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NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited

Ref: BHEL/ NR/SCT/OBRA /BOILER U-13/R&M/1076
Date: 09/11/17

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NOTICE INVITING E-TENDER (NIT)
BIDDER TO SUBMIT OFFERS ON PORTAL
https://bheleps.buyjunction.in

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To

Dear Sir/Madam

Sub : NOTICE INVITING E-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. **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	**BHEL/ NR/SCT/OBRA /BOILER U-13/R&M/1076**	
ii	Broad Scope of job	**RENOVATION AND MODERNIZATION OF BOILER AND AUXILIARIES FOR UNIT 13, 200 MW AT UPRVUNL OBRA TPS**	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	**From BHEL website (www.bhel.com) and** ***https://bheleps.buyjunction.in*** Tender documents will be available at website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 20/11/2017 , Time : 15:00 HRS*** ***Place : on https://bheleps.buyjunction.in***	*Applicable*
vi	**OPENING OF TENDER**	***At due date / time*** ***Date : 20/11/2017 , Time :15:30 HRS*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date*	*Applicable*

		& time of offer submission and opening of tenders get *(2) extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender.* ***However it being an e-tender it shall be opened online***	
vii	**EMD AMOUNT**	*Rs 21,67,760/-*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	***Five days before bid submission due date****.* *Along with soft version also, addressing to contact address given below* *1) Name: R Chandra* *Designation:Dy. Mngr* *Deptt: SCT* *Address: 104,BHEL PSNR* *Phone: 0120-2416440* *Email :rmchandra@bhel.in* *Fax: 0120-2416528* *2) Name: Susmita Basu* *Designation:Sr. DGM* *Deptt: SCT* *Address: 104,BHEL PSNR* *Phone: 0120-2416262* *Email :susmitabasu@bhel.in* *Fax: 0120-2416528*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	Mrs. Pravin Tripathi, IA & AS (Retd.) D-243, Anupam Gardens, Lane IB, Neb Sarai, Sainik Farms, New Delhi – 110 068 pravin.tripathi@gmail.com	*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) & portal https://bheleps.buyjunction.in **and not in the newspapers**. Bidders to keep themselves updated with all such information	
xiii	**Tender submission**	on portal https://bheleps.buyjunction.in	

2. 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, **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. 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 Noida 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 Noida, Sundays and second/ last Saturdays.

As this tender is an E-Tender and no paper bids will be accepted therefore the scanned copy of the Demand Draft or the Cash Receipt issued by BHEL PSNR should be uploaded in the E procurement portal. Hard Copy of the demand draft should reach BHEL PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.

4. Unless specifically stated otherwise, bidder shall deposit EMD through Cash Deposit (as permissible under the extant Income Tax Act) (before tender opening), Electronic Fund Transfer credited in BHEL account (before Tender Opening) or Banker's Cheque/ Demand Draft/ Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Noida (along with offer).

'One Time EMD' will not be considered for this tender. All the bidders who have 'One Time EMD' with BHEL and want to participate in this tender, would also submit the requisite amount of EMD as mentioned in Clause No. 1, Salient Features of NIT, Sl. No. (vii) above.
However, the One Time EMD can be adjusted against the EMD applicable against this tender on specific request of bidder.

For Electronic Fund Transfer the details are as below-:

a) **Name of the Beneficiary** -: Bharat Heavy Electricals Limited

b) Bank Particulars

i).	Bank Name -:	STATE BANK OF INDIA
ii).	Bank Telephone No.(with STD code)-:	011-23352180
iii).	Branch Address-:	CAG BRANCH, NEW DELHI
iv).	Bank Fax No. (with STD code) -:	011-23353101
v).	Branch Code -:	SBIN0009996
vi).	9 Digit MICR Code of the Bank Branch -:	110002201
vii).	Bank Account Number -:	10813608647
viii).	Bank Account Type -:	CASH CREDIT
ix).	11 Digit IFSC Code of Beneficiary Branch-:	SBIN0009996

(Note-: In case of E-Tenders, no paper bids shall be accepted, therefore, the scanned copy of the Banker's Cheque/ Demand Draft/ Pay Order/ Details of payment made through Electronic Fund Transfer should be uploaded in the E-Procurement Portal and hard copy of the same should reach BHEL-PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.)

For other details please refer General Conditions of Contract.

5. **Procedure for Submission of Tenders**: This is an E-tender floated online through our E-Procurement Site **https://bheleps.buyjunction.in**. The bidder should respond by submitting their offer online only in our e-Procurement platform at https://bheleps.buyjunction.in. Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online ONLY EXCEPT TENDER FEE & EMD (in physical form) as mentioned below:

a. Technical Tender (UN priced Tender)

All Technical details (eg. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

i. Tender Cost and Earnest money Deposit (EMD) furnished in accordance with NIT Clause 3.0 & 4.0. Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT

ii. Technical Bid (without indicating any prices).

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.
iii. Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
iv. A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
v. A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.
vi. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, same shall not be considered.

DO NOT"S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered. **Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender**.

Digital Signing of e-Tender

Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

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The Requirement:

1. A PC with Internet connectivity &
2. DSC (Digital Signature Certificate)(**Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION**)

BHEL has finalized the e-procurement service Provider-:

M/s M Junction services Limited, Kolkata

Godrej Water Side, 3rd Floor, Tower-1, Plot-V, Block - DP
Sector - V, Salt Lake, Kolkata-700091, West Bengal, INDIA

The contact details of the service provider are given below:

1. **First level:**
   - MJ Helpdesk : 033-66011717, eps.customercare@mjunction.in
2. **Second Level:**
   - Bhaskar Chakraborty: 8584008205, bhaskar.chakraborty@mjunction.in, eps.customercare@mjunction.in
   - Santosh Kumar: 9717149600, santosh.kumar@mjunction.in
3. **Third Level:**

- Rimi Ghosh: 9650044156, rimi.ghosh@mjunction.in

1. Customer care Help Desk of M/s MJUNCTION SERVICES LIMITED, Kolkata:
   Tel ~ 033 - 66011717 (From 9.30 am to 5.30 pm),
   Mob - 91633 48283 - 86/ 85840 08116 (From 5.30 pm to 8.30 pm)
   HELPDESK email: eps.customercare@mjunction.in,
   The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate)(Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)** and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

2. The contact details of the DSC Certifying Authority as given below

1	**GNFC**	www.ncodesolutions.com
2	**e-Mudhra**	http://www.e-Mudhra.com
3	**Safescrypt**	www.safescrypt.com

Vendors are also requested to go through seller manual available on www.bheleps.buyjunction.in

6. **Not Used**

7. 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. 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. **Assessment of Capacity of Bidders:**

Bidder's 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 cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -
(**Note:** For example, if latest bid submission is in Jan 2017, then the 'load' shall be calculated up to and inclusive of Oct 2016)

Total number of Packages in hand = Load (P)

Where 'P' is the sum of all unit wise identified packages (refer table-1) under execution with BHEL Regions as on the cut off month defined above, including packages yet to be commenced, excepting packages which are on Long Hold.

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all 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 and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(**Note**: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table -1))

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 of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \ldots P_N$)

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. $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + \ldots T_N$)

c) Sum 'S_1 'of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$…. $S_{1\text{-}T1}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}$). Similarly, S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. 'S_T '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

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

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

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

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 = $\mathbf{P_T}$ i.e. Sum (Σ) of columns (iii) to (ix)

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
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 Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	--------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

ii). Calculation of Overall 'Performance Rating' ($\mathbf{R_{BHEL}}$) in case at least 6 evaluation scores for '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' i.e. 6 months preceding and including the cut-off month
b) 12 months preceding and including the cut-off month
c) 24 months preceding and including the cut-off month
d) 36 months preceding and including 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 $R_{BHEL} \geq 80$, 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 'I' above)

IV. **Explanatory note**:

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

ii). Identified Packages (Unit wise)

Table-1

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

iii). Bidders who have not been evaluated for at least six package months in the last 36 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, 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 or completion of contract or availability of 6 evaluation scores including the previous scores (if any).

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 'Assessment of Capacity of Bidders'.

iv). 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.

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

a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages

b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages

c. Up to Synchronization in all Balance Packages

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

vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.

vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 25th of Evaluation Month or 3 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.

viii). Project on Hold due to reasons not attributable to bidder -

a. **Short hold:** Evaluation shall not be applicable for this period, however Loading will be considered.

b. **Long hold:** Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

ix). 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. 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. For any clarification on the tender document, the bidder may seek the same over e-procurement portal 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. 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. 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. Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15. 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 Clause No. 1, Salient Features of NIT, Sl. No. (xi) above.**

15a. **Integrity Pact (IP)**

i) IP is a tool to ensure that activities and transactions between the Company and its Bidders / Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification. Details of IEM for this tender is given at point 1 (xi) above.

ii) Please refer Section-8 of the IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

No routine correspondence shall be addressed to the IEM (phone / post / email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification / issues shall be addressed directly to the tender issuing (procurement) department.

For all clarifications/issues related to the tender, contact details are as per **Clause No. 1, Salient Features of NIT, Sl. No. (ix) above.**

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

18. 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. (a) BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer 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 RA.

(b) Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

(c) The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. **The envelope sealed price bid of successful L1**

bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

(d) If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

(e) If reverse auction process is unsuccessful, sealed envelope price bids of all the techno-commercially qualified bidders shall be opened and the tender shall be processed accordingly. However, the envelope sealed bid(s) of techno-commercially acceptable bidder(s) who had agreed to participate in the RA and had failed to submit the online sealed bid shall not be opened.

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

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

23. 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 upload 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 The offers of the bidders who are on the banned/ hold list as also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.

27.0 It may please be noted that **guidelines/rules** in respect of Suspension of Business dealings', 'Vendor evaluation format', 'Quality, Safety & HSE guidelines', milestone/ completion certificate, etc may **undergo change** from time to time and the latest one shall be followed. The abridge version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page".**

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website (www.bhel.com).

27.1 Integrity commitment, performance of the contract and punitive action thereof:

27.1.1 **Commitment by BHEL:**

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

27.1.2 **Commitment by Bidder/ Supplier/ Contractor:**

(i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

(ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in

connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

(iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the prices or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extent guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

28.0 **Micro and Small Enterprises (MSE)**

Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer

Type under MSE	SC/ST owned	Others
Micro		
Small		

Note: - If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.

a) MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either Udyog Aadhaar or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3) where deemed validity of EM-II certificate of five years has expired applicable for the last audited financial year. Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.

b) MSEs shall be exempted from payment of tender fee.

c) MSEs shall be exempted from payment of earnest money at the time of tender deposit. However, there is no exemption of security deposit submission.

d) Participating MSEs quoting price within price band of L1+15 % shall be considered for award of complete scope of work by bringing down their price to L1 price in a situation where L1 price is from someone other than a MSE. In case of more than one such MSE, MSE with lowest price shall be given the first option to match the L1 price. However, MSEs owned by the Scheduled Caste or the Scheduled Tribe entrepreneurs shall be given the preference for matching the L1 price irrespective of their standing in comparative statement of MSE bidders within price band of L1+15 %.

29.0 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.

30.0 Order of Precedence

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

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

f. General Conditions of Contract (GCC) —Volume-1C
g. Forms and Procedures —Volume-1D

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure:-

(i) Annexure-1: Pre Qualifying criteria.
(ii) Annexure-2: Check List.
(iii) Annexure-3: Chartered Accountant certificate for MSMED
(iv) Annexure-4: Authorization of representative who will participate in the online Reverse Auction Process
(v) Annexure-5: Feedback form
(vi) Annexure-6: Integrity Pact
(vii) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**RENOVATION AND MODERNIZATION OF BOILER AND AUXILIARIES FOR UNIT 13, 200 MW AT UPRVUNL OBRA TPS**
TENDER NO	**BHEL/ NR/SCT/OBRA /BOILER U-13/R&M /1076**

S. No.	Name and Description of qualifying criteria	Bidders claim in respect of fulfilling the PQR Criteria
A	**Submission of Integrity Pact duly signed.**	Applicable
B	**Assessment of Capacity of Bidder to execute the work as per clause assessment of capacity of NIT**	Applicable
C	**FINANCIAL CRITERIA**	Applicable
C-1	**TURNOVER** Tenderers should have an average annual turnover minimum of INR 325.164 Lacs of last three Financial Years (2014-2015, 2015-2016,2016-17). Bidders shall submit audited annual accounts (balance sheets and profit & loss account) in support of this. 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.	
C-2	**NETWORTH** Net Worth (Only in case of companies) of the bidder should be positive. Note-: Net worth shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above. Net worth = Paid up share capital* + Reserves (* : Share Capital OR Partnership Capital OR Proprietor Capital as the case may be)	
C-3	**PROFIT** Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'C-1' above. Note-: PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above	
D	**TECHNICAL CRITERIA**	Applicable
	Bidder who wish to participate should have 'Executed' works for any one of the following during last 7 years, ending on the "latest date of Bid Submission" of tender -: 1. One Boiler {consisting of "Pressure parts", "Structure/ESP" and "Power cycle piping" (of the same unit as standalone bidder)} of ≥ 300 TPH OR	

	2. ESP and Power cycle piping of a unit of >= 190 MW OR 3. "ESP" OR "Power cycle piping" of a unit of >=190 MW subject to entering into a consortium with another agency who has experience of "Power cycle piping" or "ESP" respectively, of a unit of >= 190 MW OR 4. One STG of >= 400 MW ,under direct order of BHEL subject to experience of Boiler {consisting of "Pressure parts", "Structure/ESP" and "Power cycle piping" (of the same unit as standalone bidder)} of >= 200 TPH OR 5. One STG of >= 400 MW ,under direct order of BHEL subject to entering into a consortium arrangement with an agency who has experience of "Boiler Structures" and "Pressure parts **or** Power Cycle Piping" of >=190 MW. OR 6. R&M/Retrofitting of one Boiler (190 MW or higher) involving minimum 2000 MT	
E	**APPROVAL OF CUSTOMER**	Applicable
F	**Consortium criteria**	Applicable only for D3 and D5 above, as per Clause 23 of NIT

Explanatory Notes

1. For D, 'Executed' means
   i. "BOILER LIGHT UP" in respect of Boiler / ESP.
   ii. "SYNCHRONISATION" in respect of STG.
   iii. "STEAM BLOWING COMPLETION" in respect of Power Cycle Piping.
   The bidder should have achieved the above criteria, even if the total contract has not been completed or closed.
2. In case audited financial statements have not been submitted for all the three years as indicated at c 1) above, then the applicable audited statements submitted by the bidders against the requisite 3 years, will be averaged by three.
3. Boiler means HRSG or WHRB or any other types of Steam generator.
4. Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.
5. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW.
6. For evaluation of PQR, the credentials of the bidder alone, and not that of the Group Company shall be considered.

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

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.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:	
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	Not Used		
10	Integrity Pact	Applicable/~~Not Applicable~~	YES/NO
11	Declaration by Authorised 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	Not Used		
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

Certificate by Chartered Accountant on letter head

This is to Certify that M/S ..... , (hereinafter referred to as 'company') having its registered office at .... is registered under MSMED Act 2006,(Entrepreneur Memorandum No (Part—II) ..... dtd:..... , Category: ..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:
   Rs .....Lacs

2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the **MSMED** Act, 2006:
   Rs .....Lacs

(Strike off which is not applicable)

The above investment of Rs ....Lacs is within permissible limit of Rs .....Lacs for .....Micro / Small **(Strike off which is not applicable)** Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/Small) (Strike off which is not applicable) and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership Number -

Seal of Chartered Accountant

ANNEXURE - 4

Authorization of representative who will participate in the on line Reverse Auction Process;

1	NAME & DESIGNATION OF OFFICIAL	
2	POSTAL ADDRESS (COMPLETE)	
3	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
4	FAX NO.	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

ANNEXURE – 5

Feedback Form: From where did you get information reg. this tender

1	NEWSPAPER ADVERTISEMENT (NAME)	
2	BHEL WEBISTE (TENDER NOTIFICATION)	
3	CENTRAL PUBLIC PROCUREMENT PORTAL OF GOVERNMENT OF INDIA (CPP PORTAL)	
4	EMAIL COMMUNICATION FROM BHEL	
5	ANY OTHER SOURCE	

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____

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

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

Section 1 – Commitments of the Principal

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

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

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

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

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

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

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

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

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

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

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

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

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

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

Section 4 – Compensation for Damages

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

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

Section 5 – Previous Transgression

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

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

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

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

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

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

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

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

Section 8 –Independent External Monitor(s)

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

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

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

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

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

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

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

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

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

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

Section 9 – Pact Duration

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

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

Section 10 – Other Provisions

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

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

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

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

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

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place----------

Date----------

Witness: _____

(Name & Address) _____

_____

Witness: _____

(Name & Address)_____

_____

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TENDER NO. BHEL/ NR/OBRA/BOILER U-13/R&M/1076

FOR

DISMANTLING OF SPECIFIED ITEMS UPTO BOILER OUTLET FLANGE, ROTARY PARTS , ERECTION/RE-ERECTION, OVERHAULING, TESTING, COMMISSIONING AND HANDING OVER OF BOILERS OF 200MW UNIT # 13 AT UPRVUNL OBRA 'B' TPS, OBRA (U.P.)

PART- I OF TCC

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt.GautamBudh Nagar, NOIDA – 201 301 (INDIA)

TECHNICAL CONDITIONS OF CONTRACT (TCC)		
CHAPTER-I: PROJECT INFORMATION		
1.0	**Project information**	
Sl. No.	**Title**	**Description**
1.1	Name of the Owner	**Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL)**
1.2	Address	OBRA THERMAL POWER STATION OBRA SONEBHADRA (U.P.) 231219
1.3	Existing	Obra 'B' (5 X 200MW) Refurbishment
1.4	Nearest Railway station	Chopan – 15Km Approx. Mirzapur – 120Km Approx. Varanasi / Mugal Sarai – 125Km Approx.
1.5	Nearest City	Roberstganj / Sonebhadra
1.6	Nearest Airport	VARANASI (150 KM)
1.7	Highest Temperature	48 deg C
1.8	Lowest Temperature	2deg C

2. 0 SCOPE OF WORK

2.1 BHEL has been awarded the work of Renovation & Modernization (R&M) of 5x200 MW units, Obra BTPS, UPRVUNL, Obra, Sonebhadra, Uttar Pradesh. R&M scope covers Design, Engineering Manufacture, Supply, Erection, Testing & Commissioning of Boiler, Turbine, Generator equipment along with its auxiliaries.

The scope for these specifications covers Dismantling in selected areas, Erection/Re-Erection, overhauling/servicing, Insulation, testing & commissioning of Boilers & Final Painting including supply of paints etc.

The scope of the work will comprise of but not limited to the following:

1. Dismantling of selected items in specified areas, and transportation of same and storing in specified areas within the powerhouse premises.
2. Taking delivery of the boiler materials from the project storage yard / stores / sheds to erection site.
3. Their preservation, safe keeping and watch and ward.
4. Checking, dressing, chipping and leveling of foundations.
5. Pre-assembly, overhauling, erection, alignment of various equipments, machining and grouting.
6. Welding, heat treatment, radiography, UT and other non-destructive tests wherever required
7. Hydraulic testing and other pre commissioning tests,
8. Insulation and finish painting including,
9. Assistance during Chemical cleaning, alkali boil out, acid cleaning and passivation, PG test as per the scope given in the tender.
10. Steam blowing and safety valve floating including erection and dismantling of all temporary piping, valves, pumps, tanks etc. required for above operations and other commissioning activities including post commissioning operations and stabilisation of the units,
11. Unit trial operation, resolving any deficiencies observed and handing over of Boiler Unit 13 of OBRA 'B' TPS of UPRVUNL Obra Distt. Sonebadra UP.
12. Assistance during PG test

Procurement of Paints

Contractor has to supply all paints, primers and other consumables for painting of relevant area of boiler & auxiliaries of Unit-13. BHEL reserves the right to reject any material not found satisfactory. Contractor shall produce manufacturer's test certificate.

Note:

1. Paints, primers etc to be procured from UPRVUNL/BHEL approved suppliers.
2. Contractor has to supply paints required for painting the total scope of work as envisaged in service portion of contractor.

2.2 The PG wise break up for the unit of Boiler Pressure Parts, Structure & Non Pressure parts, Rotary parts, Critical piping etc. is tentative as indicated under Annexure-IA,IB,IC,ID,IE

Regarding the tonnage indicated the decision of the BHEL Engineer with respect to scope, and keeping the work suitability, quality and time schedule will be final and binding on the contractor. However the work of Boiler shall be broadly as per following:

Scope of Boiler for this tender is up to BOF (Boiler Outlet Flange) which includes main boiler / furnace, structures, pressure parts, air heaters, associated ducts (including ducts between air heater and FD/PA fans), burners, Pulverised coal piping, mills, fans oil system, integral piping, Piping (as specified) structures along with cladding, rotary parts etc. Final connection at boiler outlet flanges (whether bolted / welded or both) with ducting, coal pipes with mills, or any other connection will be in the scope of this contract.

Painting and insulation shall be done for Boiler, boiler associated auxiliaries, piping& structures as per drawings and specifications shall be within the scope.

2.3 Approx. weight to be erected for the Boiler Pressure Parts, Structure & Non Pressure parts, Rotary parts, Critical piping etc. for the unit shall be 3279.33 MT as indicated in Annexure-I.

The contractor is required to erect actual tonnage (irrespective of any variation plus or minus) which may be necessary to complete their work and commission above boiler and complete the work in all respects as detailed in tender specifications, for which payments shall be released on finally accepted tonnage rates. The contractor undertakes to erect / commission actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments will also be regulated for the same. M/s. UPRVUNL and / or their Consultant may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL .

Apart from weights indicated above, dismantling (to the extent of approx. 3300 MT) of existing items for unit 13 will be carried out by the contractor. II pass SC Wall, structures have to be re-erected after servicing/repair/rectification. For re erection of such items/scope no separate payments will be made. The contractor will have to carry out other miscellaneous works such HP welding in Pressure parts which are being retained, repair of APH shell, rotor, stay plates etc., repair/oh of mill seal air system, fabrication of tie rods/hanger/suspension, procurement of miscellaneous fasteners for areas such as roof canopy, burner assy, shifting of fuel and service pipelines etc. **Break up of dismantling & miscellaneous activities shall be as per Annexure - II.**

2.4 The contractor under this contract shall also provide free of cost services of skilled persons for a total period of 216 Man-months exclusively for use by BHEL.This manpower will be required for following services

Qualified computer operator for office work. (36 man- months)

Skilled workers for working in store, office and colony. (36 man-months)

Unskilled workers for working in store, office and colony. (144 man-months)

Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.

In case contractor fails to provide above-mentioned man-power as desired by BHEL, the latter shall have right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man-months as per above provision, fully or partly, recovery at the rate of the prevailing minimum wages plus 25.08% (for statutory payments) at OBRA for the workers categories stated above plus 10% will be made from the final bill of the contractor. For Computer operator if the minimum wage is not available in schedule it shall be taken as minimum wage for skilled worker plus 10 %.

The scope of work will also include providing free of cost services of EX BHEL for direct supervision of various works other than the scope covered under this tender. These qualified Supervisors shall be provided for Twelve man-months as per site conditions. The supervisors shall possess a minimum qualification of a mechanical / electrical engineering diploma. They shall be deployed in all areas covered under various specifications as well as other related areas as may be deemed essential based upon work requirements, though not specified. They shall be guided by BHEL Engineers to ensure smooth work progress as and when /where required /deployed. No separate payment shall be paid for providing the services as per this clause. The contractor shall provide these free of cost services within the quoted rates as per Rate Schedule.

In case contractor fails to provide above-mentioned manpower as desired by BHEL, the latter shall have the right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the manmonths as per above provision, fully or partly, recovery at the rate of Rs.70000/- against each man-month will be made from the final bill of the contractor.

2.5 Contractor shall make necessary arrangements to ensure that the atmosphere in working area (under the scope of work in this tender) and on roads is free from particulate matter like dust, sand etc. by keeping the top surface wet for ease in breathing. Provision of required tanker with spraying arrangement has to be ensured by contractor within the quoted rates, at no extra cost to BHEL.

Contractor shall ensure following:

1. Contractor has to maintain contact with local hospital having scanning& other ultra modern medical facilities required during emergency including Ambulance.
2. Contractor has to ensure pre employment medical check for all staff & workers.
3. Contractor has to ensure that adequate First Aid facilities with trained nurse & ambulance are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following:

- Male nurse (in shifts)
- Oxygen set up
- Breathing apparatus
- Eye wash facility

- Stretcher
- Trauma blanket
- Medicines.

The contractor against this contract is required to arrange and maintain ambulance at site for entire contract period including extended period if any. The above emergency facility set up including ambulance, male nurse etc. will be shared by BHEL and its other contractors working at this project at no extra cost to BHEL and its sub-contractors. In case, under unavoidable circumstances, if the ambulance is not available / being used elsewhere, the contractor will have to arrange for the same as under clause Sl. No. 1 of Cl no 2.5.

In the event of the failure of contractor to bring ambulance and other facilities as above, BHEL will be at liberty to arrange the same at the risk and cost of contractor including transportation cost and BHEL overhead at the rate of 5 % of the total cost incurred by BHEL and shall be deducted from contractor bill. Till the time BHEL is unable to provide ambulance with above facility a lumpsum amount Rs. 1.1 Lac per month or part there of (considering 30 days/month) shall be deducted from the bill of the contractor for the period for which ambulance is not deployed. Decision of BHEL in this regard shall be final and binding on contractor.

2.6 The contractor shall comply with following towards Social Accountability;

a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.

b) The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.

c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.

d) The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimation/ Corporal punishment for failure in meeting with relevant requirements.

e) The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.

f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.

g) The Contractor shall arrange potable drinking water to its employees & workers.

2.7 Contractor shall ensure daily housekeeping and keep proper cleanliness of work place and do the disposal of wastes to certified area.

2.8 In order to give phillip to Pradhan Mantri Kaushal Vlkas Yojna:

"The contractor shall, at all stages of work deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/ Industrial Training Institute/ National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/ semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

3.0 FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

S.No.	Description	Scope /to be taken care by		Remarks
		BHEL /UNL	CONT.	
1.1.0	**ESTABLISHMENT**			
1.1.1	**FOR CONSTRUCTION PURPOSE**			
A.	Open space for office	**YES**		Free of charge. As and where made available by customer M/s UPRVUNL/BHEL
B.	Open space for storage	**YES**		Free of charge. As and where made available by customer M/s UPRVUNL/BHEL
1.1.2	**FOR LABOUR COLONY**			
A	Open space		**YES**	Contractor have to make own arrangement
1.2.0	**ELECTRICITY**			
1.2.1.	Electricity for construction purposes (chargeable/free)			
1.2.1.1	Single point source	**YES**		FREE OF CHARGE
1.2.1.2	Further distribution for the work to be done which include supply of materials & execution		**YES**	
1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:			
1.2.2.1	Distribution from single point including supply of materials & service		**YES**	
1.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		**YES**	
1.2.2.3	Duties & deposits including statutory clearances for above		**YES**	
1.2.2.4	Demobilization of the facilities after completion of works		**YES**	

1.2.2.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above lines		**YES**	**Chargeable** As per UPPCL standard rates Contractor shall install calibrated energy meter for metering electricity consumption.
1.3.0	**WATER SUPPLY**			
1.3.1	**FOR CONSTRUCTION:**			
1.3.1.1	Making the water available at single point	**YES**		Free.As and where made available by BHEL/ UNL
1.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
1.3.2	**LABOUR COLONY:**			
1.3.2.1	Making the water available at single point			Contractor have to arrange on his own.
1.3.2.2	Further distribution as per the requirement of work including supply of materials & execution			
1.4.0	**LIGHTING**			
1.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		**YES**	
1.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		**YES**	
	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		**YES**	
1.5.0	**Communications facilities for site operations of the bidder**			
1.5.1	Telephone, fax , internet ,intranet, email etc.		**YES**	
1.6.0	**COMPRESSED AIR SUPPLY**			
1.6.1	Supply of compressor and all other equipments required for compressor & compressed air system including pipes, valves,storage system etc.		**YES**	

1.6.2	Installation of the above system and operation & maintenance of the same		**YES**	
1.6.3	Supply of all the consumables for the above system during the contract period.		**YES**	
	ERECTION FACILITIES			
2.1.1	Providing erection drawings for all the Equipments covered under this scope	**YES**		
2.1.2	Drawings for construction method	**YES**	**YES**	In consultation with BHEL
2.1.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		**YES**	**do**
2.1.4	Shipping lists etc for reference & planning the activities	**YES**	**YES**	**do**
2.1.5	Preparation of site erection schedules and other input requirements		**YES**	**do**
2.1.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	**YES**	**YES**	**do**
2.1.7	Weekly erection schedule based on Sl. No.2.1.5		**YES**	**do**
2.1.8	Daily erection/work plan based on Sl. No.2.1.7		**YES**	**do**
2.1.9	Periodic visit of senior official of 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 month		**YES**	
2.1.10	Preparation of preassembly bay		**YES**	

3.1 BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.

3.2 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

3.3 Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets. **The energy meter to be installed by the contractor & shall be tested and certified by State Electricity Board or any other agency approved by the customer at his cost.**

3.4 The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.

a) All electrical installations should be as per Indian Electricity rules.

b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.

c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.

d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.

e) Contractor have to make their own earthing arrangement for their equipment / DB earthing.

f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.

g) Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.

h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.

i) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

3.5 ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.

3.6 In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.

3.7 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expanses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

3.8 BHEL shall provide required chemicals for the purpose of chemical cleaning of Boiler.

3.9 Compressed air required for construction purposes shall be arranged by Contractor. However, compressed air required for the instrumentation, start-up and plant operation purposes shall be provided by the owner as per the requirement and specifications indicated by the contractor.

4.0 T&P AND MMD DEPLOYED BY CONTRACTOR

Sl. No.	*Equipment*	**Capacity**	**Minimum Qty.**
1.	Tyre mounted mobile crane	18/ 20T	1 No.
2.	Tyre mounted mobile crane / Hydra	14 / 20T	1 No.
3.	TRAILER WITH PULLING UNIT	20 MT	1 No.
4.	TRAILER WITH PULLING UNIT	15 MT	1 No.
5.	Air Compressor	210 CFM	1 No.
6.	ELECTRIC WINCH	2/3/5/10/15 MT	APR(Min. 15 Nos)
7.	Hydraulic Jacks	200 MT	03 sets
8.	Gang Jack	50MTx4	01 set
9.	Self Drilling Screw Gun		02 nos.
10.	Pipe bending machines		02 nos.
11.	Gas torches (oxy acytelene) and burner nozzles for hot correction of beams		01 Set
12.	Welding sets with accessories and ovens for welding electrodes backing and holding		APR
13.	Mother Oven for baking of electrodes		APR
14.	Heat treatment and Stress relieving sets		APR
15.	Hydraulic Pipe Bending Machine (Manual and Motorised) of various sizes		02 no. Each/APR
16.	Radiography arrangement including source	Iridium 192	4 sources
17.	Pipe chamfering machine		APR
18.	Pipe cutting &beveling machines		Adequate nos.
19.	Chain pulley blocks of various & suitable capacities		APR
20.	Three phase distribution board with complete setup for drawl & distribution of construction power		APR
21.	Electric cables for drawl & distribution of construction power, heating machines		APR
22.	Sleepers of suitable sizes		APR

23.	Various sizes of clamps/ fixtures for assembling		APR
24.	Dewatering pumps		APR
25.	Portable hardness tester		APR
26.	Recordable UT test Equipment suitable to meet the requirements (KRAUTKRAMMER MODEL USN 50 or EQUIVLENT)		APR(MIN 2 NOS)
27.	Hardness testing equipment (Equotip or Microdur make) 33 Stress relieving equipment with temperature		APR (MIN 2 NOS)
28.	Magnetic particle testing equipment-DRY & WET Type		APR
29.	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		APR
30.	Spectrometer for metal testing		APR
31.	Alco meter for paint thickness checking		APR
32.	Hand Operated Megger 500 / 1000 V		APR
33.	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy		APR
34.	Digital and Analogue Millimetres		APR
35.	U Tube Manometer 0-2000 mm Water Column		APR
36.	Inclined Manometer 0-50 mm Water Column		APR
37.	Calibrated Pneumatic Torque wrench		APR
38.	Bolt Tension Calibrator		APR
39.	Special Slings for Erection of Ceiling Girders & other heavy components		APR
40.	Scaffolding Pipes		Min .12000 nos/APR
41.	Bevel Protractor		01 set/As per requirement

42.	Master level		01 set/As per requirement
43.	Micrometer		03 Sets
44.	Vernier Calipers		05 sets
45.	Temperature Gun		02 sets

NOTES

1. The above list is only indicative and these T&Ps may not be required for entire contract period but contractor will ensure that these T & Ps are provided as per need. Contractor will assess actual quantity and period of requirement based on his experience. **Contractor has to mobilize / maintain adequate numbers of T& P for meeting the work schedule and intermediate milestones as notified by BHEL Engineer.**
2. If any one of T&P mentioned above is not needed for proper execution of scope of work, provided contractor has not utilized BHEL free issued T&P for completing such work, no recovery from contractor shall be applicable.
3. Any additional item required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.
4. In case deployment of T&P w.r.t requirement, is delayed or deployed for a shorter period or abnormal down time of T&P or in case T&P w.r.t requirement was not deployed by the contractor as per instruction of BHEL and BHEL had to deploy either its own T&P or from outside, the recovery shall be done from the contractor as under:
   a. In case BHEL had to deploy its own T&P, hire charges of T&P applicable for outside agencies as per extant guidelines for **"Hire Charges on issue of Capital Tools & Plants"** shall be recovered.
   b. In case BHEL had to deploy the T&P from outside, actual hiring cost plus applicable overheads shall be recovered.
5. Other terms and conditions regarding T&Ps / MMEs please also refer clause for T&Ps & MMEs in SCC.
6. All the tools and plants required for this scope of work are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. Any additional T&Ps required to be arranged by the contractor.

If work gets delayed due to non-availability of T&Ps, BHEL reserves the right to get the work done at the risk and cost of contractor without prejudice to rights of BHEL as in GCC.

5.0 T&P AND MMD DEPLOYED BY BHEL ON SHARING BASIS

LIST OF T&P BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS				
Sl. No.	**Equipment**	***Capacity***	**Qty.**	**Remarks**
1	High capacity crane	300 MT	1 No	On sharing basis for limited period during the erection of structures like upper tiers of boilers, ceiling girders, roof top structures etc for which high capacity crane is required
2	Motorized Hydraulic Test Pump	0-600kg/cm2	1 nos	
3	Maintenance platform/SKY CLIMBER		01 set	Contractor has to arrange for assembly and provide skilled operator during entire period of its utilization.
4	Chemical cleaning setup by EDTA/chemical cleaning process			BY BHEL AGENCY

NOTES:

1. Day-today upkeep and running maintenance like filling topping up of lubricants, changing filters, etc including repair of self starter, batteries and dynamo of these cranes shall be the responsibility of the contractor. If on checking it is found that the same is not followed, BHEL will exercise its right to get the job/works done at the risk and cost of contactor. BHEL may also provided cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance shall be excluded from scope of contractor.

2. **These Cranes (S. No.1) will be provided on sharing basis on specific instruction of the BHEL Engineer as per the work requirement.**

3. **The contractor shall make necessary arrangement like lying of steel plates,assembly & dismantling of heavy lift attachment, boom, jib etc. for movement and operation of crane.**

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

6. Time Schedule

MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD AND GRACE PERIOD

6.1 INITIAL MOBILIZATION:

After receipt of LOA, Contractor shall discuss with Project Manager / Construction Manager/Engineer Incharge regarding initial mobilization. Contractor shall mobilize necessary resources (considering the immediate requirement of the site and agreed by Engineer Incharge) within 2 weeks of issue of letter of award or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

6.2 MOBILIZATION FOR DISMANTLING, ERECTION, TESTING AND COMMISSIONING ETC.

The activities for Dismantling, erection, testing etc shall be started as per directions of Construction Manager of BHEL. Contractor shall mobilize further resources as per requirement to commence the work of erection, testing etc as per scope of work, and progressively augment the resources to match schedule of the project.

6.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Entire work as detailed in the tender specifications shall be completed within **18 months** from the Zero date as per programme / milestones indicated by BHEL Engineer. Contractor has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

Start of Dismantling work activity at site shall be considered as "start of contract period". Site mobilization will not be considered as start of contract period. The contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commissioning are achieved on specified schedules:

MILE STONES	**MONTH**
Start of Dismantling	ZERO
Dismantling	4th month
Boiler Hydro Test (drainable)	6th Month
Boiler Light up	12th Month
Synchronization	14th Month
Unit Stabilization, Coal Firing & Full Load	16th Month
PG TEST & Handing over	18th Month

	SN	MAJOR MILESTONE	COMPLETION
M1	**1**	Boiler Lightup	12th month from start of contract period.
M2	**2**	Synchronization	14th month from start of contract period.

All dates in above schedule are from start of contract period (zero date) and just for an idea to bidder. Detail schedule shall be prepared by successful bidder after discussion with BHEL.

There is provision of penalty in case of slippage of intermediate milestones as following:-

a. Activity mentioned above at Sr No 1 is termed as M1 and at Sr No 2 is termed at M2 for making provisions of penalty in case of slippage of these milestones for unit 1&2.

b. In case of slippage of these intermediate millstones (M1, M2), delay analysis shall be carried out on achievement of each of above milestones.

c. In case delay in achieving M1 milestone is solely attributable to the contractor, 0.5% per week of **executable contract value***, limited to maximum 2% of executable contract value, will be withheld.

d. In case delay in achieving M2 milestone is solely attributable to the contractor, 0.5% per week of **executable contract value***, limited to maximum 3% of executable contract value, will be withheld.

e. Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 milestone.

f. Amount required to be withheld on account of slippage of milestone M1, and M2 shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @ 10% of RA bill amount form subsequent RA Bills.

g. Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/closure of contract. Withheld amount, if any due to slippage of milestone M1, M2, shall be adjusted against LD or released as the case may be.

h. In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of milestone M1, M2 shall not be released and be converted into recovery.

Executable Contract Value* means - Value of work for which inputs/fronts were made available to contractor, and which were scheduled for execution till the date of achievement of respective milestone.

6.4 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be **18 (Eighteen) MONTHS** from the "**START OF CONTRACT PERIOD**" as specified earlier.
The period from the commencement of preparatory work for dismantling/erection till the actual "start of contract period" shall not be reckoned for the above purpose.

6.5 CONSEQUENCE OF DELAY

In case of delay in completion is attributable to the contractor, BHEL may impose LD on the contractor as per GCC.

7.0 TERMS OF PAYMENT

7.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

7.2 Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.

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

7.3.1 Interest bearing recoverable advance : Applicable as per Clause No. 2.13 of GCC.

7.3.2. PROGESSIVE PAYMENT ON PRORATA BASIS

I. 85 % of unit rates
(Applicable for ITEM. No. B1 of Rate Schedule)

SL. No	**APPLICABLE FOR ITEM NO. 1 OF RATE SCHEDULE**	**FOR ITEM NO.1 (Pr. parts)**	**FOR ITEM NO.2 (Str.& Non pr. Parts)**	**FOR ITEM NO.3(Rotating M/c)**	**FOR ITEM NO.4 (Insul. & sheeting)**	**FOR ITEM NO.5 (Piping Systems)**
1.	Completion of pre-assembly wherever applicable (if not applicable this portion shall be clubbed with Placement in position)	20%	25%	15%		15%
2.	Placement in position	10 %	10 %	20%	50 %	20 %
3.	Alignment	15 %	10 %	20%	15 %	15 %
4.	welding /bolting/fixing as required	20%	15%	20%	20%	15%
5.	Completion of non destructive examination & stress relieving/ heat treatment,**(if not applicable, then this portion to be paid along with welding)**	10%				10%

6.	COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS	5 %				
7.	COMPLETION OF ROOF SKIN CASING	5%				
8.	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG		25%			5%
9.	EQUIPMENT TRIAL OPERATION			10%		
10.	HYDRAULIC TEST OR PNEUMATIC TEST					5%
	TOTAL FOR PRO RATA PAYMENTS	85%	85%	85%	85%	85%

II. STAGE/MILESTONE PAYMENTS

(Applicable for ITEM No. B1 of Rate Schedule)

1.	Completion of Hydro test (drainable and non-drainable)	1.5%
2.	Completion of air & gas tightness test for Boiler and ducting	1.5%
3.	Completion of Boiler light up	1.0%
4.	On completion of chemical cleaning, steam blowing & Safety Valve floating	1.5%
5.	Coal firing	2.0%
6.	Full loading	1.5%
7.	Trial operation	2.0%
8.	Completion of Painting	1.0%
9.	Area cleaning, temporary structures cutting/removal and return of scrap	1.0%
10.	Liquidation of pending points	1.0%
11.	Completion of all contractual Obligation and de mobilization of site office.	1.0%
	Total	**15%**

III PROGRESSIVE PAYMENT on pro-rata basis (100 %)

(Applicable for dismantling work for SL. No. B2 of rate schedule)

Sl No.	Description	%
1.	Dismantling of Water Walls	7.3%
2.	Dismantling of Buck stays, Seal Boxes and Doors	2.0%
3.	Hot correction of Buckstay Beams	6.0%
4.	Dismantling of SH Headers	2.0%
5.	Dismantling of LTSH & ECO coils	7.5%
6.	Dismantling of Platen Coils	2.5%
7.	Dismantling of Pressure Part Suspensions	1.0%
8.	Dismantling of RH Headers and RH Suspensions	1.0%
9.	Dismantling of Skin Casing	1.0%
10.	Dismantling of Soot Blower System	1.0%
11.	Dismantling of Trim Piping	2.0%
12.	Dismantling of Seal Plates and Enclousures	1.0%
13.	Dismantling of Vertical Roof Enclousure and Drum Deck and Roof Deck	3.0%
14.	Dismantling of Ceiling Structure	3.0%
15.	Dismantling of Roof Structure and Sheeting	2.0%
16.	Dismantling of Boiler Outer casing	1.0%
17.	Dismantling of Oil, Scanner Air, and Mill Seal Air Systems	1.0%
18.	Dismantling of Wind Boxes	2.0%
19.	Dismantling of Coal Piping	4.0%
20.	Dismantling of Ducts	4.0%
21.	Dismantling of Feeder	2.0%
22.	Dismantling of APH	3.5%
23.	Dismantling of ID, PA and FD Fan Systems	3.0%
24.	Dismantling of Bowl Mills	4.0%
25.	Dismantling of Piping system	3.0%
26.	Thickness survey & visual inspection and DP of a. SCW tubes and joints of stubs with header (joints b/w header & stubs at SHH – 3L&R, SHH – 4L&R, SHH – 5,SHH – 8) b. WW o/l header stubs and joints of stubs with header, c. Bottom ring header nipples and stubs including joints of stubs with header d. WW screen header stubs including joints of stubs with header e. WW hanger header stubs including joints of stubs with header f. Eco i/l header stubs including joints of stubs with header & Economizer coils g. Re heater coils as per direction of BHEL Engineers h. Final SH coils	1.5%

27.	Repair of boiler pressure parts tubes (OD≤100 mm) based on Thickness survey & visual inspection and DP in various areas as mentioned in point no. 06. Repair works shall include cutting, welding, bend fabrication, post heating, pre heating, SR, radiography & UT etc. Total no. of repair joints covered in this head shall not exceed 6500±10% joints beyond which payment or deduction for extra joints or deficient joints shall be made at rate quoted by contractor against this head in present contract.	8.5%
28.	Repair of old LDO, HFO and aux. steam pipelines, tracing lines from their respective headers to 19 mtrs station and OH of Oil Heating Station. Repair works shall include cutting, welding, bend fabrication, post heating, pre heating, SR, radiography & UT as applicable etc.. Hydro test of Oil heaters, repair/ replacement of valves, cleaning and servicing of oil strainers, restoration of steam traps etc. is also covered in this scope.	1.0%
29.	Replacement of damaged supply tubes, headers stubs, bends etc.; cutting, grinding, fit up, HP welding, NDT, pre heat and post welding of HP joints	2.0%
30.	Replacement of few portions of CRH lines, MS lines, HRH line other than erectable items (such as Headers, DESH, thermo wells etc.) supplied under R&M contract; cutting, grinding, fit up, HP welding, NDT, pre heat and post welding of HP joints. Number joints (OD > 300 mm) covered in the scope is 06 joints. However, payment of joints carried out shall be done on actual numbers carried out.	2.0%
31.	Arrangement of Misc. items a. Fabrication and cutting of threads on tie rods, suspension rods, welding and heat treatment as per site requirement b. Arrangement of miscellaneous fasteners (HT and non HT grade), screws, self drilling and tapping screws, TT Burner Assy fasteners HT fasteners (as per Clause 19.0 of Chapter – IV scope of works) asbestos cloth, asbestos packing ropes, adhesives, sealing compounds, black bituminous paint and other consumables	1.3%
32.	Providing various approach platforms to all valve and gate actuators, dampers, drives including fabrication, erection and welding of structures, fabrication and erection of approach ladders. Old materials such as plates, old boiler tubes, structural materials will be cannibalized from boiler dismantled items and shall be used for this purpose. Any other materials if required shall be provided by customer/BHEL.	1.0%
33.	Repair of damaged boiler platform, handrails and ladders. Old materials such as plates, old boiler tubes, structural materials, floor grills will be cannibalized from boiler dismantled items and shall be used for this purpose. Any other materials if required shall be provided by customer/BHEL.	1.0%
34.	Repair of APH shell, stay plates, rotor partition plates, replacement of Lub Oil pipelines, repair/replacement of Lub oil pumps	2.2%
35.	Cleaning of Lub oil coolers of fans(06 nos.) and repair/restoration of cooling pipe lines from their respective headers to coolers. Arrangement of required consumables such as pipeline fittings, valves (up to 25 Nb), flanges, fasteners, gaskets etc.	0.2%

36.	Overhauling of Mill Seal air system, including repair of ducts, cleaning of seal air filters, replacement of fan impellers, and repair of mill seal air headers. Arrangement of consumables such as gaskets, fasteners etc.	0.3%
37.	Repair/ Modification of Old Ducting plates of Cold PA Duct, FD Fan O/l to APH I/L, PA Fan O/L to APH I/L including cutting, welding, fabrication, kerosene test	1.5%
38.	Arrangement of quick setting cement Conbextra GP2(200 bags x 25 KG/bag) for RC feeder civil foundation and modification of existing foundation to suit newly supplied feeders	1.2%
39.	Shifting of Fuel Oil & Service lines	2.0%
40.	Dismantling of 300 MT or 135 MT crane from unit no. 12, marching to unit no. 13 and crane assembly, crane shifting to location as indicated by BHEL Engineer	2.5%
41.	The contractor has to obtain permission from the director of Boiler (U.P) for taking up the work of pressure parts replacement, arrange for statutory inspection of hydraulic test of Boiler by inspection of Boiler and also arrange for operational clearance certificate from director of Boiler (U.P.).	2.0%
	TOTAL	**100%**

NOTES:

1. The quantities indicated above are tentative and are liable to vary depending upon the site requirement. The contractor has to supply / erect / commission all the items indicated by BHEL for achieving the milestones and completion of work.

2. Evaluation of bids shall be done on total price against this Rate Schedule.

3. In case of any mismatch in Rate and amount on Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.

8. TAXES AND DUTIES:

8.1.1	Price quoted should be inclusive of all applicable Taxes/charges **Excluding GST.** The Contractor shall pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit. **GST Shall be payable extra as per following :**
8.1.2.	Vendor has to issue correct HSN/SAC code wise bill indicating therein description, value, rate, due tax and other particulars in compliance with the provisions of relevant GST Act and Rules.
8.1.3	Vendor has to submit GST compliant invoice within 7 days from the due date of invoice as per GST Law.
8.1.4.	GST portion of invoice shall be released only when all the following conditions are satisfied by the Contractor: - Supply of goods and services have been received by BHEL. Original Tax Invoice has been submitted to BHEL. Contractor has declared such invoice in his applicable GST return. Documentary evidence or undertaking regarding discharge of GST liability in respect of supplies made by vendor has been furnished.
8.1.5	For the purposes of claiming GST from BHEL, invoice issued by contractor should be in line with provisions of GST Act & Rules. Special care should be taken in case of month end transactions.
8.1.6	The taxes and duties referred in this chapter or elsewhere in the NIT/contract is limited to direct transactions between BHEL & its Sub-Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its Sub-Contractor.
8.1.7.	**Variation in Taxes & Duties**: Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, 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.
8.1.8.	**Modalities of Tax Incidence on BHEL:** Where GST law permits more than one option or methodology for discharging liability of tax/ levy/ duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.
8.1.9	Any loss to BHEL due to non-compliance of above noted clauses and/or provisions of the GST Act and/or Rules by the contractor shall be to his account.

8.2	**BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**
	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-
8.2.1	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.
8.2.2	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
8.2.3	It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.
8.2.4	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
8.2.5	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
8.2.6	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
8.2.7	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/Rules shall be deducted from the contractor.

Annexure – I

WEIGHT SCHEDULE

AA: SUMMARY OF WEIGHTS

SN	Description	Wt	unit	Annexure
1	Pressure Parts:	1184.248	MT	IA
2	Structure& Non-Pressure parts:	877.046	MT	IB
3	Rotating Machines:	707.613	MT	IC
4	Insulation	446.432	MT	ID
5	Critical piping (BOILER PIPING)	63.991	MT	IE
	TOTAL TONNAGE	**3279.330**	**MT**	

Annexure – IA

BB:Product Group (PG) Wise Weight Schedule For1X200MWBoiler Pressure Part

SL No.	PGMA	DESCRIPTION	WT. (KG)
1	04-136	Upper Drum Internals Only For Id 61-71	99.512
2	04-988	Drum Commisioning Spares	8
3	05-195	Inlet Platen Ww Header	3683.872
4	05-295	Outlet Platen Ww Header	
5	06-400	Unclassified Burner Panel	21408.35
6	06-631	Front Upper Ww Pnl	23667.23
7	06-634	Front Intermediate Ww Pnl	23896.81
8	06-637	Water Wall Lower Front Panel	23516.18
9	06-644	Rear Intermediate Ww Pnl	22492.49
10	06-647	Rear Lower Ww Pnl	23516.18
11	06-651	Side Upper Ww Pnl	55850.87
12	06-655	Side Lower Ww Pnl	35870.63
13	06-670	Extended Side Ww Pnl	7188.076
14	06-995	Platen WW Panel+HDR	22251.55
15	07-215	Relief Tubes From Side Wall Outlet Header	0
16	07-216	Relief Tubes From Rear Hanger Header	0
17	07-218	Relief Tubes From Front Outlet Header	0
18	07-223	Furnace Screen Tubes	16481.89
19	07-225	Furnace Rear Hanger Tubes	7411.1
20	07-226	Furnace Rear Arch Tubes	15258.48
21	07-231	Lower Corner Transition Tubes	1698.158
22	07-232	Upper Corner Transition Tubes	499.65
23	07-401	Water Wall Suspension	1258.624
24	07-431	Riser Tube Support	1735.228
25	07-500	Misc Components-Pressure Parts	284.95
26	07-501	Furnace Insert Tubes	1896.065
27	07-601	Pressure Seals	538.83
28	07-700	Bulked Bps Items For PG 04 to 07	0
30	07-993	Consumable & Erection Materials	611.876
31	08-101	Furnace Upper Buck Stay	26711.1
32	08-104	Furnace Intermediate Buckstay	16646.46
33	08-107	Furnace Lower Buck Stay	1901.57
34	08-111	Furnace Rear Arch Buck Stays	1721.254
35	08-400	UNCL Furnace Guide	0

36	08-700	Bulked BPS Items	408
37	08-900	Furnace Key Buckstays	26810.11
38	08-904	Windbox Connecting Duct Trusswork	0
39	Old Buckstay	Erection of Old Buck stay beams in 1st and 2nd pass , furnace bottom supports that are not released in shipping list but are to be re erected after replacement of WW panels	120000
40	09-001	Seal Boxes For Furnace Opening	4107.899
41	09-002	Seal Box For Instrument Inserts	1265.772
42	09-003	Material For Instrument Inserts	181.861
43	10-135	Horizontal Spaced SH Inlet Header	0
44	10-174	Vertical Spaced Sh Centre Inlet Header	8150.86
45	10-178	Vertical Platen Sh 1nlet Header	3952.37
46	10-191	SH Radiant Wall Roof Inlet Header	2452.65
47	10-235	Horizntl Spaced Sh Outlet Header	5917.68
48	10-274	Vertical Spaced Sh Centre Outlet Heade	12074.05
49	10-278	Vertical Platen Sh Outlet Header	6782.76
50	10-291	SH Radiant Wall Roof Outlet Header	2498.85
51	11-236	Sh Hor Spaced Upper Coil + Atch	76474.11
52	11-237	SH Hor Spaced Inter Coil+Atch	88562.2
53	11-274	Sh Vertical Spaced Coil + Attachment	1165.42
54	11-278	Vert Platen Centre Sh Coil Assy+Attach	76628.73
55	11-616	Sh Rear Upper Panels	1744.5
56	11-686	Sh Roof Panels	2850.036
57	11-687	Sh Rear Roof Panels	8444.95
58	11-691	Sh Radiant Wall Roofpanels	15735.95
59	12-298	Blanking Component	
60	12-535	Sh Hor Spaced Hanger	24007.5
61	12-803	Sh Steam Cooled Spacer Tube	814.908
62	12-805	Super Heater Hanger Tubes	9600.4
63	12-852	Blanking Component	0
64	12-900	Sh Desh	1750.78
65	12-903	Sh Miscl Components	23883.73
66	12-906	SH Suports for Links & Lines	3856.838
67	12-917	Suspention of Radial Roof	3291.46
68	12-944	Suspension Of SHH11 & SHH12	2122.62
69	12-948	Suspension Of Vertical Spaced Assembly	9618.016
70	12-968	Suspension of Row (D&E)	7135.511
71	12-992	Imported Electrodes	75
72	12-993	Consumables & Erection Materials	313.57
73	15-174	Reheater Vert Spaced Inlet Header RHH1	5789.47
74	15-274	Reheater Vert Spaced Outlet Header Rhh	7618.46

75	16-277	RH PD Spaced Rear Assembly	35357.46
76	16-275	RH PD Spaced Front Assembly	57306.17
77	17-904	RH Hdr Suprts & Suspension Above Roof	4303.36
78	17-919	RH Front Suspension	3656.744
79	17-929	RH Rear Suspension	7433.696
80	17-992	Rh Site Electrodes Imported	88.5
81	18-001	Furnace Roof Skin Casing	9672.792
82	18-010	Pr Pts Attachments in Furn Roof Skn Cas	4384.81
83	18-020	Vibration Snubbers	171.31
84	19-114	Coils And Supports Of Upper P.Tube Ec	40734.36
85	19-992	Imported Electrodes	0
86	20-201	Wall Deslagger Rw5e	9573.44
87	20-204	Wall Box Assembly	1107.12
88	20-988	Commissioning Spares for Wall Blowers	20.1
89	21-600	Soot Blower Piping And Fittings	6839.036
90	21-601	Soot Blower Piping Supports	5168.91
91	21-700	Bulked BPS Components	559.645
92	21-800	Sb Valves (Bhel)	468.1
93	21-825	Sb Valves (Sub Delivery)	300
94	21-850	SB Safety Valve BHEL	23
95	21-987	Commg Spares SB SV	0.08
96	21-988	Commg Spares For Sub Deliveries	0.2
97	21-992	Imported Electrodes	48.895
98	24-200	Boiler Trim Piping And Fittings	19866.3
99	24-201	Trim Piping Supports	6388.447
100	24-220	Safety Valves Esc Pipe $ Drain RH UTY	4178.55
101	24-240	Sample Cooler And Supports	593.448
102	24-260	Valves (Bhel) Rh Uty Blr	7402.8
103	24-265	Valves & Fittings SD	5551
104	24-273	Direct Water Lvl Gag	247.574
105	24-280	Safety Valve & ERV-BHEL	2642.2
106	24-316	RH DESH	2979.84
107	24-700	Bulked BPS Components	209.874
108	24-955	Lap Tool SV&ERV	78.83
109	24-960	Lap Tool Con Val (BHEL)	44.25
110	24-987	BHEL-SV/ERV Commg Spare	1.57
111	24-988	Commg Spares For Imported Sub-Delay	3.6
112	24-989	Commg Spare for Convention Valves	9.272
113	24-992	Imported Electrode	19.775
114	24-994	Name Plates	226.422
115	28-220	Doors	4056.662

116	31-010	Skin Casing Comps Welded To Pressure P	2332.754
117	31-101	WATER WALL SKIN CASING	1391.544
118	31-102	Fornace Bottom Skin Casing	892.792
119	31-104	Furnace Rear Arch Skin Casing	6301.902
120	31-105	Second Pass Skin Casing	1897.896
121	42-001	Penumatic Fittings	83.035
122	42-002	Steam Blow Materials	0
123	42-005	Instrument Fitting	235.962
124	42-150	Piping, Operating Floor Hfo & Tracer	3150.094
125	42-152	Piping,Opr'G Floor Lfo	819.01
126	42-157	Piping,Opr'G Floor Atm Air	960.271
127	42-158	Piping,Opr'G Floor Steam Ibr	2115.812
128	42-170	Piping, Oil Burner Fitting	1803.046
129	42-200	Subdelivery Fuel Oil System	1961.408
130	42-300	Bhel Valve F.O. System	486.24
131	42-358	Bhel Valve,Opr'G Floor Stm-Ibr	394.92
132	42-700	Bps Fasteners	237.949
133	42-988	Oil & Gas System Commissioning Spare	6.3
134	97-297	Mtm Clamps And Pads	32.8
TOTAL			**1184248.6**

Annexure – IB

STRUCTURE & NON-PRESSURE PARTS

SL No.	PGMA	DESCRIPTION	WT.(KG)
1	30-103	Seal Plate Assy	1701.632
2	30-105	Furnace Bottom Enclosure Framing	4791.71
3	30-211	Furnace Rear Arch Enclosure Framing	1812.964
4	30-212	Furnace Extd Side Bottom Enclosure Fra	6703.852
5	30-215	Main Boiler	3193.89
6	30-219	Vertical Roof Enclosure Framing	38901.59
7	30-220	Deck Support and Seals	19957.45
8	30-223	Gas Distribution Baffles	407.854
9	30-301	WATER WALL SKIN CASING	0
10	35-210	Boiler Ceilling Structure -Fabricated	0
11	35-220	Boiler Ceiling Structure-Rolled Beams	0
12	35-610	Boiler Roof Structure	56304.02
13	35-611	Boiler Roof Sheeting	26113.72
14	35-811	Floor Grills and Guard Plate	9292.67
15	35-851	Hand Raills & Post	5033.4
16	35-993	Consumable & Erection Material	7561.56
17	36-391	Miscellaneous Platform-Part-I	1231.719
18	37-010	Blr Outer Casing Components	13009.51
19	37-810	Blr Outer Casing	14763
20	38-410	Mill Maitanance Platform	3399.8
21	41-350	Air Cooled Oil Gun Assy,	944.851
22	41-390	Oil Gun Vice Assy Rack	832.398
23	41-500	High Energy Arc Ignitor	189.46
24	41-988	Oil & Gas Burner Commissioning Spare	1.2
25	43-004	Assy Comp Scanner & Gun Air System	1318.802
26	43-005	Assy Comp Mill Seal Air System	299.22
27	43-104	M/C COMP SCANNER & GUN AIR SYSTEM	6494.23

28	43-105	M/C COMP MILL SEAL AIR SYSTEM	4461.24
29	43-200	Subdel,Ignitor&Scanner Air System	964.12
30	45-220	Wind Box Assembly 22-In Width	50188.19
31	45-221	Wind Box Support 22-In Width	2994.192
32	47-201	Fuel Piping Supports With 20-In Pipe	12991.41
33	47-203	Pipe Couplings Orifice & Misc Items	22918.85
34	47-209	St Pipes Shop Bends For Rest Of The Mi	138102.8
35	48-012	Rect Duct Bet F.D Fan And Airheater	1289.514
36	48-014	Expn Piecesbet F.D Fan And Airheater	1880.432
37	48-015	Duct Supports	3710.596
38	48-112	SQ. Ducts Pri Fan To Airheater Prisid	0
39	48-114	Expn Piecespri Fan To Airheater Prisid	702.584
40	48-132	SQ. Ducts Pri Air Fan ToColdairbusdu	5759.266
41	48-141	Seal Air Line For HAG	3585.48
42	48-144	Expn. Pieces Coldairbus(Temp Air to Mill	3047.712
43	48-200	Instrument Tapping Point	2782.727
44	48-202	Rect Ductsairheater To Windboxduct	34656.23
45	48-204	Expn Piecesairheater To Windboxduct	10859.87
46	48-205	Supportsetcairheater To Windboxduct	5094.972
47	48-207	Flowmeters For Secondary Air Flow	5548.76
48	48-212	Wind Box Connecting Ducts - Rectangula	22627.04
49	48-222	Rect Duct Air-heater Priside to hotair B	35303.8
50	48-224	Expn Pieces airheater prisidetohot air B	2650.224
51	48-225	Supports For Hot P.A(A.h to Hot Bus)	4193.49
52	48-382	Rect Duct Economiser To Airheater2nop	60222.58

53	48-384	Expn Pieceseconomiser To Airheater2nop	7077.8
54	48-385	Supportsetceconomiser To Airheater2nop	804.181
55	48-432	Rect Duct Air Heater Boiler Outlet-Gas	12628.73
56	48-434	Expn Pieces Air Heater Boiler Outlet-Gas	351.712
57	48-435	Support etc airheater Boiler Outlet-Gas	7627.442
58	48-662	Rect Duct Hot Air Bus To Mills	22841.54
59	48-664	Expn Pieceshot Air Bus to Mills	594.048
60	48-665	Support For Hot Pa to Mills	4678.588
61	48-667	Venturi Primary Air Flow	5765.16
62	48-700	Bulked BPS Components	2048.5
63	48-993	Erection Materials	5932.1
64	97-282	Flowmeters	360
65	97-599	Pneumatic Actuator In Air&Flue Gas Sys	2828
66	95-088	Fsss Flame Scanner	249.5
67	57383	FLUE GAS SAH INLET DAMPER	12,066.49
68	57460	GUILLOTENE GATE EP INLET	.
69	57480	ID FAN INLET GATE	.
70	57490	GUILLOTENE GATE ID FAN OUTLET	.
71	57013	DAMPERS BET FD FAN & APH	2,012.23
72	57013	DAMPERS BET FD FAN & APH	2,012.23
73	57013	DAMPERS BET FD FAN & APH	12,601.12
74	57023	DAMPERS SEC. AIR INTER CONNECT	1,191.26
75	57110	GUILLOTENE GATE PA FAN TO APH	7,077.35
76	57113	DAMPERS BETWEEN PAFAN AND APH	2,621.33
77	57203	DAMP APH TO WINDBOX DUCT	8,258.07
78	57143	DAMPER COLD AIR BUS(TEMP AIR TO MILL)	2,014.04
79	57153	DAMPERS, PA FAN INTERCONNECT	903.18
80	57160	COLD AIRGATE, AIRBUS TO MILLS	7,787.05
81	57161	MANUAL OPERATOR	330

82	57223	DAMP APH PRIMARY SIDE TO HOTA	2,840.25
83	57270	GUILLOTENE GATE DUCT TO MILL	10,515.13
84	57270	GUILLOTENE GATE DUCT TO MILL	1,071.13
85	57270	GUILLOTENE GATE DUCT TO MILL	4.2
86	57270	GUILLOTENE GATE DUCT TO MILL	39.96
87	57270	GUILLOTENE GATE DUCT TO MILL	12
88	57470	EP OUTLET GATE	.
89	57663	DAMPER HOT AIR BUS TO MILL	3,772.40
90	57209	MTG BKT FOR CL DAMPER AIR CYL	2,676.00
91	57209	MTG BKT FOR CL DAMPER AIR CYL	115.2
92	57209	MTG BKT FOR CL DAMPER AIR CYL	471
93	57466	PLATFORMS AND LADDERS	4,786.12
94	57466	PLATFORMS AND LADDERS	246.4
95	57466	PLATFORMS AND LADDERS	448
96	57466	PLATFORMS AND LADDERS	504
97	57466	PLATFORMS AND LADDERS	745.92
98	57466	PLATFORMS AND LADDERS	1,941.91
99	57466	PLATFORMS AND LADDERS	383.6
100	57466	PLATFORMS AND LADDERS	978.32
101	57466	PLATFORMS AND LADDERS	1,047.20
102	57466	PLATFORMS AND LADDERS	1,145.76
103	57466	PLATFORMS AND LADDERS	80.64
104	57466	PLATFORMS AND LADDERS	775.74
105	57466	PLATFORMS AND LADDERS	.
106	57466	PLATFORMS AND LADDERS	.
107	57466	PLATFORMS AND LADDERS	.
108	57466	PLATFORMS AND LADDERS	.
109	57491	BLOWER WITH MOTOR	.
110	57491	BLOWER WITH MOTOR	.
111	57577	ELECT ACTUATOR FOR GATE DAMPER	98
112	57577	ELECT ACTUATOR FOR GATE DAMPER	98
113	57577	ELECT ACTUATOR FOR GATE DAMPER	346

114	57577	ELECT ACTUATOR FOR GATE DAMPER	98
115	57577	ELECT ACTUATOR FOR GATE DAMPER	518
116	57577	ELECT ACTUATOR FOR GATE DAMPER	196
117	57577	ELECT ACTUATOR FOR GATE DAMPER	68
118	57577	ELECT ACTUATOR FOR GATE DAMPER	180
119	57577	ELECT ACTUATOR FOR GATE DAMPER	196
120	57577	ELECT ACTUATOR FOR GATE DAMPER	346
121	57577	ELECT ACTUATOR FOR GATE DAMPER	.
122	57577	ELECT ACTUATOR FOR GATE DAMPER	.
123	57577	ELECT ACTUATOR FOR GATE DAMPER	.
124	57577	ELECT ACTUATOR FOR GATE DAMPER	.
125	57577	ELECT ACTUATOR FOR GATE DAMPER	.
126	57577	ELECT ACTUATOR FOR GATE DAMPER	.
127	57577	ELECT ACTUATOR FOR GATE DAMPER	.
128	57577	ELECT ACTUATOR FOR GATE DAMPER	.
129	57988	DUCTS COMMISSIONING SPARES	0.2
130	57988	DUCTS COMMISSIONING SPARES	1.5
131	57988	DUCTS COMMISSIONING SPARES	0.5
132	57988	DUCTS COMMISSIONING SPARES	5.5
133	57988	DUCTS COMMISSIONING SPARES	0.8
134	Ceramic Mat	CERAMIC BEND 90 DEG, ID - 483 - MOE	10944
135	Ceramic Mat	CERAMIC BEND 90 DEG, ID - 483	10944
136	Ceramic Mat	CERAMIC BEND 90 DEG, ID - 483	2964
137	Ceramic Mat	CERAMIC BEND 75 DEG, ID - 484	1278

138	Ceramic Mat	CERAMIC BEND 70 DEG, ID - 485	404
139	Ceramic Mat	CERAMIC BEND 60 DEG, ID - 486	1077
140	Ceramic Mat	CERAMIC BEND 55 DEG, ID - 487	336
141	Ceramic Mat	CERAMIC BEND 50 DEG, ID - 488	942
142	Ceramic Mat	CERAMIC BEND 45 DEG, ID - 489	3504
143	Ceramic Mat	CERAMIC BEND 45 DEG, ID - 490	1168
144	Ceramic Mat	CERAMIC BEND 45 DEG, ID - 491	1512
145	Ceramic Mat	CERAMIC BEND 35 DEG, ID - 492	247
146	Ceramic Mat	ORIFICES ID -450	65.6
147	Ceramic Mat	ORIFICES ID -435	269.2
148	Ceramic Mat	ORIFICES ID -420	207
149	Ceramic Mat	ORIFICES ID -415	278
150	Ceramic Mat	ORIFICES ID -410	70
151	Ceramic Mat	ORIFICES ID -406	563.2
152	Ceramic Mat	ORIFICES ID -400	142
153	Ceramic Mat	CERAMIC LINED FIE (L)	4336
154	Ceramic Mat	ORIFICES ID -400	5584
TOTAL			**877046.6**

Annexure – IC

ROTATING MACHINES

SL No.	PGMA	DESCRIPTION	WT. KG
1	52-013	LARGE AH-ROTOR SEALS	3450
2	52-024	COLD BASKET & ELEMENT	57590.16
3	52-025	HOT BASKET & ELEMENT	185971.08
4	52-041	HOT END CONN PLATE	9800
5	52-042	COLD END CONN PLATE	9710
6	52-054	LARGE AH-AXIAL SEALS	200
7	52-055	LARGE AH-BYPASS SEALS	780
8	52-261	LARGE AH-GUIDE BEARING	159.7
9	52-262	LARGE AH-SUPPORT BEARING	1120
10	55-000	AXIAL FAN TOOLS & FIXTURE	300
11	55-021	AXIAL ID FAN FOUNDATION MATERIALS	2000
12	55-027	ID FAN C&I ITEMS	100
13	55-114	IMPLS FD FAN 1600-2000	13500
14	55-125	IMPLS ID FAN 2000-250	43000
15	55-810	AXIAL FD FAN COUPLING	600
16	55-820	AXIAL ID FAN COUPLING	1000
17	56-135	PA FAN BC 182000-2500	18000
18	56-830	RADL PA FAN COUPLING	800
19	65-224	Dual Belt Gravimetric Feeder	29580.745
20	67-204	Needle Gate	2888.712
21	67-256	Coal Gate 24In Circ. Chain-Feeder Inlet	3815.514
22	67-801	Down Spout	11422.108
23	67-803	Feed Pipe to Mill	4352.82
24	Mills	Main Vertical Shaft	4680
25	Mills	Worm Gear Set	7590
26	Mills	Gear Hub	8616
27	Mills	Thrust Bearing Lower	222
28	Mills	Radial Brg. Lower	108
29	Mills	Thrust Bearing Adapter	531
30	Mills	Oil Pump Hub	210
31	Mills	Oil Pump Bushing	126
32	Mills	Oil Pump Keeper	38.4
33	Mills	Lower Brg. & Pump Housing	2328
34	Mills	Lower Brg. & Pump Housing Cover	1250

35	Mills	Gear Housing & Brg. Support	11850
36	Mills	Mill Bottom	7068
37	Mills	Oil Collecter	180
38	Mills	Radial Brg. Upper	690
39	Mills	Radial Brg. Housing	665.28
40	Mills	Asbestos Powder	925
41	Mills	Insulation Cover Plate	1991.5
42	Mills	Mill Side Liners	3180
43	Mills	Mill Side Bottom Liners	2100
44	Mills	Inner Cone	4462.5
45	Mills	Center Pipe	2025
46	Mills	Inner Cone Drum Section	1752.1
47	Mills	Outlet Venturi Assembly	2359
48	Mills	Outlet Venturi Collar Assembly	1622.6
49	Mills	Venturi Vane Assembly	163.8
50	Mills	Radial Bearing Worm Shaft	198
51	Mills	Thrust Bearing Worm Shaft	360
52	Mills	Thrust Bearing Housing (W.S.)	1818
53	Mills	Radial Bearing Housing (W.S.)	1200
54	Mills	Thrust Bearing Housing Cover	1086
55	Mills	Oil Cooler	1400
56	Mills	Oil Cooler Head Cover	420
57	Mills	Separator Top Cover	2952
58	Mills	Upper Radial Bearing Housing Cover	336.6
59	Mills	Split Oil Seal(Upper Brg. Hsg.)	2.5
60	Mills	Mill Bottom Cover Assly.	312
61	Mills	Insulation Cover Plate Assembly	796.6
62	Mills	Insulation Blanket	35.5
63	Mills	Bowl	13320
64	Mills	Bowl Hub	8430
65	Mills	Key Bowl Hub	15
66	Mills	Bull Ring Segments	6480
67	Mills	Bull Ring Retainers	13.8
68	Mills	Bowl Hub Clamping ring	1080
69	Mills	Bowl Extension Ring Segment	1119.6
70	Mills	Air port Assembly	6720
71	Mills	MPO Base Plate, MPO, MDV	15400
72	Mills	Spring Set	4.32
73	Mills	Worm Shaft Cover	5400
74	Mills	Grinding rolls	19800

75	Mills	Lower journal Housing	7200
76	Mills	Upper Journal Hsg.	3510
77	Mills	Lock nut (Roller)	450
78	Mills	Journal Shaft	8190
79	Mills	Journal Shaft Bearing Upper & Lower	2310
80	Mills	Journal skirt	1278
81	Mills	Journal Head	12042
82	Mills	Lock nut (Journal Head)	546.08
83	Mills	Trunion End Cap Free End	1458
84	Mills	Trunion End Cap Thrust End	1360
85	Mills	Trunion Shaft	3420
86	Mills	Trunion Shaft Bushing	504
87	Mills	Thrust Plate(Free End)	55.8
88	Mills	Thrust Plate (Thrust End)	124.2
89	Mills	Trunion Shaft Bushing Retainer	133.2
90	Mills	Pressure Spring Set	2239.2
91	Mills	Spring Adjusting Stud	500.4
92	Mills	Spring Adjusting Bolt	30
93	Mills	Pressure Spring Seat	540
94	Mills	Pressure Spring Cup	4560
95	Mills	Pressure Spring Piston	81
96	Mills	Pressure Spring Piston Cover	990
97	Mills	Thrust Bearing(P.S. C)	360
98	Mills	O - Ring Oil Seal	0.39
99	Mills	O - Ring Oil Seal (Journal)	2.988
100	Mills	O - Ring Oil Seal Pressure Spring Clamp	0.15
101	Mills	Oil Seal Viton (Jrnl.)	15
102	Mills	Thrust Bearing (Brg. guard nut)	54
103	Mills	Journal Stop bolt + nut + Bushing	1220.7
104	Mills	Deflecter Blade Assembly	1493.3
105	Mills	Deflecter Control Assembly	485.1
106	Mills	Mechanical Face Seal Assly.	2316
107	Mills	Upper Skirt Assembly	1724
108	Mills	Lower Skirt Assembly	1570
109	Mills	Scraper & guard Assly.	1104
110	Mills	Bowl Mill Motor	25500
111	Mills	Mill Body Liners	1590
112	Mills	Seperator Body	33000
113	Mills	Seperator Top Cover	8856

114	Mills	Spring Adjusting Nut	180
115	Mills	Locknut Spring Adjusting Bolt	12
116	Mills	Lock nut (Spring Adjusting nut)	24
117	Mills	Lock nut (Brg. Guard nut)	0
118	Mills	Thrust Bearing Bush (P.S.C)	36
119	Mills	Bearing Guard Nut	72
120	Mills	Journal Opening cover	14400
121	Mills	Retainer Ring (W. S.)	0.1
122	Mills	Retainer Ring (Rad. Brg. Lower)	76
123	Mills	Servo System 257 oil	5580
124	Mills	Sevomesh oil 176 oil	744
125	Mills	Shim Set	0
126	Mills	Mill Motor Coupling	0
127	Mills	Journal Opening Frame Liner	100
Total			**707612.547**

Annexure – ID

INSULATION (One Boiler)

S. No.	PGMA	Description	Approx. WT
1	32-010	Fixing Comp For Blr Pr Parts Insul	5134.04
2	32-110	Fixing Comp For Blr Mountings Insul	1610.8
3	32-120	Fixing Comb For SB Pipes Insul	1202
4	32-310	Fixing Comp For Air Ducts Insul	12315.72
5	32-410	Fixing Comp For Ah And Gas Duct Insul	7291.08
6	32-710	Fixing Comp. For Oil System Insulation	1502.5
7	33-021	Blr Pr Parts Mineral Wool	50295
8	33-121	Boiler Mounting Mineral Wool	3575
9	33-126	Sb Pipe Mineral Wool	3025
10	33-212	Main Blr Castable Refractory Gr C	60438.78
11	33-230	Main Blr Pourable Insulation	100000
12	33-321	Mineral Wool	32500
13	33-421	Air Heater and Gas Ducts Mineral Wool	27125
14	33-721	Oil Sysstem Mineral Wool	3575
15	33-924	Misc Eqpts Asbestos Material	166
16	33-970	Misc Eqpts Expanded Metal	4433.562
17	33-971	Misc Eqpts Woven Wire Cloth	499.088
18	33-975	Misc Eqpts Sealing Compound	200
19	37-010	Blr Outer Casing Components	13127.26
20	37-810	Blr Outer Casing	14763
21	81-300	FIX COM FOR MAIN STEAM PPG INSL	7370.649
22	81-327	LBM	85233
23	81-341	SEALING COMP FOR INSL	0
24	31-350	AL CLADDING FOR INSL	11050
TOTAL			**446432.5**

Annexure – IE

CRITICAL PIPING (One Boiler)

S. No.	PGMA	DESCRIPTION	WT. (KG)
1	80-303	AUX PRDS STATION PIPING	1205.098
2	80-320	CRH FROM TURBINE TO REHEATER	3800.775
3	80-340	AUX STEAM HEADER	0
4	80-418	ERECTION MATERIALS FOR INST	67.119
5	80-425	BFD CPNTROL STATION PIPING	11213.33
6	80-431	AUX PRDS CONTROL STATION PIPING	1437.761
7	80-452	HP PIPING DRAINS - SG SCOPE	1180.7
8	80-453	LP PIPING DRAINS - SG SCOPE	505.44
9	80-901	SUB DELIVERY VALVES FOR LIGHT UP	835
10	80-905	BHEL VALVES FOR LIGHT UP	11836.6
11	80-923	H & S FOR STEAM BLOWING	27409.04
12	80-992	IMPORTED ELECTRODES	0
13	81-300	FIX COM FOR MAIN STEAM PPG INSL	0
14	81-327	LBM	0
15	81-341	SEALING COMP FOR INSL	0
16	31-350	AL CLADDING FOR INSL	0
17	81-412	DIRECT GAUGES FOR NON STEAM LINES	0
TOTAL			**63990.86**

NOTES:

1. **Above details are only to give a general idea to the contractor to quote the rates as per rate schedule. Besides PGs indicated above, there is likelihood of addition of new PGs for release of some items integral to Boiler. Contractor is required to carryout such PGs also within their applicable tonnage rate. The decision of BHEL regarding inclusion of new / additional PG in Boiler will be final & binding on the contractor.**
2. **Certain items like insulation material, cladding, valves etc. may be supplied by other suppliers / BHEL units like PEM etc. and not included in PGMA applicable for Boiler system mentioned above . Such items that are also to be erected as per tonnage rates for the respective systems as mentioned above & as directed by BHEL. No extra claim shall be entertained on this account.**
3. **PG for H&S, Valves, auxiliary structure, insulation are common for both Boiler & steam turbine. Erection of above will be done by the respective contractor i.e Boiler & Turbine for that respective pipe line.**

ANNEXURE –II

DISMANTLING & MISCALLANEOUS WORKS

Dismantling of selected items in specified areas, and transportation of same and storing in specified areas as per instruction of BHEL Engineers.

Scope shall include following

Sl No.	Description
1.	Dismantling of Water Walls
2.	Dismantling of Buck stays, Seal Boxes and Doors
3.	Hot correction of Buckstay Beams
4.	Dismantling of SH Headers
5.	Dismantling of LTSH & ECO coils
6.	Dismantling of Platen Coils
7.	Dismantling of Pressure Part Suspensions
8.	Dismantling of RH Headers and RH Suspensions
9.	Dismantling of Skin Casing
10.	Dismantling of Soot Blower System
11.	Dismantling of Trim Piping
12.	Dismantling of Seal Plates and Enclosures
13.	Dismantling of Vertical Roof Enclosure and Drum Deck and Roof Deck
14.	Dismantling of Ceiling Structure
15.	Dismantling of Roof Structure and Sheeting
16.	Dismantling of Boiler Outer casing
17.	Dismantling of Oil, Scanner Air, and Mill Seal Air Systems
18.	Dismantling of Wind Boxes
19.	Dismantling of Coal Piping
20.	Dismantling of Ducts
21.	Dismantling of Feeder
22.	Dismantling of APH
23.	Dismantling of ID, PA and FD Fan Systems
24.	Dismantling of Bowl Mills
25.	Dismantling of Piping system

	Thickness survey & visual inspection and DP of
	a. SCW tubes and joints of stubs with header (joints b/w header & stubs at SHH – 3L&R, SHH – 4L&R, SHH – 5,SHH – 8)
	b. WW o/l header stubs and joints of stubs with header,
	c. Bottom ring header nipples and stubs including joints of stubs with header
	d. WW screen header stubs including joints of stubs with header
	e. WW hanger header stubs including joints of stubs with header
	f. Eco i/l header stubs including joints of stubs with header & Economizer coils
	g. Re heater coils as per direction of BHEL Engineers
26.	h. Final SH coils
27	Repair of boiler pressure parts tubes (OD≤100 mm) based on Thickness survey & visual inspection and DP in various areas as mentioned in point no. 06. Repair works shall include cutting, welding, bend fabrication, post heating, pre heating, SR, radiography & UT etc. Total no. of repair joints covered in this head shall not exceed 6500±10% joints beyond which payment or deduction for extra joints or deficient joints shall be made at rate quoted by contractor against this head in present contract.
28	Repair of old LDO, HFO and aux. steam pipelines, tracing lines from their respective headers to 19 mtrs station and OH of Oil Heating Station. Repair works shall include cutting, welding, bend fabrication, post heating, pre heating, SR, radiography & UT as applicable etc.. Hydro test of Oil heaters, repair/ replacement of valves, cleaning and servicing of oil strainers, restoration of steam traps etc. is also covered in this scope.
29	Replacement of damaged supply tubes, headers stubs, bends etc.; cutting, grinding, fit up, HP welding, NDT, pre heat and post welding of HP joints
30	Replacement of few portions of CRH lines, MS lines, HRH line other than erectable items (such as Headers, DESH, thermo wells etc.) supplied under R&M contract; cutting, grinding, fit up, HP welding, NDT, pre heat and post welding of HP joints. Number joints (OD > 300 mm) covered in the scope is 06 joints
	Arrangement of Misc. items
	a. Fabrication and cutting of threads on tie rods, suspension rods, welding and heat treatment as per site requirement
31	b. Arrangement of miscellaneous fasteners (HT and non HT grade), screws, self drilling and tapping screws, TT Burner Assy fasteners HT fasteners (as per Clause 19.0 of Chapter – IV scope of works) asbestos cloth, asbestos packing ropes, adhesives, sealing compounds, black bituminous paint and other consumables
32	Providing various approach platforms to all valve and gate actuators, dampers, drives including fabrication, erection and welding of structures, fabrication and erection of approach ladders. Old materials such as plates, old boiler tubes, and structural materials will be cannibalized from boiler dismantled items and shall be used for this purpose. Any other materials if required shall be provided by customer/BHEL.
33	Repair of damaged boiler platform, handrails and ladders. Old materials such as plates, old boiler tubes, structural materials, floor grills will be cannibalized from boiler dismantled items and shall be used for this purpose. Any other materials if required shall be provided by customer/BHEL.
34	Repair of APH shell, stay plates, rotor partition plates, replacement of Lub Oil pipelines, repair/replacement of Lub oil pumps

35	Cleaning of Lub oil coolers of fans(06 nos.) and repair/restoration of cooling pipe lines from their respective headers to coolers. Arrangement of required consumables such as pipeline fittings, valves (up to 25 Nb), flanges, fasteners, gaskets etc.
36	Overhauling of Mill Seal air system, including repair of ducts, cleaning of seal air filters, replacement of fan impellers, and repair of mill seal air headers. Arrangement of consumables such as gaskets, fasteners etc.
37	Repair/ Modification of Old Ducting plates of Cold PA Duct, FD Fan O/l to APH I/L, PA Fan O/L to APH I/L including cutting, welding, fabrication, kerosene test
38	Arrangement of quick setting cement Conbextra GP2(200 bags x 25 KG/bag) for RC feeder civil foundation and modification of existing foundation to suit newly supplied feeders
39	Shifting of Fuel Oil & Service lines
40	Dismantling of 300 MT or 135 MT crane from unit no. 12, marching to unit no. 13 and crane assembly, crane shifting to location as indicated by BHEL Engineer
41	The contractor has to obtain permission from the director of Boiler (U.P) for taking up the work of pressure parts replacement, arrange for statutory inspection of hydraulic test of Boiler by inspection of Boiler and also arrange for operational clearance certificate from director of Boiler (U.P.).

Note :

1. Above scope is tentative only, dismantling in other areas may have to be carried out by contractor as per site requirement & instruction from BHEL Engineer.
2. Before starting dismantling in any area contractor has to take prior consent of BHEL site Engineer and shall fully comply his/her instructions.
3. Items such as valves, pressure parts suspensions, u rods, collector beams, paired channels, safety valves, drain lines, vent lines, sampling lines, tracing lines, ducting supports and suspensions, boiler platform structure and bracings, WBs & RBs etc. are to be dismantled with great care as many of these items may have to be reused. These items shall be properly tagged when dismantled and stored in a safe place. Proper record of these items shall have to be maintained by contractor and is to be periodically checked and verified by BHEL site Engineers. In case any of these items are found missing then the same shall be arranged by contractor at his risk and cost.
4. Contractor has to develop a storage yard to store dismantled items indicated above and to store other items indicated by BHEL site Engineer.
5. Transportation of scraps and dismantled items from site to scrap yard (shall be defined by UPRVUNL) shall be arranged by contractor. Hydra, trailer, trolleys etc. required shall be arranged by contractor within the quoted price.
6. Contractor has to present and provide a copy of challan, test certificates for every bought out item such as cement, fasteners, gaskets, pipe fittings etc. and any other material purchased by him as per requirement of above mentioned list.

Annexure – IIA

S. No.	Description	UOM	Qty
1	Hexagonal Head Self drilling screw with washer Size 5.5x63 mm long	Nos.	30000

2	Hexagonal Head Self drilling screw with washer Size4.8x19 mm	Nos.	10000

Annexure – IIB

S. No.	Description	Specification	UOM	Qty
1	HEX HD BOLT M20X70	GRADE 10.9 IS:1364(P-1)	Nos.	350
2	HEX NUT M20	GRADE 10 IS:1364(P-1)	Nos.	350
3	PUNCHED WASHER A 22(ID)	IS:2016	Nos.	350
4	HEXHD BOLT M16X70	P CL 8.8 IS:1364(P-1)	Nos.	800
5	HEX NUT M16	P CL 8 GR A BPS 41320	Nos.	800
6	PLAIN WASHER A 16	PUNCHED STEEL IS:5370	Nos.	800

ANNEXURE –IIC

SHIFTING OF FUEL OIL & SERVICE PIPELINES

R&M work includes extension of existing ESP's due to which the passage between ESP & ID Fan is to be utilized for new fields. This passage is having, quite a large number of overhead service pipelines & Cables of all the units (Fuel Oil, LDO, Aux. Steam, cooling, water & air etc.) running through it. Also the access for heavy duty cranes including 135 MT & 300MT will be obstructed. Also FO, Aux. Steam, air, water pipelines and cables, are also running on pipe rack to left of boiler. They may also obstruct passage of cranes to boiler from left side.

These pipelines & cables have to be re-routed towards cooling tower or temporarily dismantled, as per suitability, & pipe rack structure will have to be suitably modified to create space or accommodating ESP fields of unit 13. Also in order to have access of crawler cranes & material handling equipments to individual ESPs & boilers for undertaking R&M work cooling tower inlet and outlet lines (450 Nb), cooling water lines (350Nb, 250Nb, 200Nb, 150Nb, 100Nb), cable trays and other miscellaneous pipe lines will have to be dismantled and re routed. Pipe rack structures and columns on which these pipelines and cable trays are running are also required to be dismantled or re routed as per space availability at site and decision of BHEL Engineers. Pipe rack structures, pipe lines, cable trays dismantled are to be preserved for re erection for unit commissioning. Pipe rack structures, pipe lines, cable trays dismantled shall be re erected for commissioning of units.

Since the project is a turnkey project it is possible that any unforeseen requirement arises during execution stage. Contractor must be ready for the same and will have to carry out unforeseen activities required for successful completion of the work.

Since some units will be running it will not be possible for customer to provide shutdown of all units so that exiting pipelines can be shifted in a single time slot. Instead, new pipe racks will have to be laid towards cooling tower as per requirement and then lay new pipe lines on these pipe racks. Oil, air and steam lines of individual units may then be connected to newly erected lines by demanding shutdown of individual units for small time periods. Once connection of all lines for all units is completed, old pipe lines and extra pipe racks may be dismantled at once.

Scope of Works:-

(1) Cutting of steel structures to required length for support of the pipelines. These support structures are to be welded with existing pipe rack behind ESP of Units 12 & 13 towards cooling tower side. Suitable bracing as shown also have to be provided.

Sl No.	Support Details
1.	Support by ISMB 400/500 or Box -400/500
2.	Support by ISMB 200/300
3.	Bracing support by MC 75 Box
4.	Bracing support by MC 100 Box

Necessary alteration/modifications which may require bending of pipes, fabrication of cut bends/reducers/TEEs/etc. shall be carried out by contractor within quoted price. Suitable modification of supporting system may have to be done as per actual site requirements. Contractor has to complete all the required works within finally accepted price. No extra compensation will be provided for any activity which has not been exclusively mentioned in this scope of works but is essentially required for successful completion of job. Contractor is requested to visit site and get himself acquainted with site conditions and quantum of works before quoting final price for the subject work.

(2) Following items are covered in present scope.

Sl No.	Description of piping	Size	Approx length (Meter)
1.	F. O. Supply lines	100 Nb (C.S.)	300
2.	Individual F. O. return lines	50 Nb. (C. S.)	150
3.	L.D.O common supply line to units 9, 10, 11 12 & 13.	80 Nb (C.S.)	300

4.	Steam tracing line	15 NB (C.S.)	1500
5.	Aux. steam line from common header	200 Nb (CS) SCH 40/80	150
6.	CLCT lines	450 Nb	200
7.	Cooling water line	350Nb/300 Nb	100
8.	Miscellaneous lines	250Nb,200Nb, 150Nb, 100, Nb	200
9.	Air & water pipelines will be routed as per suitable location as per site requirement.		
10.	Cable trays 3/4/5 tier 100 mtrs length		
11.	Pipe rack structures and columns 20 MT approx.		

- Above list is tentative only and quantities may vary subject to site requirements..
- The pipe lines after laying are to be aligned & welded. Root run to be tested by D.P.T. for any defect etc. Only BHEL approved welding rods, TIG welding rods shall be used.
- The pipelines have been provided with loops for expansion. Separate supports have to be given at the loop to suit the site condition. Location and quantity of loops shall be finalized jointly UPRVUNL and BHEL site Engineers.
- Suitable drains at designated location for Aux. steam piping have to be provided with isolating valves as per site requirement.
- The pipes after erection have to be insulated as per instruction of BHEL Engineers. After insulation sheeting to be provided on the pipeline as per standard practice.
- After laying the pipelines, these have to be joined with the respective headers as per site requirement..
- Few cooling lines and airlines have to be blanked or re-routed temporally to make access for cranes etc. This work will have to be done, if required, within the quoted price.
- All required piping materials, pipe fittings, valves, steam traps etc. shall be arranged by BHEL or UPRVUNL as per availability. However contractor should be ready to carry out bending of pipes, fabrication of cut bends/reducers/TEEs/etc. as many of item may not be available. Required consumables, T&Ps, hydra, trailer, gases, welding machines, welding rods, cutting sets, IMTE's etc. required shall be arranged by contractor within final quoted price.
- Insulation materials shall be arranged by BHEL/UPRVUNL.

Any other work that may be required, related to the said work, but not mentioned in the scope of work specifically, has to be done to complete the job. Contractor has to complete all the required works within finally accepted price. No extra compensation will be provided for any activity which has not been exclusively mentioned here but is essentially required for successful completion of job and R&M of unit no. 12. Contractor is requested to visit site and get himself acquainted with site conditions and quantum of works before quoting final price for the subject work.

ANNEXURE –III

TENTATIVELIST OF HP ERECTION JOINTS

OBRA UNIT 13, 200MW BOILER R&M
TENTATIVE DETAILS OF JOINTS PER BOILER

SL.NO	DESCRIPTION	SIZE OF TUBE	NO.OF .JOINTS
01	WaterWallPanels	D63.5x5.2;SA210GrA1	2517
02	Screen&HangerTubes	D76.1x7.1;SA210GrA1	322

PG:10,11,12, 15,16,17 &19
For superheater system:
D127 x 12.5- SA 106 GR.B- 22 No.
D54X4.5- SA 210 GR.A1-- 360 No.
D51X4.5- SA210 GR. A1--1000 No.
D44.5X5.0--SA213 T11----1206 No.
D44.5X4.5--SA 213 T11---402 No.
D44.5X 4.0--SA 210 GR.A1--402 No.
D51X5.6-SA213 T11---29 No.
D51X7.6--SA213 T22---29 No.
D51X8.8--SA213 T22---29 No.
D51X10--SA 213 T22---116 No.
D51X5.6--SA 213 T11---29 No.
D51X4.5--SA 213 T11---174 No.
D47.63X8.6---SA213 T22---238No.
D47.63X7.1---SA213 T22---119No.
D47.63X6.6---SA213 T22---119 No.

D323.9X32---SA335 P12----10 No.
D323.9X45---SA335 P12----10 No.
D219.1X22.2--SA106 GR.B---10 No.
D273X36---SA 106 GR.B---6 No.
D127 X12.5--SA 106 GR.B---20 No

For Reheater system:
D54x4.5---SA209 T1----89 No.
D54x3.6---SA209 T1----445 No.
D54x4.5---SA213 T11---178 No.
D54x3.6--SA 213 T11---356 No.
D47.63x5.0---SA213 T22---356 No.
D54 x 4.5--SA213 T11---356 No.

For Economiser system:
D31.8x3.6---SA 210 Gr.A1----744 No.

For PG 21:

D21.3x4.78- SA335 P22- 1 No.
D33.4x6.35- SA335 P22- 1 No.
D21.3x2.77- SA106 GR. B- 10 Nos.
D33.4x3.38- SA106 GR. B- 30 Nos.
D60.3x3.91- SA106 GR. B- 625 Nos.
D88.9x5.49- SA106 GR. B- 4 Nos.
D60.3x8.3- SA105 - 1 No.
D60.3x8.74- SA335 P22 - 1 No.
D60.3x3.91- SA 106 Gr. B - 1 No.
D60.3x8.74- SA335 P22 - 3 Nos.
D33.4x6.35- SA335 P22 - 4 Nos.
D33.4x3.38- SA106 Gr. B - 40 Nos.
D60.3x3.91- SA106 Gr. B - 500 Nos.
D60.3x8.74 SA 335 P22 – 2 Nos.
D48.3x3.68 Sa234 WPB – 2 Nos.

For PG 24:

D158.8x41.3- SA105- 1 No.
D172.0x47.9- SA105- 2 Nos.
D209.6x28.6- SA105 - 3 Nos.
D209.6x28.6- SA182 F22- 1 No.
D172.0x47.9- SA182 F22- 1 No.
D139.7x39.7- SA182 F22- 1 No.
D139.7x39.7- SA182 F22 - 1 No.
D21.3x4.78 – SA106 Gr. B – 80 Nos.
D33.4x6.35- SA106 GR. B - 100 Nos.
D48.3x7.14- SA106 GR.B - 200 Nos.
D60.3x8.74- SA106 GR.B- 120 Nos.
D73.0x9.53- SA106 GR. B- 350 Nos.
D73.0x9.53- SA106 GR. B- 75 Nos.
D73.0x9.53- SA106 GR. B- 33 Nos.
D73.0x9.53- SA234 WPB- 1 No.
D108.0x16- SA106 GR. B - 10 Nos.
D108.0x16- SA106 GR. B – 10 Nos.
D168.3x40.0 - SA106 GR. B – 2 Nos.
D323.9x35- SA216 WCB – 1 No
D323.9x35- SA216 WCB – 2 Nos.
D73.0x9.53 - SA106 GR. B – 2 Nos.
D76.1x12.5 – SA213 T22 – 2 Nos.
D76.1x12.5- SA213 T22 – 30 Nos.
D57.0x10.0- SA213 T22 - 50 Nos.
D33.4x6.35- SA335 P22 – 50 Nos.
D21.3x4.78- SA335 P22 – 125 Nos.
D14.0x2.9- SA 182 F12 CL2 – 1 No.
D21.3x4.78 – SA105 – 85 Nos.
D33.4x6.35 – SA 106 Gr. B – 160 Nos.
D48.3x7.14 – SA 106 Gr. B – 150 Nos.
D60.3x8.74 – Sa 106 Gr. B – 24 Nos.
D21.3x4.78 – SA335 P22 – 60 Nos.
D33.4x6.35 – SA335 P22 – 50 Nos.

D57.0x10.0 – SA182 F22 – 4 Nos.
D14.0x2.9 – SA 182 F22 – 500 Nos.
D14x2.9 – SA182 F12 CL2 – 1 No.
D51.0x5.0- SA105 – 8 Nos.
D44.5x6.3 – SA 105 – 1 No.
D168.3x7.11- SA106 GR. B – 12 Nos.
D219.1x6.35- SA106 GR. B – 12 Nos.
D168.3x7.11- SA335 P22 – 4 Nos.
D219.1x8.0- SA335 P22 – 4 Nos.
D114.3x6.02- SA335 P22 – 4 Nos.
D323.9x6.35- SA106 GR. B – 3 Nos.
D273.1x6.35- SA106 GR. B – 3 Nos.
D48.3x3.68- SA106 GR. B – 6 Nos.
D48.3x3.68- SA106 GR. B – 24 Nos.
D73.0x7.01- SA106 GR. B – 30 Nos.
D21.3x4.78- SA335 P22 – 2 Nos.
D21.3x4.78- SA335 P22 – 10 Nos.
D48.3x3.68- SA335 P22 – 11 Nos.
D76.1x6.3- SA213 GR. T22– 12 Nos.

For Piping PG 80:

D33.4x4.55- SA106 Gr. B – 50 Nos.
D21.3x3.73 - SA 106 Gr. B – 11 Nos.
D60.3x11.07- SA 335 P22- 26 Nos.
D168.3x21.95- SA 106 Gr. B – 10 Nos.
D73.0x9.53- SA106 Gr. B – 7 Nos.
D114.3x13.49- SA106 Gr. B – 13 Nos.
D323.9x36.0- SA106 Gr. B – 37 Nos.
D273.0x9.27 – SA106 Gr. B- 15 Nos.
D558.8x40 – SA 106 Gr. C – 8 Nos.
D219.1x12.7 – SA 335 P22 – 9 Nos.
D114.3x17.12 – SA 335 P22 – 8 Nos.
D168.3x21.95 – SA 335 P22 – 10 Nos.

- **THE ABOVE MENTIONED JOINT SCHEDULE IS FURNISHED FOR ESTIMATION PURPOSE AND ACTUAL NO. OF JOINTS MAY VARY TO ANY EXTENT.**
  NO ADDITIONAL PAYMENT SHALL BE MADE DUE TO ANY VARIATION IN NO. OF ERECTION JOINTS.

ANNEXURE – IV

MEMO for imposition of penalty against non-compliances in Quality area

The Lapse as tick marked below has been observed in your area and penalty is being imposed as per the details mentioned at the bottom of this memo:-

S. No	Nature of non- compliance	Penalty (in Rs.)	Remarks
1.	Non availability of required no. of Quality Engineers/NDT certified person as per contract	1000	Per Person per day
Calibration:-			
2.	Use of IMTEs without having valid calibration certificate	1000	Per equipment per instance
3.	Use of NDT equipment, welding equipment's without having valid calibration certificate, condition not as per requirement	1000	Per equipment per instance
Welding & NDT area:-			
4.	Unqualified Welder carrying out weld/ tack weld	1000	Per welder per instance
5.	Not using portable oven	500	Per welder per instance
6.	Not using electrodes pre- baked in master oven/ approved make of electrodes/correct electrodes as per EWS/ WPS	500	Per instance
7.	Non- removal of slag and spatters after welding	200	Per Joint
8.	Not using NDT equipment as prescribed in the manual/ contract/ guidelines	1000	Per equipment per instance
9.	Welder doing welding without job card	500	Per instance
10.	Discrepancy observed in the RT taken of weld joints vs. RT offered	2000	Per joint
Material management:-			
11.	Mismatch of location of material in store area wrt in Stock register	200	Per instance
12.	Non-compliance of preservation of material as per storage & preservation manual	1000	Per equipment
13.	Non verification of material within stipulated time as per contract	500	Per instance
Other Areas:-			
14.	Painting without surface cleaning	500	Per instance
15.	Not attending Quality meeting by the nominated member	1000	Per meeting

Details of non- compliance (Name of Sub contractors, persons, description of deficiency, etc.)

1, Rate as per above chart_____

2. No. of Persons/ equipment/ instance/ Joint/ welder/meeting. _____

3. Total Penalty= 1. X 2. =_____

Signature

(Witnessed by Sub- Contractor representative) (Witnessed by PSNR Personnel)

Name_____ Name_____

Distribution:
1. Sub- contractor
2. Head (Quality & Safety)/ BHEL PSNR

DETAILED SCOPE OF R&M WORKS

1.0 : GENERAL

Broadly the following refurbishment works are to be carried out:

- Replacement of deck supports and sealing.
- Replacement of boiler roof structure and sheeting.
- Replacement / servicing of Boiler Pressure Parts.
- Replacement of supporting structures and tie rods for headers, pipes etc.
- Buck stay dismantling / correction and re erection.
- Ash removal and cleaning of boiler prior to dismantling.
- Transfer of all important elevations to columns prior to dismantling.
- Replacement / repairing of Ducts.
- Replacement / servicing of Fuel Oil System.
- Replacement of Scanner Air System.
- Replacement of Coal Pipes.
- Replacement of Volumetric Coal Feeders with Dual Belt Gravimetric Feeders.
- Replacement of Wind Boxes.
- Servicing of Mill Seal Air System.
- Servicing of Air Pre Heaters.
- Sector Angle modification works in APH
- Servicing of FD and PA Fans.
- Replacement of ID Fans.
- Up rating / servicing of Bowl Mills.
- Replacement of Gates and Dampers.
- Replacement of Refractory and Insulation.
- Replacement / servicing of Piping systems.
- Replacement of Piping Hangers.
- Replacement / servicing of Valves.
- Application of Primer and Finish Painting.
- Transportation / segregation of dismantled items to the identified areas.
- Dismantling works

2.0 : STRUCTURES

2.1 : BOILER CEILING STRUCTURES AND CEILING GIRDERS

Following are the unit wise details of works for Boiler Ceiling Structures and Ceiling Girders:

2.1.1 : UNIT – 13

1. For unit no 13, replacements of Ceiling Girders are not required. Only strengthening, as per instruction from BHEL Engineers, of Girders to be carried out which can be done with Girders in position. Materials and Drawings required for the strengthening will be provided as per requirement. Other than ceiling girders damage RBs & WBs shall be

replaced for which materials and drawings will be provided. These works are part of scope of work and shall be carried out by contractor at final quoted price.

2.2 : PLATFORMS, FLOOR GRILLS, TOE GUARDS, HAND RAILS,

1. Wherever required, the existing Platforms, Floor Grills, Toe Guards Hand Rails etc. are to be dismantled to facilitate the refurbishment works and are to be restored back once the refurbishment works are completed.
2. Existing Damaged Platforms, Floor Grills, Toe Guards Hand rails etc. are to be Repaired / replaced.
3. Apart from the existing ones, Wherever required, new Structures, Platforms, Floor Grills, Toe Guards Hand rails etc. are to be erected.

2.3 : BOILER ROOF STRUCTURE AND ROOF SHEETING

1. Replacement of Boiler Roof Structure and Roof sheeting is to be carried out.

2.4 : TEMPORARY STRUCTURES

1. Wherever required, Temporary Structures etc. are to be erected to facilitate the refurbishment works and are to be dismantled once the refurbishment works are completed.

3.0 : BOILER PRESSURE PARTS

The following are the item wise details of works to be carried out for Boiler Pressure parts:

3.1 : DRUM

Servicing of drum internals (or replacement if required) to be carried out. Drum internal piping (dosing, blow down, etc) is to be checked (NDT / DPT for weld joint) and to be repaired if required. Safety valves and other root valves are to be replaced. Safety valves, exhaust pipes, and supports are to be retained.

3.2 : DOWN COMER

Down Comer Pipes are not to be replaced. Only the DC pipes, Supports / hangers are to be inspected and serviced if required. All the down comers are to be arrested before start of dismantling of other boiler items.

3.3 : WW BOTTOM RING HEADER

WW Bottom Ring Headers are not to be replaced. The same are to be temporarily supported (bottom support) and arrested after cooling down of boiler and before start of dismantling of other boiler items. Headers' elevation (four sides) are to be transferred / marked to the columns. If required lifting of all headers to correct elevation shall have to be carried out.
Cleaning of Bottom Ring Header, if required cutting of ring header, re welding, heat treatment & radiography shall have to be carried out.
Drain lines with valves are to be replaced and the existing routings are to be adopted.

WW panels are to be cut and dismantled leaving the stubs with headers (cutting to be done near existing joint in the panel portion), leaving some clearance for edge preparation. Weld joint location (Panel with header stub) is unchanged; hence stub length should not be reduced

while dismantling. After dismantling of WW panels, stubs are to be covered to avoid entry of dust and foreign materials during dismantling / erection.
Visual inspection/DP of ring header stubs shall be carried out by contractor and any repair work shall be carried out by contractor within quoted price.

3.4 : FURNACE WALL

All the four sides of furnace wall (1st pass) including burner panels are to be dismantled and replaced with new one. WW outlet (top) headers are not to be replaced. However temporary dismantling may be required to facilitate the replacement of other boiler items WW panels are to be cut and dismantled leaving the stubs with headers (cutting to be done near existing joint in the panel portion), leaving some clearance for edge preparation. Weld joint location (Panel with header stub) is unchanged, hence stub length should not be reduced while dismantling. After dismantling of WW panels, stubs are to be covered to avoid entry of dust and foreign materials during dismantling / erection.

WW hanger tubes, screen tubes, rear arch tubes and extended WW panels will be supplied and to be replaced. Similar to WW, for these tubes also weld joint location (with header stub) is unchanged hence stub length should not be reduced while dismantling (cutting to be done near existing joint, leaving some clearance for edge preparation).

Visual inspection/DP of all header stubs shall be carried out by contractor and any repair work shall be carried out by contractor within quoted price.

WW top outlet headers are not to be replaced. However temporary dismantling / supporting / arresting may be required to facilitate the replacement of other boiler items. Headers' elevation are to be transferred / marked in the nearer columns.

3.5 : RISER TUBES & SUPPORTS

Repair of damaged Riser Tubes and replacement of supports are to be done.

3.6 : ECONOMISER

Repairing / addition of loops are to be carried out as per BHEL instruction / site condition. Existing 07 loops coils are to be inverted upside down in order to extend life of old coils. Coil supports and inlet and outlet header connecting tubes will be required to be modified accordingly. Existing economizer coils are of either 7 loop coils and are to be converted to 10 loop coils by adding fresh 3 loop coils to the existing 7 loop coils. Visual inspection/DP/De metering of existing 07 loop coils are to be carried out and repair of damaged/ eroded parts are to be carried out.

3.7 : SUPER HEATERS

3.7.1 : SATURATION LINE

Roof SH Inlet Header is to be replaced but the Saturation lines (drum to roof SH Inlet Header) are to be retained. Weld joint locations (Saturation lines with header stubs) is unchanged, hence line length should not be reduced while dismantling the Header. Cutting to be done near existing joint (in the header stub portion), leaving some clearance for edge preparation.

3.7.2 : ROOF SH

Ceiling SH Tubes and Headers (Inlet & Outlet) are to be replaced. Their hanger support assemblies are to be inspected, serviced / repaired / replaced (wherever required) at no extra cost.

3.7.3 : STEAM COOLED WALL (2nd PASS)

Second pass wall, and extended steam cooled wall are to be retained. The walls are to be inspected and the damaged steam cooled walls are to be repaired. Loose tubes and fins will be supplied for repairing works of SCW. Bows in wall are to be corrected (hot correction or any suitable method to be used). However, second pass steam cooled roof and second pass steam

cooled screen tubes are to be replaced. Buck stay beams are to be re-fixed after bow correction, if required. Key buck stays (channels welded to wall) are to be replaced if required. Before starting of dismantling of second pass roof, second pass wall, extended water wall and headers are to be arrested and supported temporarily.

3.7.4 : STEAM COOLED WALL HEADERS

Inlet / Outlet headers of SCW, supports of SCW / headers and supply tubes of headers are to be retained. Headers' elevation (four sides) are to be transferred / marked in the nearer columns before starting of dismantling. Steam cooled wall tubes to be repaired after thickness survey & instruction of BHEL.

Stubs of SHH -8 shall be inspected visually or by dye penetration test. Any repair work if required shall be carried out contractor within quoted price.

Headers SHH – 4L & 4R have been eroded, eroded areas are to be filled by metal deposition by TIG / GMAW process as per procedure provided by BHEL.

3.7.5 : LTSH

LTSH coils and outlet headers and terminal tubes are to be replaced. Their hanger supports are to be re-used.

LTSH outlet header is to be replaced.

Supply tubes for LTSH inlet header are to be inspected visually or by DP test. Works in supply tubes such as replacement of header stubs (both in inlet and outlet header), replacement of bends, replacement of straight, NDT of joints, and pre and post heat treatment etc. if required, shall be carried out contractor within quoted price. Inlet header should be aligned & supported before start of erection of LTSH coils. Weld joint location (LTSH coil with header stub) is unchanged; hence stub length should not be reduced while dismantling. Cutting to be done near existing joint (in the coil portion), leaving some clearance for edge preparation.

3.7.6 : DESH and LINKS

SH – De Super Heaters are to be replaced. But the Links between LTSH outlet headers and Platen inlet headers are not in the scope. Link pipes are in good condition but are found in inclined position (because of the sagging of Platen inlet headers). Links are to be re-erected in original position with supports at no extra cost.

3.7.7 : PLATEN SH

Platen SH inlet header, coils and outlet headers are to be replaced. Hanger supports of headers also are to be replaced. But the Links between Link pipes are in good condition but are found in inclined position (because of the sagging of Platen outlet headers). Links are to be re-erected in original position with supports. Supports for links are to be replaced.

3.7.8 : FINAL SH

Final SH headers (inlet & outlet) are to be replaced in unit no. 13. For unit No. 13 only two nos. of coils are to be replaced. Weld joint location (SH coil with header stub) is unchanged, hence coil length should not be reduced while dismantling. Cutting to be done near existing joint (in the stub portion), leaving some clearance for edge preparation. Remaining coils shall be visually inspected or by DP test or by De metering. Any repair work if required shall be carried out contractor within quoted price.

Spool pieces may be required to be added to stubs of FSH inlet & outlet headers as per instruction from BHEL for accommodating newly supplied coils.

FSH coils which are found in good condition are to be dismantled without damaging of coils and are to be preserved / stored for reusing.

Header's hanger supports are to be replaced. But for coils 100 % supports are to be replaced.

3.7.9 : RE-HEATERS

Re-heater's inlet and outlet headers are to be replaced in unit no. 13. RH coils are to be replaced in unit no 13.

The coils supplied are to be slightly modified. Expansion loop (bend-approx 1.5M length) is to be provided in circuits at header end. The same loop will be supplied as loose piece and to be

fitted/welded at site for all the coils of RH coils. Joints required for adding expansion loops shall be considered as part of erection joints and no additional compensation will be provided for carrying out these joints.

3.7.10 : PRESSURE PART HANGERS

Hanger rod supports of WW headers are not to be replaced. However the hanger supports are to be inspected and serviced / replaced if required. Any cutting, fabrication, machining, turning, threading, welding, heat treatment etc. if required shall be carried out contractor within final quoted price. Refer scope of works under clause no. 19 S. No. 27.

Header suspension, coil supports etc. have been supplied for many areas, details of which can be found in shipping list, but all efforts shall be made from contractor to preserve them during dismantling as many of these items may be required to be re used. Before cutting/dismantling of these items contractor shall compulsorily take prior permission from BHEL Engineers. A complete record of these items dismantled shall be made by contractor and must be regularly verified by BHEL Engineers.

3.7.11 : BUCK STAY (1st & 2nd PASS)

Before start of dismantling of WW panel, buck stay beams are to be removed from WW (without any damage to beams) and to be preserved for re-fixing. Bow correction (hot correction – if required) to be carried out for the Buck Stay Beams within final quoted price. Key buck stay channels and buck stay-fixing components / corner arrangements are to be replaced. Vertical buck stays are to be re-used.

3.7.12 : BOILER MOUNTINGS (Trim Piping: valves, drains, vents, spray / SB system)

Most of the valves are to be replaced. However servicing of balance valves are to be carried out by the contractor. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling of these components which have to be reused. Following will be the scope for boiler mounting (Trim piping) area: -

1. All the valves (safety valves, ERV, isolation valve (GV) & NRV at eco inlet, spray station valves, SB control station valves, all the drain & vent valves, root valves at drum dished ends, IBD / CBD / Dosing valves, etc) in boiler area as per valve schedule / scheme will be replaced.
2. Super heater SV and ERV are to be replaced.
3. Existing exhaust pipes and silencer of all the safety valves will be retained.
4. MS stop valve will be retained, but its by-pass valve will be replaced with motor operated valve. Cabling to be done for this valve by using existing cables.
5. Drains and vents of WW, SH and RH will be replaced. Existing routing to be followed and no routing / erection drawings will be furnished.
6. Drain headers are to be retained.
7. Drains and vents valve locations can be retained or changed to suit site condition and as per customer requirements.
8. Sample coolers with lines and valves will be replaced. Sample coolers location to be finalized in consultation with BHEL (nearer to cooling water source and drain point). Existing routing to be followed for sampling lines and for cooling water line, routing to be done as per site condition.

9. Existing SH / RH spray control station to be dismantled and new spray station to be erected with pneumatic control / block valves. Spray station to be installed in the same location to suit the site condition. Reference drawings will be furnished.
10. Spray water inlet line (to station) to be replaced / modified.
11. Existing routing to be followed for spray lines and no routing / erection drawings will be furnished.
12. Soot Blowing piping, control station and drain station for all the units are to be replaced.
13. Wall Blowers are to be serviced. Commissioning spares (like gaskets, packing) will be supplied.
14. Wall blowers (quantity -56 nos.) will be removed and replaced.
15. Wall blowers removed, need not be handed over to customer as scrap. They are to be stored safely and their components are to be reused while servicing work of other units / other blowers.
16. SB Control station and drain station are to be located to suit condition in consultation with BHEL / customer.
17. CBD and IBD lines are to be replaced. Dosing line will be replaced up to NRV at drum end.
18. Servicing of CBD and IBD tank to be carried out.
19. Servicing of HP / LP Dosing system to be carried out.

4.0 : BOILER NON PRESSURE PARTS

4.1 : DUCTS

Hot air ducts and flue gas ducts are to be replaced along with expansion joints and dampers / gates for unit no. 13. Reference drawings will be furnished.

In cold air ducting system, repair / servicing work is to be carried out for duct portion. For carrying out servicing works, plates, channels angles etc. will be supplied in running meters. All the expansion joints and dampers / gates in cold air ducting system are to be replaced.

For PA fan outlet existing dampers are to be replaced with gates. PA Fan discharge duct to be modified to match with gates. Hangers and supports of cold air ducts are to be serviced. However as erection contingency requirement, one unit support material will be supplied for using in all the three units. PA and FD fans' suction sides are to be repaired as per inspection/DP.

Existing cabling for gates / dampers is to be reused / realigned / retained.

5.0 : FUEL OIL SYSTEM

5.1 : FUEL OIL PIPING

Oil system piping in the boiler area alone along with valves is to be replaced. New oil station for boiler front (firing floor) and corner stations for all corners / elevations for LDO / HFO / Air / Steam are to be replaced. Locations of oil stations can be retained in the same place. Oil lines in firing floor and corner stations alone to be replaced. Oil guns for all the units are to be replaced. HEA igniters and scanners are to be replaced.

Oil line from pump house to boiler firing floor is to be retained / serviced / replaced along with insulation within final quoted price.

Oil Heating station, oil heaters, oil filters etc., valves, steam valves, steam traps, tracing lines etc. are to be service/partially replaced by contractor within agreed price as per actual requirement.

6.0 : SCANNER AIR SYSTEM

Scanner air system with fans (A/C and D/C fans), dampers and ducts are to be replaced. Existing scanner and igniter fans are to be dismantled. Pipes for gun cooling and scanner cooling air are

to be replaced. Existing routing for the above pipes is to be followed. However suction pipe for these fans from cold air duct to fans are to be retained. Fans can be erected in the same floor. Existing power cables are to be retained / reused / realigned. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling of these components, which have to be reused.

7.0 : COAL PIPING

Coal Pipes are to be replaced along with bends and orifices. Some additional ring plates may have to be welded on transition pieces before erecting orifices. Also trimming of coal pipes may have to be carried out for re routing of lines as per site suitability. No extra compensation will be given to contractor for these modifications and shall be carried out by contractor within finally agreed price.

8.0 : WIND BOX

Wind boxes are to be replaced in unit no. 13 along with tilting mechanism.

9.0 : FEEDERS

Existing Volumetric Feeders are to be replaced with Dual Belt Gravimetric Feeders for boiler unit no. 13. Coal feed pipe from bunker outlet to feeder will be replaced along with gate. Feeder outlet pipe (at feeder side and at mill side) is to be replaced. New seal air pipe for feeder from cold air duct and cooling water line are to be erected.

For new feeders, opening on existing concrete floor are to be made as per the new requirement. To support the new feeders, additional beams are to be erected at / below feeder floor. For fixing of feeder on the concrete floor, holes are to be drilled suitably. Grouting to be carried out for fixing studs. Reference drawings will be furnished

10.0 : MILL SEAL AIR SYSTEM

Servicing of Mill Seal Air system is to be carried out. For feeder, the Seal air system is to be replaced. Existing seal air pipe to volumetric feeders is to be dismantled, and new seal air pipe and system from cold air duct is to be installed to suit gravimetric feeders. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. Dismantling and servicing of the components shall be carried out contractor within finally agreed price.

11.0 : AIR PRE HEATERS

Overhauling / servicing of existing Rotary Air Pre Heaters (2 nos. per boiler) to be carried out. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be released to contractor for dismantling & servicing of components which have to be re used. The following are the major jobs to be carried out:

1. Replacement of Radial Seal assembly.
2. Replacement of Cold and Hot End Heating elements with baskets.
3. Replacement of Hot End Sector Plates with Static Seal, Adjustor Rods, Spool Assembly and Tracking Rod.
4. Replacement of Cold End Sector Plates with Static Seal, Adjustor Rods and Spool Assembly.
5. Replacement of Axial Seal Assembly.
6. Replacement of Bypass Seal Assembly.
7. Replacement/OH of Main Drive Speed Reducer.
8. Replacement of Guide Bearing.
9. Replacement of Support Bearing.
10. Servicing of Cleaning Device at gas outlet.
11. Replacement of Pin Rack Assy.
12. Servicing of Cleaning Device at drive unit.

13. Repair of Rotor Drum, repair/replacement of diaphragm plates, repair/replacement of partition plates, repair/replacement of APH body/casings. All repair works including cutting, fabrication & welding shall be carried out as per site requirement. Contractor has to carry out these repair works within price finally accepted price.
14. Servicing of lube oil system.

12.0 : FANS

12.1 : FD Fans: Overhauling / servicing of FD fans, size AN 20 e 6 (2 Nos. per boiler) to be carried out (Fan housing to be retained). Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling and servicing of the components which have to be reused The following are the major jobs to be carried out:

1. Replacement of Shaft Assembly.
2. Replacement of Impeller Assembly.
3. Replacement of Flange Bearing with Bearing Housing Assembly.
4. replacement of External bearing and Bearing Housing assembly.
5. Replacement of Shaft seals.
6. Replacement of Expansion Joints.
7. Replacement of IGV Assembly.
8. Replacement of Coupling.
9. Servicing of Lube oil system. All consumables such as flanges, fasteners, gaskets, pipe fittings etc. shall be arranged by contractor within finally agreed price.
10. Servicing of suction ducting.

12.2 : PA Fans: Overhauling / servicing of PA fans, size NDF 22 B (2 Nos. per boiler) to be carried out. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling and servicing of the components which have to be reused The following are the major jobs to be carried out:

1. Replacement of Shaft Assembly.
2. Replacement of Impeller Assembly.
3. Replacement of Bearing with Bearing Housing Assembly.
4. Replacement of Shaft seals.
5. Replacement of Expansion Joints.
6. Replacement of IGV Assembly.
7. Replacement of Coupling.
8. Servicing of PA Fan Motor.
9. Servicing of Lube oil system. All consumables such as flanges, fasteners, gaskets, pipe fittings etc. shall be arranged by contractor within finally agreed price.
10. Repair / Fabrication / Replacement of Impeller Sealing Ring.
11. Servicing of suction ducting

12.3 : ID Fans: Complete replacement of the existing ID Fans (except ID Fan Motor) with the new ID Fans, size AN 25 e 6 B (2 Nos. per boiler) to be carried out except fan motor. The ID Fan Motor is to be serviced. Payment will be made to the contractor on the basis of tonnage quoted by

Bidder for Erection work. No separate payment will be made for dismantling and servicing of the components, which have to be reused. The following are the major jobs to be carried out:

1. Dismantling of existing ID Fans.
2. Servicing of existing motors.
3. Preparation of foundation and placement of foundation sole plates, shims and packers.
4. Erection of suction box, impeller housing, IGV, diffuser with access doors, drain plugs etc.
5. Erection of impeller with shaft and bearings.
6. Erection of flexible coupling with guard.
7. Erection of IGV controls.
8. Mounting of duplex RTD for remote indication and for alarm / trip contacts.
9. Mounting of Temperature gauges (Mist) for local indication.
10. Servicing of Lube oil system. All consumables such as flanges, fasteners, gaskets, pipe fittings etc. shall be arranged by contractor within finally agreed price.

13.0 : BOWL MILLS

Refurbishment and up rating of Bowl Mills (6 Nos. per boiler) (from XRP-763 to XRP-803) are to be done. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling and servicing of the components, which have to be reused. Besides Overhauling, the following major jobs are to be carried out:

1. Replacement of Journal Head Liners.
2. Replacement of Bowl Extn. Ring Segments.
3. Replacement of Insulation Cover Plate Assembly Segment.
4. Replacement of Mill Side Bottom Liners
5. Replacement of Bowl.
6. Replacement of Mill Side Liners.
7. Replacement of Deflector Assembly (Hinge Shaft & Blade).
8. Replacement of Inner Cone (Ceramic lined Assembly).
9. Replacement of Outlet Venturi Assembly.
10. Replacement of Outlet Ventury Collar assembly.
11. Replacement of Set Journal Opening Frame Liner.
12. Replacement of Mill Motor Coupling.
13. Replacement of Centre Pipe (Upper) Assembly (S.S.).
14. Replacement of Lower Bearing & Pump Housing.
15. Replacement of Oil Pump Bushing.
16. Replacement of Deflector Assembly.
17. Replacement of MDV Assembly.
18. Replacement of Venturi Vane with Ceramic Liner.

19. Replacement of Mill Motors.

Note:- Besides above additional spares may have to erected in mills.. Tentative list of materials to be erected is also indicated in separate list in Chapter – VIII, details of quantities .Payment of these items shall be done on finally agreed rates on per MT basis as per rate schedule finally accepted by BHEL.

14.0 : GATES & DAMPERS

Most of the Gates and Dampers are to be replaced. However servicing of balance Gates and dampers are to be carried out by the contractor. Payment will be made to the contractor on the basis of tonnage quoted by Bidder for Erection work. No separate payment will be made for dismantling and servicing of the components which have to be reused.
Existing cabling for gates / dampers is to be reused / realigned / retained.

15.0 : REFRACTORY & INSULATION

Broadly the following Insulation works are to be carried out:

- Complete Replacement of Refractory and wool Insulation to be done for all the areas of boiler like pressure parts, ducting, piping, etc.
- Aluminum cladding sheets with fixing components for the outer casing are also to be replaced.

Complete replacement of roof enclosures / bottom enclosure / rear arch enclosure is to be carried out.

16.0 : CRITICAL PIPING

Broadly the following Piping works will be carried out:

a. 100% replacement of MS, CRH and HRH Hangers and Supports.

b. CRH Header extension (both LH and RH).
c. 100% replacement of MS, CRH and HRH line insulation.
d. Replacement of insulation for Feed line, feed control station, spray line and PRDS system.
e. Replacement of Spray Water Piping from Feed line to isolation valve.
f. Replacement of FW Control Station Piping along with isolation valves, control valves, root valves, drain valves, impulse pipes, drain pipes etc.
g. Replacement of feed line Hangers and Supports.
h. Replacement of Piping from MS tap off to Aux. PRDS inlet including fittings, valves, safety valves, root valves, drain valves, impulse pipes, drain pipes etc.
i. Replacement of Aux. Steam Header for unit No. 10 and 11 along with drain valves, vent valves, root valves, impulse pipes, drain pipes, vent pipes etc.
j. Replacement of Thermo wells, Pressure Gauges, Direct Gauges and instrument fittings etc of the above systems.
k. Replacement of Drains and vents of the above systems.
l. Replacement of Control Valves of the above systems

In addition to above few portion of MS lines, HRH lines and CRH lines may have to be replaced to correct deformation of lines such as sags, twists etc.. Pipe lines will be supplied by BHEL.

17.0 : PAINTING

Application of minimum two coats of primer and two coats of finish painting of all the exposed and old surface including boiler columns, structures etc. is to be done as per BHEL specifications. Thickness measurement of the paint will be done and in case of less thickness, additional coats will be applied to achieve the required thickness. All paints, primers etc. will be supplied by contractor within price quoted by contractor.

18.0 PG TEST & COMMISSIONING

Hydraulic testing and other pre commissioning tests, such as ATT, trial runs of Fans, APH & Mills, assistance for boiler preservation.

1. Assistance during Chemical cleaning, alkali boil out, acid cleaning and passivation, PG test as per the scope given in the tender.
2. Steam blowing and safety valve floating including erection and dismantling of all temporary piping, valves, pumps, tanks etc. required for above operations and other commissioning activities including post commissioning operations and stabilisation of the units,
3. Unit trial operation, resolving any deficiencies observed and handing over of 200 MW Boiler Units 12 of OBRA 'B' TPS.
4. Assistance during PG test

19.0 DISMANTLING & MISCALLANEOUS WORKS

- Refer Annexure - II

ANNEXURE-A

UNPRICED RATE SCHEDULE

A	DESCRIPTION OF WORK		TOTAL VALUE(in Rupees)	
1	Total Price (A) for the work as per Tender Specification **DISMANTLING OF SPECIFIED ITEMS UPTO BOILER OUTLET FLANGE, ROTARY PARTS, ERECTION/RE-ERECTION, OVERHAULING, TESTING, COMMISSIONING AND HANDING OVER OF BOILER OF** 200 **MW UNIT #** 13 **AT UPRVUNL OBRA 'B' TPS, OBRA (U.P.)**		**********	
B	**DESCRIPTION OF WORK**	**% Break Up**	**Rate/MT in Rupees (In figures and words)**	**TOTAL VALUE (AMOUNT) in Rupees (In figures and words)**
1	Rate in Rupees per MT for handling, erection, painting, testing, commissioning, trial operation and handing over of unit 13, 200 MW BOILER package including auxiliaries, insulation, electrical, controls and instrumentation, etc as per tender specifications approx. tonnage 3279.33 MT	**65%** of Total value at SL NO.-A1		
2	Rate in Rupees for Dismantling (3300MT)& Miscellaneous Works (breakup as **detailed in Annexure - II**	**35%** of Total value at SL NO.-A1		
	TOTAL PRICE IN RUPEES (CV)	**100%**		

Note:

- The quantities indicated against each item above are tentative and these are liable to vary depending upon the site requirement. The contractor has to handle / erect / commission all items indicated by BHEL Engineer for achieving unit wise milestone and completion of work. Total payment made to contractor shall be on the basis of actual quantity handled/ executed as per certification of BHEL
- Incomplete offer received may not be considered for the subject work.
- The Rate shall be entered in figures as well as in words. In case of difference in rates between words and figures THE LESSER OF THE TWO will be treated as valid rate. In case of omission in quoting any rate, the evaluation will be done considering the highest quoted rate obtained against that item but the work, if awarded, will be on the lowest quoted rate obtained against that item.
- The rates of different items for the entire scope shall be worked out & awarded as per Annexure "B".

ANNEXURE-B

Calculation ratio for different items based upon the total value as per rate schedule

A	SERVICE PORTION S. NO. 1 of Rate Schedule		
Sl. No	**DESCRIPTION OF WORK**	**Qty in MT**	**Rate per MT in Rupees (In figures and words)**
1	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Pressure parts etc** as per tender specifications **(Detail as per Annexure- IA)**	1184.248	CV X0.65 X 34.120 / 100000
2	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Structures & Non pressure parts etc** as per tender specifications **(Detail as per Annexure- IB)**	877.046	CVX0.65 X 22.747 / 100000
4	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Rotating Machines etc** as per tender specifications **(Detail as per Annexure- IC)**	707.613	CV X 0.65 X 28.434 / 100000
5.	**RATE in Rupees per MT** for complete scope of work as per tender specification for **insulation and sheeting**, etc. for Boiler, ESP, piping as per specifications. **(Detail as per Annexure- ID)**	446.432	CV X 0.65 X 36.395 / 100000
6.	**Rate in Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Critical Piping systems** (including valves, flanges etc) as per tender specifications (**Detail as per Annexure –IE)**	63.991	CV X 0.65 X 51.181 / 100000
	TOTAL	**3279.330**	

TECHNICAL CONDITIONS OF CONTRACT (TCC-PART-II)

TENDER NO. BHEL/ NR/OBRA/BOILER U-13/R&M/1076

FOR

DISMANTLING OF SPECIFIED ITEMS UPTO BOILER OUTLET FLANGE, ROTARY PARTS , ERECTION/RE-ERECTION, OVERHAULING, TESTING, COMMISSIONING AND HANDING OVER OF BOILERS OF 200MW UNIT # 13 AT UPRVUNL OBRA 'B' TPS, OBRA (U.P.)

PART- II OF TCC

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northren Region,
Plot No. 25 , Sector - 16A ,
Distt.GautamBudh Nagar, NOIDA – 201 301 (INDIA)

1.0 GENERAL

The work under these specifications broadly comprises of the following for unit 13 of 200 MW rating Boilers of UPRVUNL AT OBRA 'B' TPS DISTT. SONEBADRA (UP)

- Collection/Receipt, Transportation, Erection, testing and commissioning of boilers and its auxiliaries like rotating machines, flue gas ducting etc.

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

1) Dismantling of specified items, re erection after servicing / repairs and transportation of unused items to the specified areas.
2) Collection/Receipt and transportation of materials, and positioning on ground before erection.
3) Pre-assembly, if any, pre-erection checks as applicable.
4) Overhauling/Erection, alignment and welding, bolting, fastening, grouting as applicable of:
    a) Boiler supporting structures
    b) Boiler pressure parts
    c) Boiler trim & integral piping
    d) Non-pressure parts including hot air & cold air ducting, flue gas ducting, dampers, gate etc. with their drive.
    e) Rotating machines including milling system with drives.
    f) Pulverized fuel piping
    g) Other external structures
    h) Handling arrangements for rotating machines
5) Non-destructive examination & post weld heat treatment.
6) Application of Insulation.
7) Complete painting.
8) Pre-commissioning checks / tests, trial runs / testing and commissioning.

a. Trial operation and handing over of the units (including assistance in PG test).

SCOPE OF WORK IS FURTHER DETAILED IN VARIOUS CLAUSES HEREAFTER.

1.1 The intent of this specification is to provide services for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lump sum price shall deem to be inclusive of all such contingencies.

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

1.3 The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during execution. If any portion of work is

found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be affected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.

1.4 Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices.

1.4.1 Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated inspection, measuring and test equipments as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling.

1.4.2 Proper out-turn as per BHEL's plan and commitment

1.4.3 Completion of work as per BHEL Schedule.

1.4.4 Good quality and accurate workmanship for proper performances of equipment.

1.4.5 Repair and rectification

1.4.6 Preservation / Re-conservation of all components during storage / erection till handing over.

1.4.7 HOUSE KEEPING-The contractor is supposed to carryout house keeping of the work area on regular basis to keep the work place neat and tidy and available for the SAFE Working. The scrap, generated daily during the Execution activities, is to be dumped at designated area as decided by BHEL/ NTPC on daily basis. The erection materials issued to the contractor and kept near the work area should also be staged properly at site. Compliance report on above shall be submitted by the contractor to BHEL on Daily basis. In case the contractor fails to do so, BHEL have rights to carryout the same from the other party at the Risk and cost of the contractor. The cost applicable with BHEL overheads shall also be recovered from the monthly running bills of contractor.

2.0 CIVIL WORKS, FOUNDATION, GROUTING

2.1 BHEL/UPRUNL shall provide all equipment foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor.

2.2 While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with prussian blue to get the required contact with frames.

2.3 The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to aligned and fixed on the foundations using special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm. The material required for this has to be arranged for by the contractor at his cost.

2.4 **Complete grouting of structures equipments, including anchor / foundation bolts, beneath base, base hollows etc. as may be applicable, is included in the scope of contractor.** Arranging all labour, building materials including cement as applicable (ordinary Portland as well as Quick setting – free flow – non-shrink grout mix (e.g. shrink comp , conbextra etc)), form work, shuttering, and any other requirements is in the contractor's scope. Contractor shall obtain approval of BHEL for applicable cement (ordinary as well as quick setting – free flow – non-shrink grout mix) prior to procurement and use.

Cleaning of foundation surfaces, pocket hole sand anchor bolt pits and de-watering and making them free of oil, grease, sand another foreign materials by soda washing, water washing, compressed air and other approved methods, are within the scope of this specification / work.

The contractor shall arrange for sand, stone chips, gravels, anti shrink compound, plasticizer, shuttering, grout mixing machine, labors etc at his cost. The contractor shall prepare th e required test pieces/test cubes to ensure the strength of grout and get the same tested in laboratory at his cost. Test cube shall also be taken during grouting for testing in the laboratory and shall be tested at his cost. All necessary arrangement along with watering till complete curing has to be arranged by the vendor After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason.

If required, decoupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

2.5 The contractor shall check and verify the alignment of equipment. The Grouting of all the equipments will have to be carried out by the Contractor. The contractor has to arrange for all materials required for carrying out the grouting including supply of the Special Grout as indicated in the drawings and as approved by the Engineer.

2.6 The contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor

2.7 The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting check up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer.

2.8 Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation/ casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc / foundations required for chemical cleaning pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.

3.0 ERECTION

3.1 All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include,

- Scaffolding and rigging operations,
- Machine / flame / electric cutting, grinding, welding, radiography and stress relieving
- Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, leveling, blue matching, aligning and assembly.
- Machining, surface grinding, drilling, doweling, shaping
- Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.

Insulation and painting

3.2 Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.

3.3 No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.

3.4 The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion and removed from work site.

3.5 It shall be the responsibility of the contractor to provide ladders on columns for initial work till such time stairways are completed. For this, the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL. In case it is absolutely necessary then the contractor shall cut the temporary structure and rectify the column as directed by the engineer.

3.6 The contractor is strictly prohibited in using the Boiler / Auxiliary Components for any temporary supporting or scaffolding works etc. In case of such misuse a sum of determined by Engineer will be recovered from contractor's bills.

3.7 Boiler auxiliary columns are plate formed box section and the erection joint is welded type where as the columns are butt type with HSFG bolted flange and partition plates, boiler main column are having flange with splice plates and bolted connections. However, the contractor has to carry out work at site as per drawing.

3.8 Certain adjustment in length may be necessary while erecting pipelines / ducts / casings etc. The contractor should remove the extra lengths / add extra lengths to suit the

final layout after preparing edges afresh by adopting specified heat treatment procedures.

3.9 Economizer, super-heaters, re-heater coils, burner panels may have to be hydraulically tested individually, if required, before erection as instructed by BHEL Engineer within finally accepted rates.

3.10 Suspensions for ducting will be supplied in running lengths, which shall be cut to size and adjusted as required. Ducts / expansion bellows are dispatched to site in loose walls plates / pieces and these are to be assembled and welded at site along with stiffeners etc., before erection within the finally accepted rates. All joints connecting duct expansion piece and dampers shall be seal welded on inside as well as on outside.

3.11 Assistance in mechanical work associated with the power cylinders, valves, valve actuators etc., coming under various groups shall be provided by contractor within the finally accepted rates.

3.12 Hanger rods are shown in the pressure parts arrangement drawings for boiler. Any cutting / welding of these hangers rods will be done by the contractor. The hangers for pressure parts will be tested for even distribution of load with the help of a torque wrench.

3.13 The headers are provided with hand holes. The contractor, shall as per requirement, carry out removal and re-fixing of hand hole plates within finally accepted rates.

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

3.15 Skin casing sheet for covering the boiler roof panels, rear arch tube and other areas will be supplied by BHEL. Any cutting, addition and re-fabrication to suit the site conditions shall be carried out within the finally accepted rates.

3.16 The contractor shall carry out trial run of all motors including checking the direction of rotation in the uncoupled condition. Checking of alignment and re-coupling of the motor to the driven equipment as per instructions of BHEL engineer and to their satisfaction.

3.17 The contractor shall fabricate pipe, special bends etc., threading and welding as required for installing lube oil system and carry out the acid cleaning of the fabricated piping. The contractor shall also service the lube oil system, carrying out the hydraulic test of oil coolers etc.

3.18 Contractor shall carry out kerosene testing of all bearing housings of various rotating equipment like pumps, fans etc., as per BHEL engineer's instructions. Performance of hydro test of oil coolers of rotating machines and hydro test of SCAPH and other equipment as per BHEL engineer's instructions is included in the scope of work.

Forced lube oil system of motors or rotating equipment form parts of the work under this specification.

3.19 Certain rotating machinery after initial runs and commissioning of the equipment have to be hot aligned as per the instructions of BHEL engineer. Cleaning air pre-heater, fans, boiler ducting etc., free of extraneous steel, scaffolding materials electrodes, all foreign materials etc., before trial run of rotating machinery, and at various stages of pre-commissioning activities as per BHEL engineer's instruction, is within the scope of work.

3.20 Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with kerosene or some other reagent. If necessary, dismantling some of the parts of the equipment would be necessary. He shall arrange for re-greasing / lubricating them with recommended lubricants and for assembling back the dismantled parts, at quoted rate. Lubricants will, however, be supplied free of cost by BHEL.

3.21 After initial trial of rotating equipment, control and power cabling for motors and other equipment / instrumentation shall have to be disconnected for checking alignment and re-setting / re-alignment / hot alignment. Contractor shall have to arrange for disconnecting control and power cabling as per BHEL engineer's instructions and clearance and reconnect the control and power cabling after realignment. Quoted tonnage rate shall be inclusive of the above.

3.22 Packer plates supplied may have to be machined to the correct dimensions. It may also be necessary to blue match the same with each other/ with equipment / with foundations as per BHEL instructions.

3.23 Contractor shall arrange changing of preservative oil in the gearboxes, journal and other bearing assemblies of rotating equipment when in storage areas or after erection of equipment as the case may be as per the instructions of BHEL engineer. Necessary lubricants / oil will be supplied by BHEL and the same will be drawn by contractor from BHEL / customer's stores and transporting to site. No additional payment will be made for such works even though supply of lube oil might have been made under regular dispatch-able unit (DU) number against product group main assembly (PGMA) and appearing in the shipping list. Prior to the commissioning of the equipment, oil should be drained and collected in drums provided by BHEL and returned to BHEL / customer's stores.

3.24 The air-preheater rotor may be disturbed during the initial operation. This may change the original clearances. It requires rechecking and correction of seal clearances. Contractor shall carry out such checks and resetting of clearances as per the instructions of BHEL engineer. The resetting may have to be repeated till satisfactory results are obtained.

Checking of air gaps and adjustment of stator / rotor for magnetic center of HT motors shall be carried out as part of erection.

3.25 The fans, mills and other rotating machines shall be checked for clearances and other vital tolerances. The IGV unit shall be serviced. Necessary assistance for balancing

of equipment during trial run, if required, shall be provided by the contractor free of cost.

3.26 Complete penetration of water wall (Panel to Panel) welding shall be achieved either by one side or both sides welding.

3.27 Whenever required the contractor shall arrange for pre-qualification of process task performers.

3.28 All attachments welding including those for insulation works coming on pressure parts / non-pressure parts which the contractor has erected shall be done by IBR / BHEL tested welders only.

3.29 Ducts / expansion pieces are dispatched to site in loose walls / plates and these are to be assembled at site before erection

3.30 Non specified jobs at the interface / terminal points like bolting welding, gasket changing etc. have to be done by the contractor within the quoted price.

3.31 NA

3.32 NA

3.33 NA

3.34 NA

3.35 NA

3.36 NA

3.37 NA

3.38 NA

3.39 NA

3.40 NA

3.41 The terminal points decided by BHEL should be final and binding on the contractorfor deciding the scope of work and effecting payment for the work done.

3.42 Instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal / speed switches of motors etc. which are received in assembled condition as integral part of equipments ,shall be dismounted, calibrated and re-erected by Contractor as per requirement.

3.43 Actuators / drives of 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.

3.44 NA

3.45 All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.

3.46All the shafts of rotating equipment shall be properly aligned to those of the matching equipment within design tolerances All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.

3.47All the motors and equipment shall be suitably doweled after alignment of shafts with taper / parallel machined dowels as per the direction of the Engineer. Dowel pins required are be machined by the contractor at his own cost. However the materials for dowel pins shall be issued by BHEL free of cost.

3.48The HT motor bearings shall be blue matched at site and checked for bearing clearances. The contractor if required shall carry out scraping of bearing housing. No extra claim for blue matching up to 1mm initial gap will be entertained.

3.49The contractor at no extra cost to BHEL shall carry out servicing and realignment of skid mounted equipment.

3.50 Certain instruments like pressure gauges, pressure transmitters, temperature gauges, flow switches and indicators, etc., are received in assembled condition as integral part of equipment. Contractor shall be responsible for safe receipt, installation and custody of these instruments supplied mounted on skids / equipment. The calibration of skid / equipment mounted instruments shall be arranged by BHEL through other agency engaged for C&I. Contractor will be informed by BHEL engineer about the details of C&I agency. The contractor shall coordinate with the C&I agency for removal, calibration and re-installation of the instruments. Though C&I agency will remove and reinstall the instruments after calibration, the contractor for this package will maintain the list of all the instruments removed & reinstalled. Instruments prior to removal and after reinstallation shall be considered in custody of the contractor for this package. All instruments such as pressure gauges / temperature gauges, switches etc. forming part of product group (PG) are under the erection scope of this contract and shall be installed and commissioned by the contractor of this package at no extra cost to BHEL. However the calibration of these instruments shall be done by C&I agency as above

3.51 All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR valve, before they are energized. Bearings, slip rings commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.

3.52 The contractor shall completely erect and test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves and accessories in accordance with the drawings furnished. This includes all necessary bolting, welding, pre-heating, stress relieving, testing, cleaning and painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged, screwed or other type joints are specified or sown on the drawings. All piping shall be erected true to the lines and elevation as indicated in the drawings.

3.53 Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends upto 65-mm nominal bore will have to be fabricated at site. Only cold cutting methods are to be employed for cutting of pipes and tubes irrespective of the size and material . Gas Cutting , if any ,will be allowed only in CS LP piping

3.54 The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.

3.55 It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.

3.56 Wherever piping erected by the contractor is connected to equipment / piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor who is erecting the piping under this specifications.

3.57 Normally the high-pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes within the scope of the work.

3.58 All fittings like `T'-pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection after chemical cleaning and during commissioning.

3.59 The contractor shall be responsible for correct orientation of all valves so that seats, stems and hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.

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

3.61 The adjustment of all hangers & supports erected in both cold & hot conditions for maintaining the proper slopes towards the drain pots and application of cold pull in the piping wherever required is also included in the scope of the contractor.

3.62 No temporary supports should be welded on the pressure parts and piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases the contractor if required, shall carry out heat treatment.

3.63 Spring suspensions / constant load hangers have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any adjustments, removal of temporary arrests / locks etc., have to be carried out as and when required.

3.64 Contractor shall install piping in such a way that no excessive or destructive expansion forces exists in either the cold condition or under conditions of maximum temperature and pressure. All bends, expansion joints and any other special fittings necessary to take care of proper expansion shall be incorporated as per the advice of Engineer. During installation of expansion joints, anchors, care must be taken to see that full design movement is available at all times from maximum and minimum temperature.

3.65 The hanger assemblies shall not be used for attachment of rigging to hoist the pipes into position. Other means shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the pipe and building structure.

3.66 Layout of small-bore piping in boiler, oil systems etc. as required 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 pipelines even after completion of erection or from aesthetic point of view. Contractor at no extra cost should carry this out. As built drawing is to be submitted by the contractor after erection completion.

3.67 All the valves, including motorized valves, flap valves, dampers, actuators, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.

3.68 Erection and welding of necessary instrumentation tapping points, thermocouple pads, thermo-wells, valves, battery of first root valves, condensing vessels, flow nozzles and control valves to be provided on, auxiliaries and pipe lines are covered within the scope of this specification. This will be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The welding of all the above items will be contractor's responsibility even if the:

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

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

3.69 The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The methods used the tools and the equipment deployed shall be subject to the approval of Engineer. The competent technicians shall carry out the bolting work.

3.70 The contractor shall prepare as built piping drawing & submit to BHEL Engineer for approval & verification of material used..

3.71 Erection of power cylinders, motorised valves, valve actuators etc.coming under various groups is covered under the scope of this specification. However C&I calibration / commissioning for pneumatic valves & power cylinders shall be arranged by BHEL through C&I agency at no cost to the contractor for this package. The contractor will however be responsible for drawing the materials from the stores and handing over to the agency that is to commission these. Any damage / loss in their custody will be the contractors account. The alignment and any mechanical adjustments including link adjustment, opening & reconnection of links, replacement of valve / actuator or any mechanical part, air filter & regulator cleaning etc. required during calibration and operation, the same shall be carried by the contractor for this package. However, if re-calibration is required till handing over of the equipments the same shall be organised by the contractor for this package as detailed above with in the final accepted rates. The contractor will however be responsible for drawing the materials from the stores and handing over to the agency that is to commission these. Any damage / loss in their custody will be the contractors account.

3.72 The erection of all pneumatic power cylinders for the burner-tilt mechanism and SADC is covered within the scope of this specification. BHEL will get these power cylinders for the burner-tilt mechanism and SADC calibrated & commissioned. The contractor for this scope of work shall assist and co-ordinate for the same with the agency engaged by BHEL to calibrate such pneumatic actuators.

3.73 The Erection, testing and commissioning of all electrically operated valves, actuators and dampers is covered within the scope of this specification.

3.74 Welding of P91,T23, T91,T92 materials in Boiler is to be carried out as mentioned in clause nos. 4.39 of this tender.

3.75 Scope of Work for Chemical Cleaning for the Boiler system has been covered under clause no. 4.40of this tender.

4.0 WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NDT

4.1 The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

4.2 Welding of pressure parts, equipment, piping, high tensile structural steel shall be done by certified high pressure welders who posses valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high-pressure works.

4.3 All welders including tack welders, structural and high pressure welder shall be tested as per ASME section IX / IBR and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

4.4 Engineer may stop any welder from the work if his performance is unsatisfactory for any reason or if there is a high percentage of rejection in the joints welded by him. The welder having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.

4.5 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The Engineer, prior to any repair being made, shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the engineer.

4.6 The contractor shall carry out the root run welding of all HP / LP piping, valves by TIG welding method only. The contractor shall have to carry out full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.

4.7 All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of raw material required for making test pieces will be supplied by BHEL free of cost.

4.8 The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.

4.9 **Only BHEL/CUSTOMER approved electrodes and filler wire are to be arranged and used by the contractor, within the finally quoted price. BHEL/UPRVUNL reserve the right to test from the certified lab of approved electrode being used by the contractor. Testing charges for the same shall be borne by the contractor.** All electrodes shall be baked and dried in the electric

electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number/ batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved/ accredited test house traceable to National/ International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.

4.10 All butt / fillet welds shall be subject to dye penetration test as per the instructions of the engineer at no additional cost.

4.11 The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld. He has to maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final.

4.12 The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting should be done. Gas cutting will be allowed only wherever edge preparation otherwise is impractical. All slag / burrs shall be removed from the edge and all the hand cuts shall be ground smooth to the satisfaction of engineer.

4.13 All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his own cost.

4.14 Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.

4.15 Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, thermocouple attachment units, graphs, sheets insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. The contractor should take a note of the following,

- Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
- All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost.

The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of SR operations.

4.16 The contractor shall also be equipped for carrying out other NDT like LPI / MPI/UT / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. For UT machine shall be used of recordable type.

4.17 The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.

4.18 Contractor for radiography work shall use iridium-192. The geometric un-sharpness shall not exceed 1.5 mm. The contractor should take adequate safety precautions while carrying out radiography. Contractor at his cost shall arrange necessary safe guards required for radiography (including personnel from BARC).

4.19 Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between 1.5 to 2.0.

4.20 All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.

4.21 Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.

4.22 Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification.

4.23 The joint is to be marked with permanent mark A, B, C to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down streamside of the weld.

4.24 For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.

4.25 Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.

4.26 All arrangements for carrying out radiography work including dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.

4.27 The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.

4.28 Contractor shall note that 100% radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / IBR / Customer's requirements. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not

envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out

4.29 All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL / customer.

4.30 Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC / DRP certificate to be provided before taking up the work.

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

4.32 Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re- submitted for evaluation.

4.33 However, if the defect persists after first repair, further repair work followed with radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.

4.34 If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.

4.35 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.

4.36 The contractor shall assist BHEL Engineer in preparing complete field welding schedule for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. The contractor shall strictly adhere to such schedules.

4.37 The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.

4.38 Check shots as per the requirement of BHEL/UPRVUNL will be taken at your cost.

4.39 Erection Welding Practice for Materials P91

NA

4.40 Chemical Cleaning

Chemical Cleaning will carried by a separate agency appointed by BHEL. While the work of installation of tanks , Pumps , Piping and operation of the system is in the scope of that agency, the Contractor has to extend all assistance (including providing of welding power point) and complete interface requirements for the completion of the work.

5.0 APPLICATION OF INSULATION

5.1 All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length. Application of red oxide paint including supply of paint on welded portions as directed by BHEL is also included in scope of work.

5.2 The mineral wool mattresses (bonded / un-bonded) / LRB mattresses are received at site in standard sizes. These are to be dressed / cut to suit site requirements by the contractor.

5.3 The number of layers / thickness of mineral wool / LRB mattresses for auxiliaries, pipe lines, valves and other vessels shall be as per various drawings and as directed by Engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of rings/ hooks shall be fixed as directed and as per drawings and spec.

5.4 The contractor should ensure, proper finishing of surface of the insulation, sheeting and cementing.

5.5 The contractor should ensure that the finished surface of the insulation works conforms to the dimensions and tolerances given in the drawings. Aesthetic finish and accuracy of work are most important.

5.6 It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions. Closed / semi closed sheds or any other arrangements required for this will by him at his cost. If any damage occurs to the material due to improper storage or due to any causes attributable to the contractor except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor.

5.7 Aluminum sheet cladding will be fabricated to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets, crowning the sheets if necessary will be carried out by him. Two coats of anti-corrosive black bituminous paint are to be applied on inner surfaces of the cladding. Bitumen sealing compound on the joints if necessary is included in the scope of this work. **Contractor may note that he will also supply anti-corrosive black bituminous paint & bituminous sealing compound required for above works at his cost.**

5.8 Aluminum sheet metal cladding over insulation will consists of plain / ribbed / corrugated sheets. The sheets will be supplied in standard sizes. Cutting them to required size, grooving, fabricating bends, boxes etc., for proper covering is contractors responsibility. Any cutting / bending / welding of fabricated skin casing sheets if required will also covered within the scope of this contract.

5.9 A logbook shall be maintained by the contractor to obtain clearance for application of insulation. If the contractor does the work on his own accord without prior permission the area may have to be redone at his cost.

5.10 Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Wastage allowance for the material issued are as below:

1. Wool / LRB mattresses and cladding sheets 2%

2. Insulation bricks and mortar 2%
3. Castable refractory 1%

5.11 The entire surplus, unused materials etc., supplied by BHEL shall be returned to BHEL after the work is over. Materials like gunny bags and packing materials, empty containers may be returned at periodical intervals.

5.12 The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.

5.13 If during erection and commissioning any of the parts are to be insulated temporarily fixed and then replaced by permanent ones at a later date or if any of the parts are to be removed for modification, rectification, adjustment and then refitted or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the erection rate quoted shall be inclusive of such contingencies.

5.14 Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL Engineer.

5.15 All temporary pipelines required during testing, pre-commissioning and commissioning should be insulated as directed by BHEL at no extra cost to BHEL. However required insulation material shall be issued by BHEL free of cost.

6.0 PAINTING INCLUDING FINISH PAINTING

6.1 All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant paint. However, due to aging, the same may have got deteriorated for peeled off. The surfaces are to bethoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.

6.2 After applying the primer paints all structure / equipment / items, shall be finish painted with two coats of alloyed resin machinery enamel paints as specified by BHEL engineer. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish is achieved. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.

6.3 Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.

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

6.5 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.

6.6 The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.

6.7 The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.

6.8 The contractor shall ensure availability of

- Ford Cup-4 to measure consistency of paint,
- Automatic magnetic gauge to measure the dry film thickness and
- SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.

6.9 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.

7.0 TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING

7.1 The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for their successful and reliable operation. These would include hydraulic test of boiler, air tightness test, clean air flow test, chemical cleaning of piping and boiler, water washing, oil flushing of oil system etc. as instructed by BHEL using contractors own consumables, labour and scaffoldings etc. Air leak test on pressure parts preliminary to hydraulic test by compressed air shall also be carried out to check and rectify the various leakage and defects etc.

7.2 All the chemicals required for carrying out these activities will be supplied by BHEL free of cost.

7.3 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications.

7.4 Specialized test equipment, if any, shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to him.

7.5 NA

7.6 After completion of erection of furnace, ducts and air heaters, a test shall be performed on the steam generator by the contractor to establish the tightness of the erected equipment from the outlet of FD fan through the steam generator up to stack.

7.7 All the tests may have to be repeated till all the equipment satisfy the requirement /obligation of BHEL at various stages. The contractor shall do all the repairs for site welded joints arising out of the failure during testing.

7.8 The scope of pre-commissioning activities cover installation of all necessary equipment including temporary piping, supports, valves, blanking, pumps, tanks, with access platforms valves, along with accessories required for hydro test, applicable steam blowing or for any other tests. The scope also covers the offsite disposal of effluents of the tests under the scope of this contract as per instruction of BHEL Engineer.

7.9 **All items / material required for conducting hydraulic test, Chemical Cleaning (alkaliboil out, acid cleaning of Boiler – as applicable) , steam blowing of erected Piping etc. will be supplied by BHEL. However, servicing, dismantling and returning of the same to stores is the responsibility of the contractor who is erecting the equipment / piping. The contractor may note that no separate payment shall be released for any temporary works that are to be carried out for conducting pre-commissioning and commissioning testseven though supply of material might have been made under regular dispatch-able unit (DU) number against product group main assembly (PGMA) and appearing in the shipping list. Bidders are advised to include expenses on temporary works along with the rates being quoted by them.**

Broadly the work on temporary systems will be divided as under:

Boiler: Erection etc. of all temporary piping along with insulation and supports for steam blowing of the installed piping and effluent disposal are to be carried out as part of Boiler work. The Contractor will be responsible for their operation and any servicing required till completion of commissioning activities.

For Chemical Cleaning : Installation and operation of all equipments, temporary piping, tanks and electrical switchgear along with their accessories shall be carried outby another agency of BHEL. While agency appointed by BHEL will be responsible for the Equipments of Chemical Cleaning Operation, the Boiler Contractor shall make ready main boiler equipments required for chemical cleaning process and they will closely associate themselves with the BHEL's agency during the process for carrying out the other operations required on the Boiler for completing the Process. The Boiler Contractor will carry out the connection / installation and normalizing of terminal connection of the Main Equipment. Erection etc. of blowers and blanks and putty required for conducting air tightness test shall be carried out as part of Boiler work (Putty to be procured by the contractor without any extra cost to BHEL).

The above is only a broad breakup of the temporary works. The engineer at site will make final break up. His decision will be final and binding on the contractor. Dismantling of the temporary equipment and piping will be done by the contractor. Contractor will also responsible to return these materials to the stores.

7.10 Commissioning of the boiler will involve trial run of all the equipment erected. The boiler has to be lighted up for refractory drying, alkali boil out, acid cleaning, passivation, preservation, steam blowing and floating of safety valves. Flushing of all the lines by air, oil or steam as the case may be, trial run of the boiler, servicing of valves and any other works incidental to commissioning are to be carried out. During this period though the BHEL's customer's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision, men, consumables, T&P and IMTE's **till such time the commissioned units are taken over by the BHEL's customer.**

7.11 It shall be the responsibility of the contractor to preserve the boiler as per BHEL's requirement. Required chemicals, DM Water and other required items etc required for this purpose will be supplied by BHEL.

7.12 It shall be the responsibility of the contractor to provide various category of workers insufficient numbers along with Supervisors during Pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&P's, IMTE's etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.

7.13 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the

contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.

7.14 In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning, commissioning and trial operation (till unit is taken over by BHEL customer), the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.

7.15 During commissioning, opening / closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price / rates shall also include all such work.

7.16 The contractor shall make all necessary arrangements including making of temporary closures on piping / equipment for carrying out the hydro-static testing on all piping, equipment covered in the specification at no extra cost.

7.17 The valves will have to be checked, cleaned or overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as may be necessary.

7.18 In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the contractor at his cost shall do the same as per Engineer’s instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.

7.19 All temporary supports shall be removed in such ways that pipe supports are not subjected to any sudden load. During hydraulic testing of pipes, all piping having variable spring type supports shall be held securely in place by temporary means while constant spring type support hangers shall be pinned or blocked solid during the test.

7.20 The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left unserviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats. Cleaning and servicing of all the filters / strainers, toppings of oils coming in the system shall be done by the contractor within the accepted price.

7.21 At the time of each inspection, the contractor shall take note of the decisions / changes proposed by the Engineer and incorporate the same at no additional cost. The contractor shall carry out any other test as desired by BHEL Engineer/ Manufacturer on erected equipment covered under scope of this contract during testing and

commissioning to demonstrate the physical completion of any part or parts of the work performed by the contractor

7.22 The scope of pre-commissioning, commissioning and post commissioning activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, chemical cleaning (Except for Feed, CEP outlet, Drip lines), steam blowing or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents

7.23 NA.

7.24 All arrangement required for steam blowing including removal, reinstallation and welding of CRH NRV and installation of steam blowing arrangements including steam blow off piping is included in the scope of work.

7.25 It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.

7.26 The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydro-static testing on all piping equipment covered in the specification at no additional cost. The contractor shall carryout the required test on the pipelines such as Hydraulic Test (as per IBR requirement/ instruction of BHEL), of various piping systems, Ultrasonic Test for weld defects and finding thickness, Dye penetrant test, Magnetic particles test for Weld defects and materials defects etc. All facilities (manpower, materials, equipment, consumables etc.) including proper approaches wherever required shall be provided by the contractor for satisfactory conduction of above tests. Special equipment such as magnetic particle tester, Metelascope for analysis of weld material of T/P-91 pipings, ultrasonic test kit and engineers required for these tests shall be arranged by the contractor along with Qualified technician within finally accepted rates. All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests/ activities may not have been listed in these specifications.

7.27 All the above tests should be repeated till all the erected piping satisfy the requirement/obligation of BHEL and Boiler Inspectorate, if required at various stages. All the repair for site welded joints arising out of the failures during testing shall be done by the contractor as part of the work within finally accepted rates.

7.28 Contractor shall layout all necessary temporary piping, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, oil flushing, steam blow off or for any other tests as the case may be and will be carried out above activities under the scope of work as per instructions of BHEL. After the test is over, all the temporary piping, etc., will be removed and returned to BHEL store. All these form part of the scope of work. No separate payment shall be made towards erection and dismantling of these temporary works. Chemical cleaning of feed lines, CEP outletlines,

and Drip lines will be carried out by a separate agency. Cleaning of all other lines is in scope of this contract. However the contractor executing this work has to render all assistance to the separate agency including removal of valves , putting loops and restoring back after cleaning .

7.29 All items required for conducting hydraulic test, oil flushing, steam blowing etc., will be supplied by BHEL. However, servicing, erection and dismantling and returning of the same to BHEL Store is the responsibility of the contractor

7.30 The valves will have to be checked, cleaned or overhauled in full or in part before erection, alkali flushing, steam blowing and during commissioning as may be necessary.

7.31 Suitable welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable deaeration/ ventilation draining points with valves as per BHEL Engineer's instruction, for performing hydro test of piping and other equipments, is within the scope of this specification. Gaskets, valves, fasteners, blank flanges, blanks or steel for blank flanges will be provided free of cost by BHEL. Contractor shall cut out steel blanks from steel provided. After completion of Hydraulic Test, welded blanks shall be cut andremoved and weld burrs ground finished and cavities/ scars of cutting weld filled ~, dground as per BHEL Engineer's instruction at no extra cost. NDT & SR if required may have to be carried out.

7.32 Hydro test of piping has to be repeated several times in consonance with technical/statutory requirements during stage of erection pre commissioning/ commissioning. Hydro test will have to be done to the satisfaction of Boiler Inspector/ Customer/ BHEL Engineer after attending repairs, Hydro test shall be repeated before Boiler Inspector/customer/ BHEL engineer to their satisfaction.

7.33 Soon after conducting: the hydro test of the piping, the same shall be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out all the incidental jobs like filling up of water, dozing of chemicals and pressuring the system to the required pressure and keep a constant watch on the preservation work as per the instruction of BHEL Engineer. The preservation shall be resorted to whenever the boiler is not under trial operation till the completion of commissioning activities.

7.34 While conducting hydraulic test of steam lines, water lines, either individually or grouping a few lines or in portions, blanks/ spools may have to be put up at terminal points, strainers, valves, flanges etc. After conducting the tests, the blanks shall be removed and the lines restored. Also interconnecting piping between boiler and turbine, the hydraulic test may have to be done section wise and sometimes piping of other agencies may have to be combined. Contractor shall carry out all such incidental work.to satisfactorily conduct the Hyd. Test. Wherever work is involved in the terminal points, contractor shall carryout the same as per instruction of BHEL Engineer. The decision of BHEL Engineer is final and the same is binding on the contractor.

7.35 The contractor shall carry out any other tests as desired by BHEL engineers on erected equipment covered in the scope of this contract during testing and commissioning to demonstrate the satisfactory completion of any part or whole of work performed by the contractor. During Hydraulic Test, the pipes being tested shall be isolated from the equipments to which they are connected. In certain places blanking has to be resorted prior to Hydraulic test and spool piece shave to be erected in place of control valves, orifices and other fittings and these spool pieces have to be subsequently replaced with the regular valves/ fittings by the contractor at no extra cost.

7.36 During this period though the BHEL's/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision, consumables, labour, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer.

7.37 It is possible that due to any reason the final supporting may not be completed before conducting Hydraulic Test. The contractor may have to strengthen or install any additional supports as per instruction of BHEL. This work is a part of the work and no additional payment shall be made on this account

7.38 NA

7.39 NA.

7.40 All the shafts of the equipment shall have to be properly aligned to that of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid over-heating of bearings or other conditions, which may tend to shorten the life of the equipment. All bearings, shafts and other rotating parts shall be thoroughly cleaned and lubricated as per recommendations of BHEL engineer.

7.41 During commissioning changing of gaskets , tightening of bolts, realigning of rotating and other equipment, attending to leakage and minor adjustments of erected equipment may arise. The quoted rate of contractor shall be inclusive of all such works.

7.42 Lubricating oil units of the rotating machines are to be cleaned thoroughly before pouring of final lubricating oil. Topping up of lubricants during running of the set till handing over to be done by the vendor. Required lubricants both for first filling and topping up are to be supplied by BHEL free of cost. The empty containers of the lubricating oils should be returned to BHEL stores/place indicated by BHEL from time to time.

7.43 The instruction of the motor manufacturer regarding storage of the motors and re-conservation must be strictly followed without any deviation.

7.44 All the shaft equipment shall have to be properly aligned to those of matching equipment to perfection , accuracy as required and the equipment shall be free from

excessive vibrations so as to avoid over heating of bearings or other conditions , which may tend to shorten the life of the equipment . All bearings, shafts and other rotating parts shall be thoroughly cleaned and lubricate das per the recommendations of BHEL Engineer before starting.

7.45 All the bearings, gear boxes etc of the equipment and electrical motors to be erected are provided with protective grease only. Contractor shall arrange for cleaning the bearings , gears etc. with kerosene or some agent , as and when required by BHEL Engineer, by dismantling some of the parts of the equipment during erection and shall arrange for re - greasing / lubricating them with recommended lubricants ,which will be supplied by BHEL free of cost.

7.46 Lubricating oil units of the rotating machines are to be cleaned thoroughly before pouring of final lubricating oil.

7.48 Contractor has to rectify all post commissioning defects in Boiler & Auxiliaries such as

- boiler tube leakages, leakages in critical piping, tracing lines etc.
- gas leakages, air leakages
- oil leakages in oil station and associated piping
- misalignment, malfunctioning and other defects in operation of rotary parts such as APH, fans, mills, RC feeders, soot blowers, actuators etc.,
- Malfunctioning of valves, gates, dampers etc.
- improper load adjustment of hanger supports of critical piping,
- defects in hanger supports of drains and vent lines and other piping
- coal leakages from coal piping, mills, RC feeders
- Improper coal fineness
- Improper functioning of lub oil pumps of boiler rotary parts

till unit is being taken over by BHEL's customer or for a period of 01 year from date of 1st unit synchronization.

CONSUMABLES

8.1 All required consumables and other items shall be arranged by contractor as per SCC Clause 4.1.

8.2 All required TIG filler wire and welding electrodes are to be arranged by contractor within Quoted price.

8.3 In addition to above Fasteners required as Annexure – II of PART I of TCC are also to be arranged by contractor within finally accepted price. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

TOOLS AND PLANTS / IMTE's

9.1 T&P / IMTE's being provided by BHELto sub-contractor free of hire charges shall be shared by other subcontractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.

9.2 Besides the T&P and IMTEs being made available to contractor free of hire charges by BHEL, all other T&Ps and IMTEs which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor. He should ensure that these are in good working condition. In the event of the failure of contractor to bring necessary and sufficient T&Ps and IMTEs, BHEL will be at liberty to arrange the same and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.

9.3 All distribution boards, connecting cables, wire ropes, hoses, pipes etc, including temporary air / water / electrical connections etc shall have to be arranged by the contractor at his own cost.

9.4 In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL.

9.5 The operation of all BHEL's T&P being provided free of hire charges shall be in the scope of the contractor. The contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation. (Operators, fuel and other consumable for BHEL/UPRVUNL's 55/135/300 MT & Hydra/Mobile cranes along with helpers shall be provided by contractor within the final accepted rates). All lubricants for these cranes such as mobil oil, gear oil, brake oil, hydraulic oil, torque converter oil and grease will have to be arranged by contractor free of cost. The contractor will arrange the same well in advance. For other cranes of lower capacity the contractor shall arrange, at his own cost, trained operators, fuel and other consumables for their operation.

9.6 The contractor shall engage trained and experienced operators for the operation of BHEL's T&Ps. Their skill / performance will be checked by BHEL Engineer before they are allowed to operate the same. However checking of skills by BHEL does not absolve the contractor of his responsibilities for proper and safe handling of equipment, consistent good performance of operators and regular performance evaluation of operators.

9.7 Contractor shall also arrange for load test of cranes on yearly basis or as per assessment of BHEL site engineer and provide test certificate to BHEL site. Maintenance of BHEL's T&Ps shall be carried out by contractor as per manufacturer's / BHEL's maintenance schedule at his cost. These shall be maintained in good working condition during the entire period of use. T&Ps in defective / damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps. These shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor BHEL at its own discretion get the servicing / repair of equipment done at the risk and cost of the contractor with BHEL overheads.

The contractor at his own cost shall arrange all supervision and labour required for maintenance of cranes. For attending breakdowns, the contractor shall arrange for labour. Minimum one mechanic and two helpers shall be exclusively marked for the

above work. Specialist's supervision, if required, for attending breakdowns shall also be arranged by contractor

a. The contractor shall arrange at his cost all spares needed for upkeep of all T&Ps including Cranes and Hydraulic Test Pumps supplied by BHEL. However, the cost of only major damaged / worn out parts of BHEL cranes will be borne by BHEL, provided the damage is not due to the negligence of the contractor. Contractor will have to arrange crane mechanics, service engineers at their cost for attending any type of defects in BHEL Cranes. However, if there are breakdowns / damages due to negligence of the contractor, the complete service / repair charges and cost of all the spares damaged with BHEL overheads shall be recovered from contractor's RA bills.

9.8 Increasing / shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his cost. All necessary manpower, tools, support, consumables, illumination etc. will have to be arranged by contractor at his cost. If required, contractor has to return the crane with original boom.

9.9 The area and infrastructure development of the area to be carried out by the customer. However in construction projects of this magnitude it is possible that all the areas / approaches may not be ready. In such cases consolidation of ground and arrangement of sleepers / sand bag filling etc for safe operation / movement of equipment including cranes / trailers, cutting/dismantling of all pipe lines required for crane movement, dismantling of any other plant equipments required for crane movement/shifting, dismantling of any type of civil structures as per requirement, cutting of structures, dismantling of columns/pillars etc shall be the responsibility of the contractor at his cost. Dismantled pipelines, structures, columns, pillars, plant equipments, civil structures etc. are to be restored as per site requirement. No compensation on this account shall be payable.

9.10 In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.

9.11 The contractor has to maintain a logbook and shall furnish regular maintenance and utilization report of the BHEL T & P's under his possession, as per requirement of BHEL.

9.12 Any loss / damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.

9.13 It shall be responsibility of the contractor to take delivery of T&Ps from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.

9.14 The contractor shall return BHEL T&Ps and IMTEs issued to him in good working condition as and when desired by BHEL (on completion or reduction of workload). If contractor delays return of T&P and IMTE, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return.

T&Ps and IMTEs returned in damaged / unserviceable condition shall be got repaired by BHEL at its own discretion and entire cost of repair with BHEL overheads shall be recovered from the contractor.

9.15 Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T&Ps and IMTEs shall be recovered from the contractor's running / final bills

9.16 All tools and tackles, machinery, equipment, instruments required for the work have to be arranged by the contractor including its transportation before and after work and including storage, insurance etc.

9.17 The contractor shall provide all required tools and plants, inspection, measuring and test equipment and handling & transportation equipment for the scope of work covered under these specifications. Some of the major T & Ps to be necessarily provided by the contractor is listed in chapter- X. BHEL will provide the services of their T & Ps listed vide appendix-IX, free of charge, on sharing basis.

9.18 All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification.

9.19 Contractor shall provide all the necessary scaffolding materials, temporary structures, as may be required and necessary safety devices etc.

9.20 Contractor's responsibilities with regard to operator, fuel, lubricants and daily upkeep of T & P s provided by BHEL is further detailed in relevant section.

9.21 Timely deployment of adequate quantity of T & P is the responsibility of the contractor. The contractor shall be prepared to augment the T & P at short notice to match the planned program and to achieve the milestones.

9.22 Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.

9.23 The T & P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no damage / breakage occurs to foundations, other equipments, material, property and men. All arrangements for the movement of the T & P etc., shall be the contractor's responsibility.

The contractor shall arrange adequate nos. of wooden sleepers for compaction of approach for crane movement and material stacking near work site failing which BHEL may get the same done at their risk & cost.

9.24 The contractor at his cost shall carry out periodical testing of his construction equipments and calibration of measuring instruments (MMDs) and tests. Test/ calibration certificates shall be furnished to BHEL. MMDs shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL.

9.25 Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Fitness certificate of T&P shall have to be submitted before it is put in use. Identification for such T&Ps will be done as per BHEL Engineer's advice.

9.26 Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection measuring and testing equipment). The IMTEs shall have test / calibration certificates from authorized / Government approved / accredited agencies traceable to National / International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for

calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

9.27 Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. If any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy IMTEs and retake the readings at contractor's cost.

9.28 BHEL shall have lien on all T&P, IMTEs and other equipment of the contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract / extended period. The contractor and / or his sub-contractors, without the prior written approval of the Engineer, shall remove no material brought to the site.

9.29 The month wise T&P deployment plan to be submitted as per format (at Annexure-D to general conditions of contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required T&P, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.

9.30 One SKY CLIMBER/MAINTENANCE PLATFORM for boiler will be provided to the erection agency. The total erection including dismantling, commissioning, maintenance, statutory clearances shall be in the scope of erection agency at no extra cost to BHEL. All day to day and routine maintenance and checking of the lift is to be carried out by the contractor as per the recommendations of the supplier. He should periodically check to ensure the safety for all those using the hoist.

The hoist should never be overloaded as this can lead to serious accidents. Ensuring all safety aspects in operation of lift shall be responsibility of contractor. All the landing platforms are to be erected by him. They are to be provided with proper barricades and hand railings. No separate payment for the temporary jobs will be made. The contractor will have to dismantle such temporary works and return the material to the stores.