS-RI	82.578	STR
6	35	160	AIRHEATER COLUMNS	29.791	STR

7	35	190	GIRDER PIN CONNECTIO	6.855	STR
8	35	210	BOILER CEILING STRUC (CGs&WBs)	322.893	STR
9	35	220	BOILER CEILING STRUC (RBs)	66.197	STR
10	35	230	BOILER CEILING STRUC	14.382	STR
11	35	310	HORIZONTAL BRACING I	19.754	STR
12	35	320	HORIZONTAL BRACING II	21.005	STR
13	35	330	HORIZONTAL BRACING III	18.147	STR
14	35	340	HORIZONDAL BRACING IV	20.821	STR
15	35	350	HORIZONDAL BRACING V	15.059	STR
16	35	360	HORIZONDAL BRACING VI	17.535	STR
17	35	380	LANDING PLATFORMS	24.530	STR
18	35	381	LAND PLATFORM LOWER	23.139	STR
19	35	390	PLATFORM AT DRUM FLO	48.333	STR
20	35	441	HORIZONTAL BEAMS-LOW	131.944	STR
21	35	443	HORIZONTAL BEAMS-UPP	109.405	STR
22	35	511	FRONT BRACING-LOWER	17.838	STR
23	35	513	FRONT BRACING-UPPER	17.309	STR
24	35	521	SIDE BRACING-LOWER	56.495	STR
25	35	523	SIDE BRACING-UPPER	48.879	STR
26	35	531	REAR BRACING-LOWER	38.382	STR
27	35	533	REAR BRACING-UPPER	30.076	STR
28	35	700	HSFG FASTENERS FOR P	8.636	STR
29	35	811	FLOOR GRILLS AND GUA	93.912	STR
30	35	821	STAIRS - LOWER	25.067	STR
31	35	823	STAIRS - UPPER	8.552	STR
32	35	851	HAND RAILS AND POSTS	42.759	STR
33	35	993	Misc. Erection Matls.	19.696	STR
34	36	310	MAIN MBL FLOOR 11TH	87.469	STR
35	36	311	MAIN FLOOR I MBL 1ST	68.039	STR
36	36	320	MAIN FLOOR 12TH LEVE	68.803	STR
37	36	321	MAIN FLOOR II MBL IS	53.428	STR
38	36	322	MAIN FLOOR II MBL 2N	88.248	STR
39	36	330	MAIN FLOOR 13TH LEVE	29.024	STR
40	36	331	MAIN FLOOR III MBL 1	34.076	STR
41	36	332		34.056	STR
42	36	340	MAIN FLOOR 14TH LEVE	26.964	STR
43	36	341	MAIN FLOOR IV MBL 1S	25.782	STR
44	36	350	MAIN FLOOR 15TH LEVE	31.836	STR
45	36	351	MAIN FLOOR V MBL IST	24.912	STR
46	36	352	MAIN FLOOR V MBL II	23.918	STR
47	36	360	MAIN FLOOR 16TH LEVE	15.323	STR
48	36	361	MAIN FLOOR VI MBL 1S	17.178	STR

49	36	391	MISCELLANEOUS PLATFO	12.451	STR
50	36	392	MISCELLANEOUS PLATFO	25.900	STR
51	36	393	MISCELLANEOUS PLATFO	12.134	STR
52	36	610	BOILER ROOF STRUCTUR	68.166	STR
53	36	611	BOILER ROOF SHEETING	19.036	STR
54	36	612	WEATHER PROTECTION F	23.787	STR
55	36	620	BOILER SIDE CLADDING	35.952	STR
56	36	621	BOILER SIDE CLADDING	10.220	STR
57	36	740	POSTS AND HANGERS	26.857	STR
58	36	811	FLOORGRILLSANDGUARDP	27.427	STR
59	36	813	FLOORGRILLSANDGUARDP	57.699	STR
60	36	820	STAIRS AND LADDERS	11.284	STR
61	36	851	HANDRAILS AND POSTS	23.729	STR
62	36	853	HANDRAILS AND POSTS	13.356	STR
63	38	299	MILL HANDLING MONORA	38.432	STR
64	38	310	CONN PLATFORMS TO MI	9.613	STR
65	38	410	MILL MAINTANANCE PLA	63.606	STR
66	38	810	FLOORGRILLS AND GUAR	24.465	STR
67	38	820	STAIRS AND LADDERS	0.648	STR
68	38	850	HAND RAILS AND HAND	12.122	STR
69	38	993	Consumables & Misc. Erection Matls.	12.578	STR
70	39	101	COLUMNS FRAMES BEFORE ESP	179.150	STR
71	39	140	COLS FRAMES NEAR I.D (BEFORE ID)	211.405	STR
72	39	150	COL FRAMES BETN I.D. AND CHIMNEY	33.456	STR
73	39	300	PLATFORMS - EXTERNAL	75.391	STR
74	39	301	STRUC AND PLATFORM FOR FANS	4.773	STR
75	39	302	STRUC FOR MOTOR HOOD	7.512	STR
76	39	303	MONORAIL BEAMS FOR FANS	10.724	STR
77	39	304	FAN HANDLING STRUCTURE FOR FD	15.565	STR
78	39	305	FAN HANDLING STRUCTURE FOR PA	24.640	STR
79	39	700	HSFG FASTENERS FOR PG 39	0.479	STR
80	39	810	FLOOR GRILL	11.366	STR
81	39	820	STAIRS	5.640	STR
82	39	850	HAND RAIL AND HAND RAIL POST	6.799	STR
83			Deaerator Apporach Platform (Str. Steel Lot)	6.214	STR
			Total	**3782.790**	
1	4	146	UPR DRUM SUSPENSN	13.861	PP
2	7	401	WW HDR SUSPENSION	22.046	PP
3	7	410	DOWNCOMER SUSPENSION	7.664	PP
4	7	420	DC SEISMIC GUIDES	3.306	PP
5	7	431	RISER TUBE SUPPORT	2.232	PP

6	12	914	EXPN-SH RAD ROOF HDR	0.910	PP
7	12	917	SUSPN OF RADINT ROOF	3.676	PP
8	12	924	SUSPN-SH BAKPASS HDR	14.216	PP
9	12	927	SUSPN OF REAR ROOF	2.091	PP
10	12	928	SUSPN - SH REAR WALL	4.937	PP
11	12	944	SUSPN-SH PLATEN HDRS	1.953	PP
12	12	948	SUSP-VERT SPACD ASSY	18.450	PP
13	12	954	SUSP-VERT SPACD HDRS	4.684	PP
14	12	968	SUSPN OF PLATEN ASSY	14.533	PP
15	17	904	RH HDR SUPRT AB ROOF	5.105	PP
16	17	919	RH FRONT SUSPENSION	13.572	PP
17	17	929	RH REAR SUSPENSION	13.464	PP
18	19	904	ECO HDR SUPT AB ROOF	15.240	PP
19	19	905	ECO HDR SUPT BL ROOF	6.816	PP
20	19	906	ECO LINE&LINK SUPORT	0.545	PP
21	19	907	ECO LINE&LINK SUPORT	0.283	PP
22	21	601	S.B PIPING SUPPORTS	5.715	PP
23	21	800	SB VALVES (BHEL)	0.354	PP
24	21	825	SB VALVES (SUBDELY)	0.325	PP
25	21	850	SB SAFETY VALVE BHEL	0.023	PP
26	24	201	TRIM PIPING SUPPORTS	7.125	PP
27	24	215	SPRWAT SYST RH UTY	3.464	PP
28	24	220	SV ESCAPE PIPES	11.922	PP
29	24	225	SV SILENCER SUPPORT	12.889	PP
30	24	235	START VENT SIL SUPRT	0.893	PP
31	24	240	SAMPLE COOLER&SUPRT	0.654	PP
32	24	260	VALVES BHEL	13.484	PP
33	24	265	VALVES & FITTINGS SD	5.626	PP
34	24	273	DIRECT WTR LVL GAUGE	0.247	PP
35	24	280	SAFETY VAL & ERV-BHE	3.816	PP
36	24	285	SV&ERV SILNCER BHEL	33.054	PP
37	24	350	BLR FILLING PIPING	0.518	PP
38	24	351	H&S BLR FILLING PPG	0.643	PP
			Total	**270.335**	
1	8	101	FURNACE UPPER BUCKST	58.233	NPP
2	8	104	FURNACE INTERMEDIATE	43.844	NPP
3	8	107	FURNACE LOWER BUCKST	35.932	NPP
4	8	111	FURNACE REAR ARCH BU	2.193	NPP
5	8	380	FURNACE BOTTOM SUPPO	34.130	NPP
6	8	400	FURNACE GUIDE	10.943	NPP
7	8	500	FURNACE BACK PASS BU	72.287	NPP
8	8	700	EX.MOVEMENT MEASUREM	0.487	NPP

9	8	900	FURNACE KEY BUCKSTAY	3.330	NPP
10	9	1	SEAL BOX FURN OPENG	6.410	NPP
11	9	2	SEAL BOX INST OPENG	1.764	NPP
12	9	3	MATL FOR INST TAPPG	0.175	NPP
13	20	51	LONG RETRACT SB M11E	23.840	NPP
14	20	54	WALL BOX NPR LRSB MI	0.557	NPP
15	20	201	WALL DESLAGGER RW5E	9.574	NPP
16	20	204	WALL BOX NPR-RW5E	1.107	NPP
17	20	511	DA HEAD VALVE ASSY	0.111	NPP
18	20	794		0.063	NPP
19	20	972	TEMP PROBE DUPLTC	1.562	NPP
20	28	220	DOORS	5.876	NPP
21	28	700	BPS FASTENERS	0.665	NPP
22	41	350	ACOIL GUN ASSY	0.800	NPP
23	41	390	OIL GUN VICE&RACK	0.830	NPP
24	42	1	PNEUMATIC FITTINGS	0.147	NPP
25	42	5	INSTRUMENT FITTINGS	0.219	NPP
26	42	46	DO PUMP-MOTOR ASSY	0.200	NPP
27	42	70	BURNER STN SKID ASLY	4.759	NPP
28	42	152	PIPING,OP.FLR LFO	1.018	NPP
29	42	154	PIPING,OP.FLR DO	1.594	NPP
30	42	157	PIPING,OP.FLR AIR	0.875	NPP
31	42	200	SUB.DEL FO SYSTEM	0.874	NPP
32	42	300	BHEL VALVE F.O. SYS	0.816	NPP
33	42	358	B.VALVE,OP.FLR STM	0.232	NPP
34	42	700	BULKED BPS COMPONENT	0.354	NPP
35	43	4	ASSY SCNR&GUN AIR SY	1.622	NPP
36	43	5	ASSY MILL AIR SYSTEM	2.501	NPP
37	43	104	M/C SCNR&GUN AIR SYS	10.927	NPP
38	43	105	M/C MILL AIR SYSTEM	16.569	NPP
39	43	200	SUBDEL,IGNR,SCNR AIR	1.715	NPP
40	45	220	WBOX ASSY 22-IN	64.188	NPP
41	45	221	WBOX SUPRT 22-IN	6.373	NPP
42	47	221	FUEL PIPE SUPRT 22IN	24.973	NPP
43	47	223	COUPLING,ORIFICE ETC	25.227	NPP
44	47	229	ST PIPE& SHOP BENDS	257.633	NPP
45			Coal Pipe15°,45°,50°,55°, 90° Bend,	68.278	NPP
46			Ceramic Transition Piece	5.760	NPP
47			Orifices ID	1.530	NPP
48			Fuel inlet Elbow	66.328	NPP
49	48	015	SUPPORT-FDFAN TO A.H	10.716	NPP

50	48	115	SUPPORT-PAFAN-PRI-AH	5.210	NPP
51	48	145	SUPPORT-COLDAIRBUS	4.202	NPP
52	48	205	SUPORT AH-WIND BOX	5.024	NPP
53	48	225	SUPORT AH-HOTAIRBUS	9.256	NPP
54	48	385	SUPPORT ECO-AIRHEATR	4.104	NPP
55	48	435	SUPORT AH-BLROUTFL	9.876	NPP
56	48	465	SUPORT BLR OUTFL-EP	14.421	NPP
57	48	485	SUPPORT EP/MP-IDFAN	8.643	NPP
58	48	495	SUPORT IDFAN-CHIMNEY	8.327	NPP
59	48	665	SUPPORTS FOR HOT PA	7.671	NPP
60	48	700	BULKED BPS COMPONENT	2.031	NPP
61	67	40088	Seal Air Header Assembly	15.000	NPP
62	67	272	COALVALVE-36 MOT OPR	5.693	NPP
63	67	276	RAWCOAL GATE-CHAIN36	5.951	NPP
64	67	283	FDR ISOLATION GATE	7.243	NPP
65	67	801	DOWN SPOUT	15.647	NPP
66	67	802	BUNKER EMPTYINGCHUTE	15.111	NPP
67	67	803	FEED PIPE TO MILL	8.110	NPP
68	97	599	PNEUMATIC ACTUATOR IN AIR & FLUE GAS	4.364	NPP
69	99	100	FAN HANDLING EQUIPT	11.100	NPP
70	99	400	APH Handling	1.000	NPP
			HVR Transformer(ESP) with Electronic Controlers	59.920	NPP
			Total	**1118.047**	
1	52	100	LARGE AH ROTOR DRIVE	3.535	RTM
2	52	211	LARG AH-AIRSEAL PIPE	0.673	RTM
3	52	271	OIL PIPING GUIDE BEARING	0.516	RTM
4	52	272	OIL PIPING SUPPORTING BEARING	0.536	RTM
5	52	274	LUB OIL CIRCULATION UNIT	1.102	RTM
6	52	301	WASH MANIFLD GAS INL	0.600	RTM
7	52	302	WASH MANIFLD GAS OUT	0.568	RTM
8	52	329	CLE EQPT DRIVE UNIT	1.634	RTM
9	55	810	AXIAL FDFAN COUPLING	0.555	RTM
10	55	830	AXIAL PAFAN COUPLING	1.184	RTM
11	55	910	AXIAL FDFAN ACCESSORIES	2.592	RTM
12	55	911	AXIAL FDFAN SILENCER	25.681	RTM
13	55	930	AXIAL PAFAN ACCESSORIES	2.588	RTM
14	55	931	PA FAN SILENCER	30.576	RTM
15	56	161	BAC 1 SUC SA FAN	0.500	RTM
16	56	820	RAD ID FAN COUPLING	11.673	RTM
17	56	920	RAD ID FAN ACCESSORIES	2.326	RTM

18	57	13	DAMPERS BET FD FAN & APH	3.509	RTM
19	57	23	DAMPERS SEC. AIR INTER CONNECT	2.174	RTM
20	57	30	GATE -SAH AIR BY PASS	6.121	RTM
21	57	110	GUILLOTENE GATE PA FAN TO APH	10.831	RTM
22	57	113	DAMPERS BETWEEN PAFAN AND APH	3.875	RTM
23	57	143	DAMPER COLD AIR BUS(TEMP AIR T	1.626	RTM
24	57	160	COLD AIR GATE,AIRBUS T	6.962	RTM
25	57	203	DAMP APH TO WINDBOX DUCT	7.629	RTM
26	57	209	MTG BKT FOR CL DAMPER AIR CYL	3.262	RTM
27	57	223	DAMP APH PRIMARY SIDE TO HOT A	4.332	RTM
28	57	270	GUILLOTENE GATE DUCT TO MILL	16.585	RTM
29	57	273	DAMPER BOILER OUTLET	5.837	RTM
30	57	383	FLUE GAS SAH INLET DAMPER	15.178	RTM
31	57	433	DAMPER APH BOILER OUTLET-GAS	17.346	RTM
32	57	460	GUILLOTENE GATE EP INLET	18.305	RTM
33	57	466	PLATFORMS AND LADDERS	20.226	RTM
34	57	470	EP OUTLET GATE	18.309	RTM
35	57	480	ID FAN INLET GATE	13.854	RTM
36	57	490	GUILLOTENE GATE ID FAN OUTLET	14.736	RTM
37	57	491	BLOWER WITH MOTOR	0.600	RTM
38	57	577	ELECT ACTUATOR FOR GATE	5.146	RTM
39	61	88	JOURNAL ASSEMBLY	123.958	RTM
40	61	188	MILL DRIVE & BOWL ASSEMBLY	157.966	RTM
41	61	288	MILL SIDE & LINER ASSEMBLY	106.152	RTM
42	61	388	CLASSIFIER ASSEMBLY	193.204	RTM
43	61	488	MDV ASSEMBLY	36.669	RTM
44	61	788	MILL MOTOR COUPLING	0.960	RTM
45	61	888	MILL HANDLING SYSTEM	19.800	RTM
46	65	736	36GRAVIMETRIC FEEDER	43.434	RTM
47			ID Fan Motor (2 nos.)	33.680	RTM
48			FD Fan Motor (2 nos.)	11.650	RTM
49			PA Fan Motor (2 nos.)	27.600	RTM
50			Mill Motor (6 nos.)	35.652	RTM
			Total	**1074.007**	
1	80	460	SG AUX COOLING WATER UNIT SYSTEM	29.138	PIPING
2	80	463	TG AUX COOLING WATER	115.696	PIPING
3	80	468	MAIN CIRCULATION WATER PIPING	58.989	PIPING
4	80	471	BOILER WATER WASH TO AND FROM UNIT	7.361	PIPING
5	80	480	FIRE WATER-OTHER AREAS	7.708	PIPING
6	80	610	SERVICE AIR-COMP SUCT & DIS TO	3.442	PIPING

			RECEIVER		
7	80	650	FUEL OIL SUPPLY AND RETURN PIPING	6.080	PIPING
8	80	673	LUBE OIL PIPING SYSTEM	0.385	PIPING
9	80	901	SUB DELIVERY VALVES FOR LIGHT UP	1.183	PIPING
10	80	920	H&S FOR HYDRO TEST	1.025	PIPING
11	80	921	H&S FOR LIGHT UP STEAM LINE	3.538	PIPING
12	80	923	H AND S FOR STEAM BLOWING	156.578	PIPING
13	80	928	H&S FOR BOILER LIGHT UP- TG	12.306	PIPING
14	80	930	H&S FOR SYNCHRONISATION- TG	7.699	PIPING
15	80	933	H&S FOR LP PIPING	34.425	PIPING
16	80	934	STANDARD HANGER COMPONENTS	34.867	PIPING
17	80	905	IMPORTED VALVE	6.233	PIPING
18	80	913	IMPORTED VALVE	105.857	PIPING
19	80	914	IMPORTED VALVE	3.769	PIPING
20	80	918	IMPORTED VALVE	15.656	PIPING
21			IPL Supply-Valves	5.746	PIPING
22			PEM Supply- Piping	38.719	PIPING
23			BHOPAL Supply- Butter Fly Valve	6.338	PIPING
			Total	**662.738**	
1	78	401	ROLL/SLIDE SUPPORTS	11.808	ESP
2	78	406	INSULATOR HOUSING AS	20.718	ESP
3	78	410	GD DRIVE ARRANGEMENT	0.458	ESP
4	78	417	DRIVE ARGT.FOR EMIT	14.787	ESP
5	78	423	INSPECTION DOORS	6.067	ESP
6	78	426	COLL ELEC RAPP DRIVE	3.204	ESP
7	78	430	ELECTRICAL SD COMPTS	6.449	ESP
8	78	431	GERAED MOTOR FOR RAPP	10.668	ESP
9	78	442	OUTER ROOF -EP	134.971	ESP
10	78	455	PENT HOUSE FOR EP	88.635	ESP
11	78	461	EP PERF TEST EQUIPT	0.422	ESP
12	78	465	APP PLATFORM-HOPPER	75.741	ESP
13	78	466	WATER WASHING SYSTEM	3.390	ESP
14	78	472	INTER LOCKS EP	0.975	ESP
15	78	473	ELECTRICALLY OPERATED HO	3.207	ESP
16	78	481	SUPPORTING STRUCTURE F	218.552	ESP
17	89	610	EP GALLERIES & STAIRS	51.069	ESP
18	89	611	ESP ROOF HANDRAILS	4.212	ESP
			Total	**655.333**	
			Grand Total	**7563.250**	

Note: Besides the mentioned Painting BOQ, All manhole doors, Grab Rods, Uninsulated Zone, Supports (Duct or Pipes) is also in the scope of work.

Summary of Balance Weight Details

Amravati Unit # 2

S No.	Area	Erection (In MT)	Allignment, Bolting, Grouting & Welding (In MT)	Leak Test, NDT, Heat Treatment, equipment trial run (In MT)	Painting (In MT)
1	Structure	287.753	400.625	400.625	3782.790
2	Pressure Parts	0.224	0.224	0.224	270.335
3	Non- Pressure Parts	21.976	45.610	45.610	1118.047
4	Rotary	19.850	19.850	19.850	1074.007
5	Piping including HT	10.022	10.022	10.022	662.738
6	ESP	15.013	22.906	22.906	655.333
7	Insulation	47.000	47.000	47.000	0.000
	Total	**401.837**	**546.237**	**546.237**	**7563.250**

NOTES:

1. The weights given against PGMAôs listed above are tentative. It may change on actual erection. Rate quoted by the Contractor shall not change due to variation in weight.

2. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHELôs unit for release of some items, integral to this work. Tenderersôquoted unit rates shall be applicable for such product groups also.

3. BHELôs decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.

Attached separately as file titled 'Painting Scheme-1553'.

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, BHELÕS Customer, CustomerÕs 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 EngineerÕs decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

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

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

11.8
The work shall confirm to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to ContractorÕs 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 Contractorôs bills towards expenditure incurred including cost of materials and departmental overheads of BHEL as per GCC.

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

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

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

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

11.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractorôs 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 ôGeneral Conditions of Contractô

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 Engineerôs 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.

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 Contractorôs 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 equipmentôs 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 equipmentôs 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 BHELôs 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 thermo wells & 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 thermo wells 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 equipment / 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 Contractorôs 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 engineerôs instructions. The machine surfaces/finished surfaces should be greased and covered.

11.36
BHEL is operating web based computerized system that includes, inter-alia, issue of materials, daily progress reporting, Contractorôs running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHELôs system and use the same for his scope of work.

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

11.37
Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost. For T-91 material site weld joints argon as per grade-3 of is 5760: 1998 with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the Contractor. The supply should accompany test certificate for the batch indicating individual element ppm level and overall purity level.

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

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

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

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

12.1 PRESSURE PARTS

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

B) Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the Contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. No gas cutting will be permitted. All fittings like ñTòpieces, weld neck flanges, reducers, etc shall be suitably matched with pipes for welding (This is applicable to piping work also).

C) 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.

D) 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.

E) 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.

F) 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.

G) 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~~

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

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

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

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

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

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

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

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

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

12.2.9

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 in order to meet certain completion commitments.

12.2.10

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.

12.2.11

~~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.~~

~~12.2.12~~
~~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.~~

~~12.2.13~~
~~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.~~

~~12.2.14~~
~~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.~~

~~12.2.15~~
~~It may become necessary to make & install temporary spool pieces for certain process requirements. Contractorôs scope shall include preparation, erection, fit-up, welding, NDE etc and dismantling of such spool pieces at appropriate stage without any additional payment.~~

~~12.2.16~~
~~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 / customerôs 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 Contractorôs 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.

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

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.

12.4.6
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.

12.4.7
Installation of high voltage interlocks (excepting rotary switch interlock of switchgear panels) is in the scope of work.

12.4.8
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.

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

12.5.1
Boiler main supporting structures have to be erected in a sequential manner.

12.5.2
Quality norms with regard to verticality of column, inter-alia, have to be adhered to strictly, at various stages of erection.

12.5.3

It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, which may necessitate temporary installation of some structural steels at appropriate locations to keep the stability of structure intact. such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL

engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the Contractor to suit the requirement.

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

12.5.4
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.

12.5.5
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.

12.5.6
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.

12.5.7
Electro forged floor grills will be supplied for this project. These may have to be cut to suit requirement. Cutting shall be done only by mechanical cutters **and not by gas cutting**. Cold galvanizing compound is to be applied on the cut surface/edge. Cold galvanizing paint supply is in Contractor scope.

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

12.5.8
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.

12.5.9
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) 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.

b) 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.

c) 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.

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

e) 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.

f) All welded joints should be painted with anticorrosive paint / primer immediately after completion of all work.

g) 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.

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

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

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

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

13.3
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipmentôs. 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 contractors.

13.5
Complete grouting of structures equipmentôs, 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 ï free flow - non-shrink grout mix (e.g. conbextra gp1/gp2), form work, shuttering, and any other requirements is in the Contractorôs scope. Contractor shall obtain approval of BHEL for cement (Ordinary Portland as-well-as quick setting ï 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 equipmentûs involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipmentûs has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

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

14.1 WELDING

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

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

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

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

14.1.5
Before any welder is engaged on work, he shall be tested and qualified by BHEL/ customer, though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason. All the expenditure in testing/qualification of the Contractorôs 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 Contractorôs 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 Engineerôs 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 engineerôs 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 ï 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 P-91 material, the induction heating process shall continue un-interrupted.

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/BHELôs erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer/Boiler inspecting authority. Bidder shall also arrange the UT equipment with recording facility at his own cost. Usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

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

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

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

14.3.6
Contractor shall note that 100% radiography shall be taken on all high pressure welding till such time the weldersôperformance is found by BHEL Engineers to be satisfactory. Subsequently, subject to consistency in welderôs performance, the percentage of radiography will be based on BHELôs 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 Contractorôs 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 IRï 192 other suitable source subsequently after completing the joint UT to be done. For this Contractor has to deploy leveli 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 deducted from Contractorôs 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, BHELôs 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.

15.7
Cutting & dressing of insulation bricks to suit the site area of application is incidental to work.

15.8
Removable type of insulation has to be provided for valves fittings, expansion joints etc as per drawing or as directed by BHEL Engineer.

15.9
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.

15.10
Cladding/outer casing shall be fixed expeditiously, so as to avoid damage to the insulation from the weather.

15.11
The overlapping surface of outer casing/cladding sheet shall be coated with sealing compound, which will be supplied by BHEL free of cost.

15.12
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.

15.13
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 Engineerõs instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

15.14
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.

15.15
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.

15.16
The following works are also included in the scope of this contract.

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

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

15.17
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.

15.18
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.

15.19
Prior to application of refractory bituminous painting on the pressure parts and other area is under Contractor scope. The bituminous paint will be supplied by Contractor. No separate payment will be made for application of paint.

16 PAINTING

16.1
All exposed metal parts of the equipment including piping, structures, railings 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** of painting specification (attached separately). However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

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

16.3
Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employerôs 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 equipmentõs/ 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 mechanized 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 equipmentõs as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.

16.7
Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents. The Contractor at his own cost shall provide all the consumables and application implements.

16.8
During the preparation of surface, if the shop coat is damage by chemical cleaning or by mechanical means, Contractor shall repair the same free of cost to BHEL. BHEL will make available only the primer and paints free of any charge to Contractor.

16.9
Specified drying time shall be permitted from one to another coat.

16.10
This work requires working at higher altitudes from ground level to as high as 90 m and more. The work spread is also substantial involving substantial run of structures and piping. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. The ropes, ladders, scaffolding materials, clamps etc. and climber used should be of standard quality for safe and smooth execution of work.

16.11
Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by Contractor, BHEL shall have the right to recover the cost of such damages from the Contractor.

16.12
Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the Contractor without any extra charges.

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

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

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

16.16

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

16.17 PRIMER AND PAINTS FOR FINAL PAINTING

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

17.1
Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing e.g. hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/setting various clearances/ parameters, ensuring operation of various equipmentôs free of undue restrictions 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 equipmentôs 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 equipmentôs.

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, equipmentôs, 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 customerôs / BHELôs 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 / customerôs 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 equipmentôs 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 equipmentôs 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 engineerôs instructions. Claim, if any, for these works shall be governed by relevant clauses of õGeneral 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 Engineerôs 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 engineerôs / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as relevant clauses of õGeneral Conditions of Contract

17.12
During this period, though BHEL/ clientôs staff will also be associated in the work, the Contractorôs 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 along with 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 along with BHEL Engineers and hence considerable overtime payment is involved. The Contractorôs 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/ clientôs staff will also be associated in the work, the Contractorôs 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
Assistance for Conducting of performance guarantee test (PG test) is in the scope of work. Contractor shall install all necessary tapping points; instruments etc. and provide necessary assistance in this regard**.**

In case PG test is getting delayed beyond the contract period (normal plus extension if any) due to reasons not attributable to the Contractor, PG test issue will be mutually discussed and decided. However installation of necessary tapping points, impulse pipes, approaches etc are to be completed by the Contractor.

17.18

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

18.1 PRESERVATION & PROTECTION OF COMPONENTS

At all stages of work, equipmentõs/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 equipmentõs 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/ clientõs stores. In case of failure of Contractor in compliance of this requirement, BHEL will make suitable arrangement at Contractorõs 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 utilization 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.