

TENDER SPECIFICATION

NO: BHE/PW/PUR/SKT-BAL BLR U#3/1235

Collection of materials from BHEL/ client's stores/ storage yard, site and other locations; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines final painting etc of UNIT-3 of 250 MW at 2x250 MW Gujarat State Electricity Corporation Limited

At

GSECL Sikka TPS,

Distt. Jamnagar
(Gujarat).

VOLUME – I-Technical Bid

CONSISTING OF:

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



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

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Tender Specification Issue Details

TENDER NO: BHE/PW/PUR/SKT-BAL BLR U#3/1235

Collection of materials from BHEL/ client's stores/ storage yard, site and other locations; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines final painting etc of UNIT-3 of 250 MW at 2x250 MW Gujarat State Electricity Corporation Limited
At

GSECL Sikka TPS,

Distt. Jamnagar
(Gujarat).

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR Refer Notice Inviting Tender
TENDER SUBMISSION .

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

M/s.

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PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date :

1235

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



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Notice Inviting Tender**

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Ref: BHE/PW/PUR/SKT-BAL BLR U#3/1235
18/02/2014

Date:

NOTICE INVITING TENDER (NIT)
**NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES
OR
PURCHASE TENDERS FROM THIS OFFICE ALSO**

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION
i	TENDER NUMBER	BHE/PW/PUR/SKT-BAL BLR U#3/1235
ii	Broad Scope of job	Collection of materials from BHEL/ client's stores/ storage yard, site and other locations; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines final painting etc of UNIT-3 of 250 MW at 2x250 MW Gujarat State Electricity Corporation Limited At GSECL Sikka TPS, Distt. Jamnagar (Gujarat).
iii	DETAILS OF TENDER DOCUMENT	
a	Volume-IA	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i> Applicable
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i> Applicable
c	Volume-IC	<i>General Conditions of Contract (GCC)</i> Applicable
d	Volume-ID	<i>Forms and Procedures</i>
e	Volume-II	<i>Price Schedule (Absolute value).</i> Applicable
iv	Issue of Tender Documents	1. <u>Sale from BHEL PS Regional office at :</u> <u>Start : 21/02/2014 ,</u> <u>Closes: 01/03/2014 , Time : 16.00 Hrs</u> 2. From BHEL website (www.bhel.com) Applicable/ Not applicable

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Technical Conditions of Contract –Volume I A (Part I : Contract Specific Details)

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		Tender documents will be available for downloading from website till due date of submission	
v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 03/03/2014, Time 15.00 Hrs Place : BHEL PS Regional office at :Nagpur Tenders being submitted through representative shall be submitted at dispatch section of of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: <ul style="list-style-type: none"> • Pratih Gee Varghese/Sr Engineer(Purchase) • Shivkesh Meena / Engineer (Purchase) 	Applicable
vi	OPENING OF TENDER	1 hours after the latest due date and time of Offer submission Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender	Applicable
vii	EMD AMOUNT	Rs 2,00,000/- (Rupees Two Lakhs Only)	Applicable
viii	COST OF TENDER	Rs 2000/-.	Applicable
ix	LAST DATE FOR SEEKING CLARIFICATION	Five days before the due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)	Date :	Not applicable.
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	Being appointed; will be advised separately	Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) and not in the newspapers . Bidders to keep themselves updated with all such information	

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

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- 3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at Nagpur, Sundays and second/ last Saturdays
- 4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.
- 5.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:
- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
 - PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
 - One set of tender documents shall be retained by the bidder for their reference
- 6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped)**

Sl no	Description	Remarks
	Part-I A	
	ENVELOPE – I superscribed as : PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: CONTAINING THE FOLLOWING:-	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. Note: <ol style="list-style-type: none"> a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. <ol style="list-style-type: none"> i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender 	
iii.	Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph	

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

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

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

	OUTER COVER	
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	<p>ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:</p>	
i	<ul style="list-style-type: none"> o Envelopes I o Envelopes II o Envelopes III 	

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

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

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

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

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

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

i).
$$\frac{\text{Total number of Packages}}{\text{Total number of Packages in hand}} = P$$

Where

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

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

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month for reckoning 'Period of Assessment' shall be the month two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

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

- i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':
This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:
- a) $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ etc be the packages (**under execution/** executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = P_T (ie $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
 - 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 ' T_T ' for total similar Packages ' P_T ' for all Regions (i.e $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
 - c) Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}, \dots, S_{1-N}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (i.e $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-N}$). Similarly S_2 for package P_2 for period T_2 , S_3 for package P_3 for period T_3 , etc for the tendered scope for all Regions. Now calculate cumulative sum ' S_T ' of 'Monthly Performance Evaluation' Scores for total similar Packages ' P_T ' for all Regions (i.e ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$ ')
 - 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):

Aggregate of Performance scores for all similar packages in all the Regions

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

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

- e) **Bidders to note that the risk of non evaluation or non availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder**
- f) **Table showing methodology for calculating 'a', 'b' and 'c' above**

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SI no	Item Description	Details for all Regions							Total
		(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No of similar packages for all Regions = P_T ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T ₁	T ₂	T ₃	T ₄	T ₅	...	T _N	Sum (Σ) of columns (iii) to (ix) = T_T
3	Monthly performance scores for the corresponding period (as in Row 2)	S _{1-1,} S _{1-2,} S _{1-3,} S _{1-4,} ... S _{1-T1}	S _{2-1,} S _{2-2,} S _{2-3,} S _{2-4,} ... S _{2-T2}	S _{3-1,} S _{3-2,} S _{3-3,} S _{3-4,} ... S _{3-T3}	S _{4-1,} S _{4-2,} S _{4-3,} S _{4-4,} ... S _{4-T4}	S _{5-1,} S _{5-2,} S _{5-3,} S _{5-4,} ... S _{5-T5}	S _{N-1,} S _{N-2,} S _{N-3,} S _{N-4,} ... S _{N-TN}	-----
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅	...	S _N	Sum (Σ) of columns (iii) to (ix) = S_T

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

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

- 'Period of Assessment.
- 12 months preceding the cut-off month
- 24 months preceding the cut-off month
- 36 months preceding the cut-off month

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

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

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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 9.I)

IV. Explanatory note:

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

Table-1

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

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Technical Conditions of Contract –Volume I A (Part I : Contract Specific Details)

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	vii). Others (Civil)		vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Handling x). Material Management xi). Material Handling & Material Management xii). Others (Mechanical)
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- c) Bidders who have not been evaluated for at least six package months in the last 36 months in the online BHEL system for contractor performance evaluation in BHEL PS Regions, wef July'2010 shall be considered "NEW VENDOR".

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

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

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

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

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

- d) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders' or due to non-approval by Customer, then BHEL at its discretion reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating 'R_{BHEL}'** only, starting from the upper band.
- e) 'Under execution' shall mean works in progress as per the following:
- i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries
 - ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)
 - iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.

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

- f) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work
- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**
- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

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- 19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .
- However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDS' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:
- 23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.
- 23.2 'Stand alone' bidder cannot become a '**Prime Bidder**' or a '**Consortium bidder**' or '**Technical Tie up bidder in a consortium (or Technical Tie up) bidding**'. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.
- 23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR
- 23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work
- 23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder" as specified in clause 9.0
- 23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'
- 23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified
- 23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.
- 23.9 Prime Bidder shall be responsible for the overall execution of the contract

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- 23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats
- 23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.
- 23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.
- 23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.
- 23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.
- 23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also
- 24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.
- 25.0 The bidder may have to produce original document for verification if so decided by BHEL.
- 26.0 Order of Precedence
In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:
- a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
 - b. Notice Inviting Tender (NIT)
 - c. Price Bid
 - d. Technical Conditions of Contract (TCC)—Volume-1A
 - e. Special Conditions of Contract (SCC) —Volume-1B
 - f. General Conditions of Contract (GCC) —Volume-1C
 - g. Forms and Procedures —Volume-1D

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

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

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Annexure-1: Pre Qualifying criteria.

02. Annexure-2: Check List.

03. Annexure-3: Integrity Pact

03. Annexure-4: Important Information.

03 Other Tender documents as per this NIT.

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ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	Collection of materials from BHEL/ client's stores/ storage yard, site and other locations; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, Rotating Machines final painting etc of UNIT-3 of 250 MW at 2x250 MW Gujarat State Electricity Corporation Limited At GSECL Sikka TPS, Distt. Jamnagar (Gujarat).
TENDER NO	BHE/PW/PUR/SKT-BAL BLR U#3/1235

SL NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	
		Name and Description of qualifying criteria	Page no of supporting document. Bidder must fill up this column as per applicability
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	Not APPLICABLE	
B	<u>Technical</u> B.1 Erection Testing & Commissioning (E T & C) of Atleast One Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of rating 300 TPH or above. OR B.2 E T & C of ESP and Power Cycle Piping of One Unit of Rating 190 MW or above OR B.3 E T and C of ESP or Power Cycle Piping of a Unit of rating 190 MW or above subject to: Entering into a Technical Tie Up with another agency who has experience of Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) & Power Cycle Piping OR Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) & ESP respectively, of a unit of rating 190 MW or above OR	APPLICABLE	

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	<p>B.4 E T & C of Atleast One STG of 400 MW or higher, under direct order of BHEL subject to:-</p> <p>a) Experience of E T & C of Boiler (Consisting of Pressure Parts, Structures/ESP and IBR/Power Cycle Piping, of the same Unit as a Stand alone bidder) of atleast 200 TPH OR</p> <p>b) Entering into a Technical Tie Up with an agency who has experience of E T & C of Boiler Structures and Pressure Parts or IBR/Power Cycle Piping of 190 MW or above with his own T&Ps and consumables</p>		
C-1	<p><u>Financial TURNOVER</u> Bidders must have achieved an average annual financial turnover (Audited) of Rs 375 Lakhs or more over last three Financial Years (FY) i.e. 2010-2011, 2011-12 & 2012-13</p>	APPLICABLE	
C-2	<p><u>NETWORTH</u> (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive</p>	APPLICABLE	
C-3	<p><u>PROFIT</u> Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1' above based on latest Audited Accounts.</p>	APPLICABLE	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	APPLICABLE	By BHEL
E	<p>Approval of Customer (if applicable)</p> <p>Note: Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.</p>	APPLICABLE	BY BHEL
F	<p>Price Bid Opening</p> <p>Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E</p>		BY BHEL
F	Technical Tie up criteria (if applicable)	APPLICABLE FOR B.3 & B.4	
<p><u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u></p> <ol style="list-style-type: none"> Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies) 			

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<p>4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above</p> <p>5. 'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified:-</p> <p>1. Bidder should have executed similar work of any one of the following:</p> <p>a. One (1) work of value not less than Rs XXX OR</p> <p>b. Two (2) works of not less than Rs YYY OR</p> <p>c. Three (3) works of not less than Rs ZZZ (Value XXX, YYY, ZZZ shall be as indicated by BHEL</p> <p>2. 'Similar' work for criteria 5 above means</p> <p>a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works</p> <p>b. Electrical works in respect of 'ELECTRICAL'</p> <p>c. CI works in respect of 'CI' Works</p> <p>d. Material Handling and/or Management works in respect of 'MM' works</p> <p>6. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission</p> <p>7. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed</p> <p>8. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:</p> <p>1. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP</p> <p>2. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG</p> <p>3. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping</p> <p>4. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping</p> <p>5. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears</p> <p>6. "Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.</p> <p>7. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works</p> <p>8. 'Readiness for coal Filling" in respect of Bunker Structure Work.</p> <p>9. Boiler means HRSG or WHRB or any other types of Steam Generator</p> <p>10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines</p> <p>11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.</p> <p>12. In case the experience/POAWO certificate enclosed by bidders do not have separate break up prices for the E&G portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.</p> <p>13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.</p> <p>14. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered</p>
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unless otherwise specifically indicated in the PQR

15. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.

16. Explanatory Notes for PQR 'B.3 & B.4'

- a. Agency with BOILER Experience shall be called as 'Prime Bidder' and the agency satisfying B.3.b shall be called as 'Tie-up Partner'
- b. Prime bidder and Tie-up Partner shall meet their respective technical Pre qualifying Criteria.
- c. Prime bidder shall meet all other Pre-Qualifying Criteria of the Tender
- d. Prime Bidder shall be responsible for overall execution of the Contract.
- e. Tie-up partner shall provide Technical Supervision and support to the Prime Bidder for execution of job.
- f. Tie-up Partner shall submit Security Deposit (SD) equivalent to 2 % of Total contract value in addition to the SD to be submitted by the Prime Bidder for the Contract Value.
- g. Prime bidder and the Tie-up partner are required to enter into a Tie-up Agreement with a validity period of Six months initially (During submission of tender). Thereafter both the agencies shall extend the validity of the agreement for the entire contract period, if the work is awarded.
- h. In case Tie-up partner backs out, another Tie-up partner meeting the QR shall be engaged by the Prime Bidder.
- i. In case Prime bidder backs out, the whole contract shall be considered cancelled and short closed

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

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ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (✓) whichever applicable:- ONE TIME EMD / ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY(BY BHEL)	ENCLOSED BY BIDDER
6	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable/ Not Applicable	YES/NO
8	Copy of PAN Card	Applicable/ Not Applicable	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable/ Not Applicable	YES/NO
10	Integrity Pact	Applicable	NO
11	Declaration by Authorised Signatory	Applicable/ Not Applicable	YES/NO
12	No Deviation Certificate	Applicable/ Not Applicable	YES/NO

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

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

**DATE :
SIGNATORY**

**AUTHORISED
(With Name, Designation and Company seal)**

Annexure-3

INTEGRITY PACT

Between

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

And

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

Preamble

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

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

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

Section 1 - Commitments of the Principal

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

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a

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promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

- 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- 2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document

provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

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

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

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

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

Section 4 – Compensation for Damages

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

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

Section 5 – Previous Transgression

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

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

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

- a. The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- b. The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- c. The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

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

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

Section – 8 Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

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- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

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

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

Section 10 – Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.
- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- 10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On Behalf of the Principal
(Office Seal)

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

IMPORTANT INFORMATION

1. **TENDER SCOPE**

THIS SPECIFICATION IS FOR THE BALANCE LEFT OVER JOB OF UNIT # 3 BOILER E&C. ANNEXURE I 'WEIGHT DETAILS' OF THIS SPECIFICATION INDICATES ENTIRE WEIGHT OF THE COMPLETE SYSTEM AND THE QUANTUM OF WORK BALANCE. BIDDER HAS TO SUBMIT THEIR RATES ONLY FOR THE BALANCE LEFTOVER JOB

2. All Bidders shall make site visits on working day to familiarize with the site conditions and to get exact details of extent of work completed.
3. Any clause in this specification which is not pertaining to the balance works of these specification shall be treated as deleted at the sole discretion
4. There is a BHEL Store located outside the Project Premises at about 4 KM distance from erection site.
5. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -> List of Banned Firms)
6. All Statutory Requirements as applicable for this project shall be complied with.
7. Please take note of following Revised Tender Clauses:
 - i. Notice Inviting Tender: SI No 9
 - ii. General conditions of Contract: Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5
8. Following Notes are added to Form F- 15 of Volume I D 'Forms & procedures'
 - i. It is only indicative and shall be as per the online format issued by BHEL time to time.

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- ii. No request will be entertained after specified date of the current month w.r.t the changes requested in the scores of immediate previous month.

9. PRICE VARIATION CLAUSE

Price Variation Compensation Clause no. 2.17 of Vol I C GCC shall not be Applicable:

10. OVER RUN COMPENSATION

Over Run Compensation Clause no. 2.12 of Vol I C GCC shall not be Applicable

11. Broad Terms & Conditions of Reverse Auction

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

- 11.1. Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).
- 11.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 11.3. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- 11.4. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit 'online sealed bid' in the Reverse Auction. Non-submission of 'online sealed bid' by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

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-
- 11.5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- 11.6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 11.7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 11.8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
- 11.9. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
- 11.10. Reverse auction will be conducted on scheduled date & time.
- 11.11. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
- 11.12. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
- 11.13. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.
- 11.14. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
- 11.15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
- 11.16. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
- 11.17. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



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SI No	DESCRIPTION	Chapter	No. OF PAGES
Volume-IA	Part-I: Contract specific details		
1	Project Information	Chapter-I	2
2	Scope of Works	Chapter-II	1
3	Facilities in the scope of Contractor/BHEL (Scope Matrix)	Chapter-III	7
4	T&Ps and MMEs to be deployed by Contractor	Chapter-IV	4
5	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V	1
6	Time Schedule	Chapter-VI	2
7	Terms of Payment	Chapter-VII	6
8	Taxes and other Duties	Chapter-VIII	2
9	Drawing	Chapter-IX	1
10	Specific Exclusion	Chapter-X	1
	Annexures		
	Estimated Weights of Various Systems in Scope of Work	Annexure I	19
	List of IBR Weld Joints	Annexure II	3
	Painting Scheme	Annexure III	9
11	General	Chapter-XI	7
12	Boiler, Auxiliaries and Piping	Chapter-XII	10
13	Foundation & Groutings	Chapter-XIII	2
14	Welding, Radiography, NDT, PWHT	Chapter-XIV	5
15	Lining & Insulation	Chapter-XV	3
16	Painting	Chapter-XVI	3

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17	Testing, Pre-Commissioning, Commissioning	Chapter-XVII	4
18	Preservation & Protection of Components	Chapter-XVIII	1

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter - I : Project Information

	Project Information										
1.1	<p>INTROUCTION</p> <p>Sikka Thermal Power Station is presently having two sets (units) of 120 MW units in operating condition. The plant owner M/s Gujarat State Electricity Corporation Limited (GSECL) has undertaken expansion of this power plant by installing two units of 250 MW each (name plate rating) in the same premises. Though both the new units are of 250 MW name plate rating, they are guaranteed to produce an output of 270 MW each.</p> <p>The Bidder shall acquaint himself with Balance works of Erection, Testing & Commissioning in Unit # 3 Boiler & Aux. by a visit to the site necessarily, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on BHEL/ Owner. All relevant site data/information as may be necessary shall have to be obtained /collected by the Bidder.</p>										
1.2	<p>LOCATION AND APPROACH</p> <p>In Sikka, Jamnagar district, Latitude 22^o 26' N & Longitude 69^o 49' E. The site is surrounded by villages Mungai, Sikka, Gagva & Nanikkhavri of Jamnagar district of Gujarat state.</p> <p><u>Access by Road:</u> It is connected to State Highway (SH-25) by a 5 km long road through Sikka village.</p> <p><u>Access by Railways:</u> Jamnagar – Okha broad-gauge section is passing at a distance of 12 km form Sikka.</p> <p><u>Nearest Airport:</u> Jamnagar</p> <p><u>Nearest Seaport:</u> Okha & Navalakhinare located 140 Km & 130 Km respectively from the site.</p>										
1.3	<p><u>Other Salient Information:</u></p> <table border="0"> <tr> <td>1. Owner</td> <td>M/s GSECL</td> </tr> <tr> <td>2. Owner's Consultant</td> <td>M/s TCE, Bangalore</td> </tr> <tr> <td>3. Project Title</td> <td>2x250 MW Sikka TPS Extension Units # 3 & 4</td> </tr> <tr> <td>4. Location</td> <td>12 km from Sikka, District – Jamnagar, Gujarat</td> </tr> <tr> <td>5. Nearest Railway Stn.</td> <td>Jamnagar</td> </tr> </table>	1. Owner	M/s GSECL	2. Owner's Consultant	M/s TCE, Bangalore	3. Project Title	2x250 MW Sikka TPS Extension Units # 3 & 4	4. Location	12 km from Sikka, District – Jamnagar, Gujarat	5. Nearest Railway Stn.	Jamnagar
1. Owner	M/s GSECL										
2. Owner's Consultant	M/s TCE, Bangalore										
3. Project Title	2x250 MW Sikka TPS Extension Units # 3 & 4										
4. Location	12 km from Sikka, District – Jamnagar, Gujarat										
5. Nearest Railway Stn.	Jamnagar										
1.4	<p>CLIMATIC CONDITIONS</p> <p>1.Ambient Air Temperature</p>										

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter - I : Project Information

	a. Maximum	42 Deg. C	
	b. Minimum	8 Deg. C	
2. Relative Humidity			
	c. Maximum	100%	
	d. Minimum	21%	
3. Rainfall			
	e. Average annual	650 mm	
	f. Maximum	900 mm	
	g. Minimum	400 mm	
4. Wind Data			
	h. Basic wind speed at 10m height	50 m/sec	
	i. Wind pressure	As per IS: 875 Part III	
5. Seismic Zone			Zone IV as per IS: 1893-2002

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II : Scope of Works

2.0 The work under the scope of these specifications is broadly as follows.

Collection of materials from BHEL/client's stores/storage yard; transportation to site of work; pre-erection checks, pre-assembly if necessary, erection, testing, assistances for commissioning & trial operation, handing over, assistance for performance guarantee test of Boiler and its Auxiliaries, Electrostatic Precipitator (ESP) Power Cycle Pipeline, final painting etc of unit nos. 3 & 4 of 2x250 MW Gujarat State Electricity Corporation Limited at Sikka, Distt. Jamnagar (Gujarat).

Following named systems are broadly in scope of the present contract of balance work:

- i) Boiler supporting structures.
- ii) Stairs, Platforms, Hand Rails, Toe Guards etc.
- iii) Boiler pressure parts.
- iv) Boiler trim & integral piping and mountings
- v) Fuel oil Pumps & pipeline
- vi) Non-pressure parts
- vii) Rotating machines with their drives, lube oil system, approach platform, ladder/stair, canopy etc.
- viii) Pulverised fuel pipeline (plain as well as ceramic lined) with special couplings.
- ix) External structures (e.g. duct supporting, elevator structure etc).
- x) Handling arrangements for rotating machines & other equipment.
- xi) Power Cycle Pipeline.
- xii) Low Pressure (Air & Water) Pipeline
- xiii) HP by-pass system (Valves, Control Fluid system with pipeline).
- xiv) De-aerating Heater & Feed Water Storage Tank with associated structures and platforms
- xv) Electrostatic precipitator with stairways, galleries, roof & side cladding.
- xvi) HP & LP chemical dosing systems.
- xvii) Roof & Side Cladding (metapoly sheet) of Boiler & Elevator.
- xviii) **Insulation and Cladding.**
- xix) Application of final paint on non-insulated surfaces.

For details of various sub-systems, please refer relevant Appendix. Please note that there is possibility of deletion or inclusion of some sub-systems with regard to the scope of contract.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	ESTABLISHMENT			
3.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Fire fighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	FOR LIVING PURPOSES OF THE BIDDER			
a	Open space for labour colony (as per availability)		Yes	Electricity, Water etc for Labour colony is also in the scope of Contractor
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.2.0	ELECTRICITY			
3.2.1	Electricity For construction purposes 3 Phase of Voltage 415/440 V			FREE
a	Single point source	Yes		at one point near the erection site
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	Electricity for the office, stores, canteen etc of the bidder			FREE
a	Single point source	Yes		
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc		Yes	Bidder to make his own arrangement
a	Single point source		Yes	

BHEL-PSWR

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	WATER SUPPLY			
3.3.1	For construction purposes: (to be specified whether chargeable or free)			FREE
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	<u>Water supply for bidder's office, stores, canteen etc</u>			FREE
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	<u>Water supply for Living Purpose</u>		yes	Bidder to make his own arrangement

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

SI.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	PART I			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4.0	LIGHTING			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Telephone, fax, internet, intranet, e-mail etc		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

SI.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.6.0	COMPRESSED AIR wherever required for the work		Yes	
3.7.0	Demobilization of all the above facilities		YES	
3.8.0	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
B	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

SI.No	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.9.1	Engineering works for construction:			
a	Providing the erection/constructions drawings for all the equipments covered under this scope	Yes		For Details PI refer Chapter-II-
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes	Yes		
d	Shipping lists etc for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on SI No. e		Yes	In consultation with BHEL

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III : Facilities in the scope of Contractor/BHEL

SI.No	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
h	Daily erection / work plan based on SI No. g		Yes	In consultation with BHEL
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself		Yes	
L	Arranging the materials required for preassembly		Yes	

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY
1	Crawler Crane	75 MT	1 for from the first month
2	Crawler/Tyre mounted Crane	20 MT	1 for from the first month
3	Pick & Carry Crane	8 MT	1 (at least one from the first month)
4	Trailer with Prime Mover	20 MT	As per Requirement
5	Trailer with Prime Mover	15 MT	1
6	Passenger cum Goods Elevator to reach up to boiler drum floor	1 MT	As per Requirement 1 No upto COD
8	Air Compressor (Electric/Diesel operated)	140 CFM, 7 Kg/cm ²	As per Requirement
10	Huck Installation Tool (Guns)	For fastening 12 mm and 16 mm diameter Huck Bolts in ESP	As per requirement. Tentatively till ESP Box up 12 mm – 1 sets, 16 mm – 1 set
11	Hydraulic cum Electrical Hose Assembly for Huck Bolting machine	For connecting Huck Power Rig with Installation Tools	As per requirement. Tentatively till ESP Box up
12	TIG Welding Set	As required	As per requirement. Min 5 sets
13	Plasma Cutting M/c	For cutting up to 10 mm thick Stainless Steel	As required
14	3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power	As required	As required
15	Power Cable for drawl of Construction Power	As required	As required
16	Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.)	As required	5 set
17	Radiography Arrangement with Radioactive Isotope Source	Iridium-192	2 sets

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY
19	Theodolite of Required Accuracy	To ensure verticality of structural columns	As per requirement. As & when required
20	Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets	As required	2
21	Chemical circulation pumps to handle acid solution, opr temp 80 deg cel, with drive motors, starter panel, cable, switch fuse unit etc. Suggested rating: 150 m ³ , 120 – 150m WC, with 90 kw, 3000 rpm, 150 amps motor. However, contractor shall deploy the required capacity pump with accessories after obtaining written approval of BHEL.	As required	4 sets
23	Electro-hydraulic pipe bending machine	Up to 2" Nb and 12 mm thick pipes	2 Sets
24	Welding Generator (Electrical) & Rectifiers	300 Ampere rating	15 & 35
25	Welding Generator (Diesel Operated)	300 Ampere rating	As per requirement.
26	Radiography Film Viewer	As required	2
27	Hydraulic Pipe Bending Machine (manual)	For bending of pipes up to 50 mm Nb size	2 sets
28	Baking Oven with thermostat and temperature gauge for welding electrodes	As required	4

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY
29	Holding Oven with thermostat and temperature gauge for welding electrodes	As required	2
30	Portable Oven for welding electrodes	As required	20
31	Electric Winch	3 Ton	4
32	Electric Winch	1 Ton	4
33	Hand Winch	0.5 Ton	As per requirement.
34	Scaffolding Materials	Suitable for working at various heights	Adequate qty for parallel working in multiple workfronts.
35	Profile making M/c	for aluminium sheet cladding work	As required
36	Nibbling M/c		As required
37	Shearing M/c		As required
38	Portable Grinding M/c	As required	As required
39	Portable Drilling M/c	As required	As required
40	Chain Pulley Blocks	Up to 15 MT Capacity	As required
41	Fire retardant Tarpaulines	As required	As required
42	Fire Extinguisher	As required	As required
43	Furnace Maintenance Platform (Sky Climber)	0.5 MT	1

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

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY
44	Pressurizing Pump	450 Kg/cm ² & 600 Kg/cm ²	1 each
45	Fogging Machine / Air Blower	As required	1

A: PASSENGER CUM GOODS ELEVATOR

Contractor, as part of his T&P, shall arrange, install, operate and maintain 1 MT capacity passenger-cum-goods elevator in each boiler to facilitate access to various platform elevations upto top floor/boiler drum floor. The elevator shall conform to the national standard and industrial safety code as applicable. These shall be deployed at the time of **mobilization** for this contract of E&C in consultation with BHEL site engineer.

The probable suppliers for the elevator are:

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

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

B: MEASURING AND MONITORING DEVICES (MMD):

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

NOTE:

THE LIST INDICATED ABOVE IS ONLY SUGGESTIVE AND NOT EXHAUSTIVE. CONTRACTOR SHALL DEPLOY ALL OTHER T&P AND MMD AS WELL THAT ARE NECESSARY FOR PROPER EXECUTION OF WORK UNDER ERECTION & COMMISSIONING OF WORK UNDER THE SCOPE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – V: T&Ps and MMEs to be deployed by BHEL on sharing basis

SN	Description	Capacity	Quantity	Remarks
(i)	Crawler Crane	~100 MT	1	For Material Feeding and Erection.
(ii)	Huck Power Rig	As required	1	For ESP work. See Note 6 here
(iii)	Induction Heating Equipment	As required	4	For welding of P-91 pipeline. See Note 6 here
(vi)	Air-leak test set up	As required	1	For leakage test of ESP

Notes:

- 1 All these cranes are to be used on sharing basis with other agencies working in the project. Contractor shall furnish his requisition for particular crane to BHEL sufficiently in advance to ensure proper planning and timely deployment. Decision of BHEL for allocation of cranes to different agencies in the project will be based on the overall interest of the project and priority of the activity. Such decision will be binding on the contractor.
- 2 Contractor shall make necessary arrangements like laying of sleepers; minor earth filling & consolidation; assembly & dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane.
- 3 BHEL will obtain all the aforelisted cranes on hiring basis including operating and maintenance crew. Bidder shall arrange for fuel (HSD) in his own cost. Since the cranes are to be used on sharing basis with other agencies of BHEL, the fuel/cost of fuel shall be shared in proportion to usage at mutually agreed rates
- 4 Contractor shall transport the equipments from BHEL stores, install, operate, carry out preventive as well as breakdown maintenance, dismantle after use and return to BHEL stores.
- 5 Certain tools / components / consumables for Huck Bolting M/c and Induction Heating M/c shall have to be arranged by the contractor in his cost.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 01 week of issue of fax letter of intent (tentatively First week of April 2014) or as per the directive of Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

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

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

6.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Full mobilization of manpower, resources, submission of Organization Chart, Action Plan, Material Reconciliation with respect to extent of work completed in a jointly signed Protocol, Taking Over of Completed/ unfinished/ Semi-finished work/ equipments/ fronts with proper jointly signed PROTOCOL and start of Erection/placement/ alignment of equipment covered in the scope of these specifications as instructed by Construction Manager and issue of Certificate clearly indicating the specific compliance of these requirement with evidence, shall be recognized as “start of contract period of THIS contract”.

Contractor is likely to mobilise fully and commence the work under scope of this contract in First Week of April, 2014.

During execution of contract, based on the availability of civil foundations from customer and materials from manufacturing units, contractor may have to advance the start of erection after getting clearance from construction manager, or the start of erection may get delayed due to site condition.

The Contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:

All following activities/ Milestones are intended to be started from the status on as is where is basis

SN	Major milestone	Tentative completion Schedule for Unit # 3
1	Balance Pr. Parts & Balance Duct Erection for BLU	10 May 2014

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

2	Balance LP Piping & Platform erection	10 May 2014
3	Boiler hydraulic test (non-drainable)	15 May 2014
4	Boiler light up	25 Jun 2014
5	Oil Flushing	15 Jun 2014
6	Steam blowing	05 Oct 2014
7	Synchronization	25 Nov 2014
8	Stabilization of the plant operation, Completion of all Facilities & Performance Guarantee Test	25 Dec 2014

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

6.1.4 CONTRACT PERIOD

The total contract period for completion of entire work for This Balance work of Unit-3 shall be **09 (Nine) months** and **03 (Three) months' Grace Period** from the start of erection as specified earlier.

The Contractor shall complete all milestones and physical works within 09 months and attend to final works including Painting, Final Billing, Punch Points, Material Reconciliation etc. in the Grace Period of 03 months. For operation of contract the Total contract period shall be reckoned at **12 months**.

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-VII: Terms of Payment

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

12.1.1 E & C OF BOILER AND AUXILIARIES, PIPING, FABRICATED STRUCTURES ETC

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

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Chapter-VII: Terms of Payment

1.9	INSTALLATION OF TEMPORARY PIPING										60	
1.10	DISMANTLING OF TEMPORARY PIPING, EDGE PREPARATION AND RETURN TO BHEL STORES, AREA CLEANING										25	
1.11	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG		--	25		--	--	15	10			--
1.12	COMPLETION OF FURNACE ALIGNMENT AND FIRE BALL CHECKING	5										
1.13	COMPLETION OF BACK PASS ALIGNMENT	5										
1.14	COMPLETION OF VIBRATION SNUBBERS, MECHANICAL SPACERS, CASSETTE BAFFLES, STEAM COOLED SPACERS	5										
1.15	COMPLETION OF HOPPERS ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS, ETC		--	0		--	5		--			--
1.16	COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC		--	--		--	5	--	--			--
1.17	ERECTION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES		--	--		--	5	--	--			--
1.18	EQUIPMENT TRIAL OPERATION					10						
1.19	HYDRAULIC TEST OR PNEUMATIC TEST								3			
1.20	FLOATING OF LINES, FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALVES (if not applicable, this portion to be clubbed along with hydraulic test/pneumatic test)								2			

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

1.21	AIR PRE HEATERS (PG 52) From the total amount payable for the PGMA weight at tonnage rates, payment will be regulated as under:											
1.21.1	Completion of Support steel squareness and levelling, Expansion arrangement, Housing panel erection and alignment, Erection, alignment and welding of pedestals				11							
1.21.2	Completion of Erection, alignment and welding of Support Bearing, Guide Bearing, Rotor post, Bottom and Top centre sections, Hot and cold end connecting plates				14							
1.21.3	Completion of erection and alignment of modules				15							
1.21.4	Completion of erection, alignment and welding of Pin Rack assembly and Drive assembly				12							
1.21.5	Completion of seals setting				17							
1.21.6	Erection, alignment and welding of Lube oil systems, Cleaning Device, Fire sensing device, Deluge and water wash lines, Observation port and lighting assemblies and other accessories				13							
1.21.7	Completion of PGMA				1							
1.21.8	Air preheater Trial Run				2							
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	85	85	85	85	85	85	85	85	85	85	85
II	STAGE/MILESTONE PAYMENTS (15%)											
2.1	AIR & GAS TIGHTNESS TEST		--	5		--	1	5	--			--

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-VII: Terms of Payment

2.2	GAS DISTRIBUTION TEST		--	--		--	1	--	--			--
2.3	CHARGING OF ESP FIELDS		--	--		--	4	--	--			--
2.4	COMPLETION OF AIR & GAS TIGHTNESS TEST FOR FURNACE		2									
2.5	BOILER HYDRAULIC TEST (DRAINABLE)	0	2									
2.6	BOILER HYDRAULIC TEST (NON DRAINABLE)		1									
2.7	Reheater Coils Hydraulic Test		2									
2.8	Clean Air Flow test					1						
2.9	Boiler Light Up	0	1		2	1			1	1		1
2.10	ABO		1	1	2	1		1	1	1		1
2.11	Steam Blowing	0		2	1	1			1	1		1
2.12.	SVF		2		2				1	1		1
2.13	Oil Flushing (TG)											
2.14	Barring Gear (TG)											
2.15	Rolling and Synchronisation	0								1		
2.16	Coal Firing			2	2	2	2	2		1		1

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-VII: Terms of Payment

2.17	Full Load					1			1	1		1
2.18	Trial Operation of Unit					2	1	2	2	2		2
2.19	Completion of sheet covering for Boiler roof, burner roof, lift shaft cladding, completion of gutters	3										
2.20	Completion of all drains and vents to respective locations and placement of instrument sensors after steam blowing								2			
2.21	Painting	6	0	1	1	2	2	1	2	1		0
2.22	Area cleaning, temporary structures cutting/removal and return of scrap	1	1	1	1	1	1	1	1	2		3
2.23	Punch List points/pending points liquidation	2	1	1	2	1	1	1	1	1		1
2.24	Submission of 'As Built Drawings'											
2.25	Material Reconciliation	2	1	1	1	1	1	1	1	1	15	2
2.26	Completion of Contractual Obligation	1	1	1	1	1	1	1	1	1		1
	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)	15	15	15	15	15	15	15	15	15	15	15
	TOTAL I + II	100	100	100	100	100	100	100	100	100	100	100
	*INCLUDING NDE AND SR/HT WHERE EVER APPLICABLE (IF APPLICABLE, WEIGHTAGE OF 10%)											

NOTES:

- Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

2. The weights given against PGMA's listed above are tentative. It may change after detailed engineering is done. Rate quoted by the Contractor shall not change due to variation in weight of individual PGMA.
4. BHEL' s decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.
5. Stage payment against respective applicable tonnage/milestone is indicated in price bid also. In case of any conflict between the stage payment percentages in this chapter and the price bid, percentage breakup indicated in price bid shall prevail.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 03 dated 09/04/2013)

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

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

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

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

8.2 'Enabling Works'

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

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

8.3 New Taxes/Levies

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

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-IX : DRAWINGS

DRAWINGS:

Following drawings are attached at the end of Vol IA

1. General Arrangement of boiler Sectional plan

Drawing No. – 0-00-022-74225/Rev02

2. General Arrangement of boiler Sectional Elevation

Drawing No. – 0-00-022-74224/Rev02

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X : SPECIFIC EXCLUSIONS

10.0 EXCLUSIONS

The following listed activities are specific exclusions from the scope of work under this tender specification-

7. LP By-pass valve with Hydraulic System
8. Downstream Steam Pipeline from LP by-pass valve to Condenser
9. Interceptor Valve to IP Turbine pipeline
10. Electrical components such as push-buttons, junction boxes etc.
11. E&C work of cable trays, cables and earthing etc
12. Control panels, EPMS, MCC etc.
13. Electrical & C&I items of equipment handling system
14. All electrical and control & instrumentation items except those specified elsewhere in these specifications.
15. Civil works except to the extent specifically indicated elsewhere in this tender.
16. Supply of primer and paints for final painting
17. Pneumatic copper tubing and fittings thereof.
18. Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
19. Electrical and C&I items of variable frequency drives as provided elsewhere in these specifications.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I Estimated Weights of various System in Scope of Work

A) Following weight details indicates total weight of entire Boiler Vertical Package of Original Unit # 3 in totality: However scope of work under this tender specification is limited to the balance left over job which is detailed in subsequent pages:

SUMMARY BOQ FOR BOILER VERTICAL PKG U # 3 SIKKA					
SL.NO	Contract (Main Package)	Rate schedule Identifier	QTY	UNIT	PG MAs covered
1.1	Boiler	Structures	2876	MT	35,36,38
1.2	Boiler	Pressure Parts	1444	MT	04, 05, 06, 07, 08, 09, 10,11, 12,15, 16, 17, 19, 21, 24 (part), 28, 31, 32, 42, 45, 52, mtm pads and clamps of 97
1.3	Boiler	Non Pressure Parts (upto ESP inlet funnel)	1552	MT	30,41,43,47,48 (part), 57, 80 (part), 81(part), 99 (part)
2.1	RM	Rotating Machines (ID/FD/PA Fans, Mills, etc and aux)	857	MT	55,56,61,62,65,67,99 (part)
2.2	RM	Handling Equipments of Rotating Machines	12		99 (part)
3.1	ESP	ESP	2364	MT	78,79,7X
3.2	ESP	Non Pressure Parts (ESP outlet funnel to Chimney)	623	MT	39,89,48, 57
4.1	PIPING	Piping-P91	91	MT	24,80, 81
4.2	PIPING	Piping-AS	228	MT	24, 80
4.3	PIPING	Piping-CS (HP)	285	MT	80, 81
4.4	PIPING	Piping-CS (LP)	22	MT	
4.5	PIPING	Piping-SS	06	MT	80,81

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I Estimated Weights of various System in Scope of Work

SUMMARY BOQ FOR BOILER VERTICAL PKG U # 3 SIKKA					
SL.NO	Contract (Main Package)	Rate schedule Identifier	QTY	UNIT	PG MAs covered
4.6	PIPING	Piping-Hangers and Supports	95	MT	80
4.7	PIPING	Piping-Temporary (Steam Blowing)		MT	
4.8	PIPING	Piping-Temporary (Chemical Cleaning)		MT	
5.1	INSULATION	Insulation	95	MT	
5.2	INSULATION	Pourable and castable	211	MT	
5.3	INSULATION	Iron parts	86	MT	
5.4	INSULATION	Aluminium Cladding sheets	8	MT	
5.5	INSULATION	Wool Mattress	353	MT	
	TOTAL		11208	MT	

B) Scope of Balance Works in Unit # 3 Sikka under subject tender:

1.0 This contract is the Balance work left out from previous agency's scope. All exhaustive materials' description, quantities and weight are already mentioned elsewhere in this contract (SI No A above) to give an indication to BIDDERS as what constitute a whole Boiler which they

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I Estimated Weights of various System in Scope of Work

have to complete and commission and shall be responsible for PERFORMANCE GUARANTEE.

2.0 The applicable BOQ under subject tender is given below which may vary subject to revisions, additions or deletions during the course of execution of this project.

3.0 BOQ:

Rate Schedule Identifier	Cont. Table Sr no	Description of work	unit	Balance Quantity
A1.1 STRUCTURE	1.1	PRE ASSEMBLY	MT	606.66
	1.2	PLACEMENT (ERECTION)	MT	607.35
	1.3	ALIGNMENT	MT	707.62
	1.4	WELDING/BOLTING/FIXING	MT	837.72
	1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)	MT	865.00
	1.12	COMPLETION OF FURNACE ALIGNMENT AND FIRE BALL CHECKING	MT	825.00
	1.13	COMPLETION OF BACK PASS ALIGNMENT	MT	825.00
	1.14	COMPLETION OF VIBERATION SNUBBERS, MECH SPCERS, CASSETTE BAFFLES, STEAM COOLED SPACERS	MT	1875.00
	2.19	COMPLETION OF SHEET COVERING FOR BOILER ROOF, BURNER ROOG LIFT SHAFT CLADDING, COMPLETION OF GUTTERS	MT	2875.00
	2.21	PAINTING	MT	2875.00

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I Estimated Weights of various System in Scope of Work

	2.22	AREA CLEANING, TEMP STRUCTURE CUTTING REMOVAL AND RETURN OF SCRAP	MT	2875.00
	2.23	PUNCH LIST POINT PENDING POINTS LIQUIDATION	MT	2875.00
	2.25	MATERIAL RECONCILIATION	MT	2875.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	2875.00
A1.1 STRUCTURE Total				
B1.1 PRESSURE PART				
	1.1	ON PRE-ASSEMBLY	MT	365.69
	1.2	PLACEMENT IN POSITION	MT	366.33
	1.3	ALIGNMENT	MT	798.52
	1.4	WELDING/BOLTING/FIXING	MT	570.81
	1.5	COMPLETION OF NDE & STRESS RELIEVING/HT	MT	705.00
	1.7	COMPLETION OF ATTACHED WELDING, FIN WELDING, SUPPORTS	MT	905.00
	1.8	COMPLETION OF ROOF SKIN CASING	MT	1655.00
	2.1	COMPLETION OF AIR & GAS TIGHTNESS TEST FOR FURNACE	MT	2905.00
	2.5	BOILER HYDRAULIC TEST (DRAINABLE)	MT	1705.00
	2.6	BOILER HYDRAULIC TEST (NON DRAINABLE)	MT	2905.00
	2.7	RE HEATER COIL HT	MT	2905.00
	2.9	BOILER LIGHT UP	MT	2905.00
	2.1	ABO	MT	2905.00
	2.12	SVF	MT	2905.00
	2.22	Area cleaning, temporary structures cutting/removal and return of scrap	MT	2905.00

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I Estimated Weights of various System in Scope of Work

	2.23	Punch List points/pending points liquidation	MT	2905.00
	2.25	Material Reconciliation	MT	2905.00
	2.26	Completion of Contractual Obligation	MT	2905.00
B1.1 PRESSURE PART Total				
D1.1 NON PR PART	1.1	ON PRE-ASSEMBLY	MT	739.81
	1.2	PLACEMENT IN POSITION	MT	740.06
	1.3	ALIGNMENT	MT	1230.93
	1.4	WELDING/BOLTING/FIXING	MT	1002.98
	1.11	HANGERS & SUPPORTS ETC WHEREVER NECESSARY CHECKING	MT	1295.00
	2.1	AIR & GAS TIGHTNESS TEST	MT	1295.00
	2.1	ABO	MT	1295.00
	2.11	STEAM BLOWING	MT	1295.00
	2.16	COAL FIRING	MT	1295.00
	2.21	PAINTING	MT	1295.00
	2.22	Area cleaning, temporary structures cutting/removal and return of scrap	MT	1295.00
	2.23	Punch List points/pending points liquidation	MT	1295.00
	2.25	Material Reconciliation	MT	1295.00
	2.26	Completion of Contractual Obligation	MT	1295.00
	D1.1 NON PR PART Total			
D2.1 ROTATING PARTS	1.1	ON PRE-ASSEMBLY	MT	253.06
	1.2	PLACEMENT IN POSITION	MT	253.06
	1.3	ALIGNMENT	MT	680.00
	1.4	WELDING/BOLTING/FIXING	MT	648.62
	1.18	EQUIPMENT TRIAL OPERATION	MT	855.00
	2.8	CLEAN AIR FLOW TEST	MT	855.00

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I Estimated Weights of various System in Scope of Work

	2.9	BOILER LIGHT UP	MT	855.00
	2.1	ABO	MT	855.00
	2.11	STEAM BLOWING	MT	855.00
	2.16	COAL FIRING	MT	855.00
	2.17	FULL LOAD	MT	855.00
	2.18	TRIAL OPERATION OF UNIT	MT	855.00
	2.21	PAINTING	MT	855.00
	2.22	AREA CLEANING TEMP STR CUTTING REMOVAL AND RETURN OF SCRAP	MT	855.00
	2.23	Punch List points/pending points liquidation	MT	855.00
	2.25	MATERIAL RECONCILIATION	MT	855.00
	2.26	Completion of Contractual Obligation	MT	855.00
D2.1 ROTATING PARTS				
Total				
D2.1 ROTATING HANDLING EQUIPMENTS				
	1.1	ON PRE-ASSEMBLY	MT	12.50
	1.2	PLACEMENT IN POSITION	MT	12.50
	1.3	ALIGNMENT	MT	12.50
	1.4	WELDING/BOLTING/FIXING	MT	12.50
	1.18	EQUIPMENT TRIAL OPERATION	MT	12.50
	2.8	CLEAN AIR FLOW TEST	MT	12.50
	2.9	BOILER LIGHT UP	MT	12.50
	2.1	ABO	MT	12.50
	2.11	STEAM BLOWING	MT	12.50
	2.16	COAL FIRING	MT	12.50
	2.17	FULL LOAD	MT	12.50
	2.18	TRIAL OPERATION OF UNIT	MT	12.50
	2.21	PAINTING	MT	12.50

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Annexure-I Estimated Weights of various System in Scope of Work

	2.22	AREA CLEANING TEMP STR CUTTING REMOVAL AND RETURN OF SCRAP	MT	12.50
	2.23	Punch List points/pending points liquidation	MT	12.50
	2.25	MATERIAL RECONCILIATION	MT	12.50
	2.26	Completion of Contractual Obligation	MT	12.50
D2.1 ROTATING HANDLING EQUIPMENTS Total				
D3.1 ESP	3.1	ON PRE-ASSEMBLY	MT	544.84
	1.2	PLACEMENT IN POSITION	MT	544.27
	1.3	ALIGNMENT	MT	811.83
	1.4	WELDING/BOLTING/FIXING	MT	668.62
	1.5	COMPLETION OF HOPPER ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS ETC	MT	668.62
	1.6	COMPLETION OF INNER OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMER, PENT HOUSE MONO RAILS HOISTS ETC	MT	1565.00
	1.7	ERECTION OF EMITING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVERS	MT	1565.00
	2.1	AIR & GAS TIGHTNESS TEST	MT	668.62
	2.2	GAS DISTRIBUTION TEST	MT	2365.00
	2.3	CHARGING OF ESP FIELDS	MT	2365.00
	2.16	COAL FIRING	MT	2365.00
	2.18	TRIAL OPERATION OF UNIT	MT	2365.00
	2.21	PAINTING	MT	2365.00
	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	2365.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	2365.00
	2.25	MATERIAL RECONCILIATION	MT	2365.00

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Annexure-I Estimated Weights of various System in Scope of Work

	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	2365.00
D3.1 ESP Total				
D3.2 NPP-ESP	1.1	ON PRE-ASSEMBLY	MT	523.78
	1.2	PLACEMENT IN POSITION	MT	534.17
	1.3	ALIGNMENT	MT	624.13
	1.4	WELDING/BOLTING/FIXING	MT	593.49
		HANGERS & SUPPORT ETC WHEREVER NECESSARY AS PER DRG	MT	562.20
		AIR & GAS TIGHTNESS TEST	MT	880.00
		ABO	MT	880.00
		Coal Firing	MT	880.00
		TRIAL OPERATION	MT	880.00
		Painting	MT	880.00
		Area cleaning, temporary structures cutting/removal and return of scrap	MT	880.00
		Punch List points/pending points liquidation	MT	880.00
		Material Reconciliation	MT	880.00
		Completion of Contractual Obligation	MT	880.00
D3.2 NPP-ESP Total				
4.1 PIPING -P91 (Along with associated fittings,flow nozzles etc.)	1.1	ON PRE-ASSEMBLY	MT	73.00
	1.2	PLACEMENT IN POSITION	MT	80.64
	1.3	ALIGNMENT	MT	90.00
	1.4	WELDING/BOLTING/FIXING	MT	75.70
	1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	90.00
	1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	90.00
	1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	90.00

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Annexure-I Estimated Weights of various System in Scope of Work

	1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALVES.	MT	90.00
	2.9	BOILER LIGHT UP	MT	90.00
	2.1	ABO	MT	90.00
	2.1	STEAM BLOWING	MT	90.00
	2.12	SVF	MT	90.00
	2.12	FULL LOAD	MT	90.00
	2.13	TRIAL OPERATION OF UNIT	MT	90.00
	2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	90.00
	2.21	PAINTING	MT	90.00
	2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	90.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	90.00
	2.25	MATERIAL RECONCILIATION	MT	90.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	90.00
4.1 PIPING -P91 (Along with associated fittings,flow nozzles etc.) Total				
4.2 PIPING-AS (Along with associated fittings,flow nozzles etc.)	1.1	ON PRE-ASSEMBLY	MT	120.04
	1.2	PLACEMENT IN POSITION	MT	125.36
	1.3	ALIGNMENT	MT	230.00
	1.4	WELDING/BOLTING/FIXING	MT	152.01
	1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	152.01

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I Estimated Weights of various System in Scope of Work

	1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	230.00
	1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	230.00
	1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALVES.	MT	230.00
	2.9	BOILER LIGHT UP	MT	230.00
	2.1	ABO	MT	230.00
	2.1	STEAM BLOWING	MT	230.00
	2.12	SVF	MT	230.00
	2.12	FULL LOAD	MT	230.00
	2.13	TRIAL OPERATION OF UNIT	MT	230.00
	2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	230.00
	2.21	PAINTING	MT	230.00
	2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	230.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	230.00
	2.25	MATERIAL RECONCILIATION	MT	230.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	230.00
4.2 PIPING-AS (Along with associated fittings,flow nozzles etc.) Total				
4.3 PIPING -CS (HP) (Along with associated fittings,flow nozzles etc.)				
	1.1	ON PRE-ASSEMBLY	MT	188.22
	1.2	PLACEMENT IN POSITION	MT	217.03
	1.3	ALIGNMENT	MT	284.65
	1.4	WELDING/BOLTING/FIXING	MT	195.90

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Annexure-I Estimated Weights of various System in Scope of Work

	1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	195.90
	1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	285.00
	1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	285.00
	1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES.	MT	285.00
	2.9	BOILER LIGHT UP	MT	285.00
	2.1	ABO	MT	285.00
	2.1	STEAM BLOWING	MT	285.00
	2.12	SVF	MT	285.00
	2.12	FULL LOAD	MT	285.00
	2.13	TRIAL OPERATION OF UNIT	MT	285.00
	2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	285.00
	2.21	PAINTING	MT	285.00
	2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	285.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	285.00
	2.25	MATERIAL RECONCILIATION	MT	285.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	285.00
4.3 PIPING -CS (HP) (Along with associated fittings, flow nozzles etc.) Total				
4.4 PIPING -CS (LP)				
	1.1	ON PRE-ASSEMBLY	MT	2
	1.2	PLACEMENT IN POSITION	MT	2
	1.3	ALIGNMENT	MT	3.06
	1.4	WELDING/BOLTING/FIXING	MT	5.06

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Annexure-I Estimated Weights of various System in Scope of Work

	1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	24.50
	1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	24.50
	1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	24.50
	1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES.	MT	24.50
	2.9	BOILER LIGHT UP	MT	24.50
	2.1	ABO	MT	24.50
	2.1	STEAM BLOWING	MT	24.50
	2.12	SVF	MT	24.50
	2.12	FULL LOAD	MT	24.50
	2.13	TRIAL OPERATION OF UNIT	MT	24.50
	2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	24.50
	2.21	PAINTING	MT	24.50
	2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	24.50
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	24.50
	2.25	MATERIAL RECONCILIATION	MT	24.50
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	24.50
4.4 PIPING -CS (LP) Total				
4.4 PIPING -SS	1.1	ON PRE-ASSEMBLY	MT	0.60
	1.2	PLACEMENT IN POSITION	MT	0.60
	1.3	ALIGNMENT	MT	0.60
	1.4	WELDING/BOLTING/FIXING	MT	0.60
	1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	0.60

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Annexure-I Estimated Weights of various System in Scope of Work

	1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	0.60
	1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	0.60
	1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALVES.	MT	0.60
	2.9	BOILER LIGHT UP	MT	0.60
	2.1	ABO	MT	0.60
	2.1	STEAM BLOWING	MT	0.60
	2.12	SVF	MT	0.60
	2.12	FULL LOAD	MT	0.60
	2.13	TRIAL OPERATION OF UNIT	MT	0.60
	2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	0.60
	2.21	PAINTING	MT	0.60
	2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	0.60
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	0.60
	2.25	MATERIAL RECONCILIATION	MT	0.60
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	0.60
4.4 PIPING -SS Total				
4.6 PIPING-HANGERS & SUPPORT				
	1.1	ON PRE-ASSEMBLY	MT	93.21
	1.2	PLACEMENT IN POSITION	MT	93.21
	1.3	ALIGNMENT	MT	93.59

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Annexure-I Estimated Weights of various System in Scope of Work

1.4	WELDING/BOLTING/FIXING	MT	93.21
1.5	COMPLETION OF NDE & STRESS RELIEVING/HEAT TREATMENT	MT	95.00
1.11	HANGERS&SUPPORTS ETC WHEREEVER NECESSARY	MT	95.00
1.19	HYDRAULIC TEST OR PNEUMATIC TEST	MT	95.00
1.2	FLOATING OF LINES,FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES.	MT	95.00
2.9	BOILER LIGHT UP	MT	95.00
2.1	ABO	MT	95.00
2.1	STEAM BLOWING	MT	95.00
2.12	SVF	MT	95.00
2.12	FULL LOAD	MT	95.00
2.13	TRIAL OPERATION OF UNIT	MT	95.00
2.2	COMPLETION OF ALL DRAINS VENTS TO RESPECTIVE LOCATIONS AND PLACEMENTS OF INSTRUMENT SENSORS AFTER STEAM BLOWING.	MT	95.00
2.21	PAINTING	MT	95.00
2.22	AREA CLEANING,TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	95.00
2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	95.00
2.25	MATERIAL RECONCILIATION	MT	95.00
2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	95.00
4.6 PIPING-HANGERS & SUPPORT Total			

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I Estimated Weights of various System in Scope of Work

4.6 PIPING-TEMPORARY (STEAM BLOWING)	1.9	INSTALLATION OF TEMPORARY PIPING	MT	25.00
	1.1	DISMANTLING OF TEMP PIPNG, EDGE PREPARATION AND RETURN TO BHEL STORE AREA CLEANING	MT	25.00
	2.25	MATERIAL RECONCILIATION	MT	25.00
4.6 PIPING-TEMPORARY (STEAM BLOWING) Total				
4.6 PIPING-TEMPORARY (CHEMICAL CLEANING)	1.9	INSTALLATION OF TEMPORARY PIPING	MT	20.00
	1.1	DISMANTLING OF TEMP PIPNG, EDGE PREPARATION AND RETURN TO BHEL STORE AREA CLEANING	MT	20.00
	2.25	MATERIAL RECONCILIATION	MT	20.00
4.6 PIPING-TEMPORARY (CHEMICAL CLEANING) Total				
5.1 Insulation	1.2	PLACEMENT IN POSITION	MT	94.69
	1.3	ALIGNMENT	MT	94.69
	1.4	WELDING/BOLTING/FIXING	MT	94.69
	2.9	BOILER LIGHT UP	MT	95.00
	2.1	ABO	MT	95.00
	2.1	STEAM BLOWING	MT	95.00
	2.12	SVF	MT	95.00
	2.16	COAL FIRING	MT	95.00
	2.17	FULL LOAD	MT	95.00
	2.18	TRIAL OPERATION OF UNIT	MT	95.00

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Annexure-I Estimated Weights of various System in Scope of Work

	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	95.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	95.00
	2.25	MATERIAL RECONCILIATION	MT	95.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	95.00
5.1 Insulation Total				
5.2 Pourable and Castable				
	1.2	PLACEMENT IN POSITION	MT	164.15
	1.3	ALIGNMENT	MT	164.15
	1.4	WELDING/BOLTING/FIXING	MT	164.15
	2.9	BOILER LIGHT UP	MT	210.00
	2.1	ABO	MT	210.00
	2.1	STEAM BLOWING	MT	210.00
	2.12	SVF	MT	210.00
	2.16	COAL FIRING	MT	210.00
	2.17	FULL LOAD	MT	210.00
	2.18	TRIAL OPERATION OF UNIT	MT	210.00
	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	210.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	210.00
	2.25	MATERIAL RECONCILIATION	MT	210.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	210.00
5.2 Pourable and Castable Total				
5.3 Iron Parts				
	1.2	PLACEMENT IN POSITION	MT	67.26
	1.3	ALIGNMENT	MT	67.26

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Annexure-I Estimated Weights of various System in Scope of Work

	1.4	WELDING/BOLTING/FIXING	MT	67.26
	2.9	BOILER LIGHT UP	MT	85.00
	2.1	ABO	MT	85.00
	2.1	STEAM BLOWING	MT	85.00
	2.12	SVF	MT	85.00
	2.16	COAL FIRING	MT	85.00
	2.17	FULL LOAD	MT	85.00
	2.18	TRIAL OPERATION OF UNIT	MT	85.00
	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	85.00
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	85.00
	2.25	MATERIAL RECONCILIATION	MT	85.00
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	85.00
5.3 Iron Parts Total				
5.4 Aluminium Cladding Sheets				
	1.2	PLACEMENT IN POSITION	MT	7.50
	1.3	ALIGNMENT	MT	7.50
	1.4	WELDING/BOLTING/FIXING	MT	7.50
	2.9	BOILER LIGHT UP	MT	7.50
	2.1	ABO	MT	7.50
	2.1	STEAM BLOWING	MT	7.50
	2.12	SVF	MT	7.50
	2.16	COAL FIRING	MT	7.50
	2.17	FULL LOAD	MT	7.50
	2.18	TRIAL OPERATION OF UNIT	MT	7.50
	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	7.50

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Annexure-I Estimated Weights of various System in Scope of Work

	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	7.50
	2.25	MATERIAL RECONCILIATION	MT	7.50
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	7.50
5.4 Aluminium Cladding Sheets Total				
AIR PRE-HATER (APH)	1.21.1	Completion of Support steel squareness and levelling, Expansion arrangement, Housing panel erection and alignment, Erection, alignment and welding of pedestals	MT	0.00%
	1.21.2	Completion of Erection, alignment and welding of Support Bearing, Guide Bearing, Rotor post, Bottom and Top centre sections, Hot and cold end connecting plates	MT	1.00%
	1.21.3	Completion of erection and alignment of modules	MT	4.50%
	1.21.4	Completion of erection, alignment and welding of Pin Rack assembly and Drive assembly	MT	6.50%
	1.21.5	Completion of seals setting	MT	11.00%
	1.21.6	Erection, alignment and welding of Lube oil systems, Cleaning Device, Fire sensing device, Deluge and water wash lines, Observation port and lighting assemblies and other accessories	MT	11.70%
	1.21.7	Completion of PGMA	MT	1.00%
	1.21.8	Air preheater Trial Run	MT	2.00%
	2.9	BOILER LIGHT UP	MT	2.00%
	2.1	ABO	MT	2.00%
	2.11	STEAM BLOWING	MT	1.00%

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Annexure-I Estimated Weights of various System in Scope of Work

	2.12	SVF	MT	2.00%
	2.16	COAL FIRING	MT	2.00%
	2.21	PAINTING	MT	1.00%
	2.22	AREA CLEANING, TEMPORARY STRUCTURES CUTTING/REMOVAL AND RETURN OF SCRAP	MT	1.00%
	2.23	PUNCH LIST POINTS/PENDING POINTS LIQUIDATION	MT	2.00%
	2.25	MATERIAL RECONCILIATION	MT	1.00%
	2.26	COMPLETION OF CONTRACTUAL OBLIGATION	MT	1.00%
AIR PRE-HATER (APH)				
Total				

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μ m (min)
				Paint	No. of Coats / DFT	Paint	No. of coats	Paint	No. of coats	Shade	
1.1	1AC	Drum (Except Internals) 04 - 114, 116, 118, 124, 126, 128, 210, 212, 214, 270	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 / DFT= 30 μ m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20 μ m per coat	International Orange Shade No: 592 of IS 5	70
1.2	1AC	Drum Suspension 04 -142, 144, 146, 148	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 / DFT= 30 μ m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20 μ m per coat	International Orange Shade No: 592 of IS 5	70
1.3	5	Drum Internals 04 - 134, 136, 138 Other Machined Components: 43 - 101, 102, 103, 104, 105, 106, 107	SSPC-SP1 or SP3 Solvent / Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 - 04	1 DFT=25 μ m per coat	--	--	--	--	--	25
1.4	1AE	Drum Transport Structures 04 - 194, 196, 35 - 391, 810	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30 μ m per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20 μ m per coat	Yellow Shade No: 356 of IS 5	70
2.1	11	Foundation Materials and Pin: 35 - 010, 011, 012, 013, 020, 030, 190 38 - 010 39 - 010, 011, 012, 020, 030, 040 48 - 019	SSPC-SP1 or SP3 Solvent / Power Tool Cleaning	No Paint				No Paint			

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Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
2.2	1B	<p>Buck Stays and Structural Items:</p> <p>Buck stays 01 - 001, 003, 006, 007, 101, 104, 107, 111, 380, 382, 400, 500, 501, 503, 700, 900, 901, 904, 907, 910</p> <p>Boiler Supporting Structures 35 - 100, 110, 111, 112, 120, 121, 122, 130, 131, 132, 133, 134, 135, 136, 140, 141, 142, 143, 144, 150, 151, 152, 153, 160, 161, 162, 171, 172, 173, 174, 181, 182, 183, 184, 185, 186, 191, 192, 193, 194, 195, 196, 210, 211, 212, 213, 214, 220, 221, 222, 230, 231, 232, 240, 250, 310, 311, 312, 320, 321, 322, 330, 331, 332, 340, 341, 342, 350, 351, 352, 360, 361, 362, 380, 381, 382, 383, 390, 392, 410, 420, 430, 440, 441, 442, 443, 451, 452, 453, 461, 462, 463, 471, 472, 473, 481, 482, 483, 500, 510, 511, 512, 513, 514, 520, 521, 522, 523, 524, 530, 531, 532, 533, 540, 541, 542, 550, 551, 552, 561, 562, 563, 571, 572, 573, 581, 582, 583, 591, 592, 593, 594, 595, 596, 597, 598, 599, 610, 612, 613, 710, 711, 712, 713, 715</p> <p>36 - 110, 120, 130, 150, 200, 210, 211, 212, 220, 221, 222, 230, 231, 232, 240, 241, 242, 250, 251, 252, 260, 261, 262, 270, 271, 272, 280, 281, 282, 290, 291, 292, 300, 301, 302, 310, 311, 312, 313, 314, 315, 316, 320, 321, 322, 323, 324, 325, 326, 327, 330, 331, 332, 333, 334, 335, 340, 341, 342, 343, 344, 345, 346, 347, 348, 350, 351, 352, 353, 354, 355, 360, 361, 362, 363, 370, 371, 372, 380, 381, 382, 383, 390, 391, 392, 393, 394, 395, 396, 397, 410, 420, 430, 490, 491, 492, 510, 520, 610, 612, 620, 621, 630, 631, 632</p> <p>38 - 110, 120, 130, 210, 211, 299, 310, 311, 380, 381, 390, 410, 510, 511, 512, 513, 521, 522, 610, 611, 612, 620, 710, 712, 720, 730</p> <p>39 - 100, 101, 102, 110, 120, 121, 130, 140, 141, 142, 143, 150, 160, 200, 210, 300, 301, 303, 304, 305, 306, 311, 312, 323, 390, 391, 392, 393, 901</p> <p>Duct Supports 48 - 005, 015, 025, 045, 055, 065, 085, 105, 115, 125, 145, 155, 185, 195, 200, 205, 215, 225, 235, 245, 255, 265, 275, 295, 305, 315, 325, 335, 345, 355, 365, 375, 385, 415, 425, 435, 445, 455, 465, 475, 485, 495, 665, 805, 815, 825, 845, 855, 865, 875, 885, 995</p> <p>Piping Centre: 80-800 to 882, 920 to 933, 940</p>	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	2	-	-	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	2	Smoke Grey Shade No: 692 of IS 5	160

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
2.3	1BB	Hangers: 36 - 740, 741, 742, 743, 744	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	2	--	--	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	2	Smoke Grey Shade No: 692 of IS 5	160
2.4	1BC	Floor grills, Guard plate 35 - 811 36 - 010, 810, 811, 812, 813, 814, 815, 816, 840 38 - 810, 811 39 - 810, 811, 840, 841	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	1	--	--	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	1	Black	80
2.5	1BC	Hand Rails & Posts 35 - 850, 851 36 - 850, 851, 852, 853 38 - 850, 851 39 - 850, 851	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	1	--	--	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	1	Black	80
2.6	1BC	Ladders & Stairs 35 - 820, 821, 822, 823 36 - 820, 821, 822, 823 38 - 820, 821 39 - 820, 830, 831 48 - 466	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	1	--	--	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	1	Black	80

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Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3.1	10	Components >95° C like silencers, vent pipes and safety valves etc. <u>Un-insulated other than components coming in Gas Path</u> 09 - 001, 002, 003 21 - 800, 850, 875, 997 24 - 120, 160, 173, 180, 185, 190, 195, 220, 260, 273, 280, 285, 290, 320, 345, 360, 373, 380, 385, 390, 395, 420, 460, 480, 485, 490, 495, 520, 560, 573, 580, 585, 590, 660, 680, 685, 690, 820, 860, 880, 885 28 - 220 42 - 300, 318, 328, 348, 358 48 - 380	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =20 microns)	--	--	Heat Resistant Aluminium Paint to IS 13183 Grade-I	1 (DFT =20 μm per coat)	Aluminium	40
3.2	3	Components >95° C <u>Insulated</u> 05 - 137, 139, 147, 153, 154, 155, 158, 159, 175, 188, 195, 220, 227, 229, 231, 236, 241, 246, 251, 255, 281, 283, 296, 330, 340, 341, 350, 493, 879, 900 07 - 101, 102, 104, 106, 107, 108, 109, 200, 201, 202, 203, 204, 211, 212, 214, 215, 216, 217, 218, 221, 222, 223, 225, 226, 229, 231, 232 10 - 100, 120, 122, 135, 136, 140, 141, 151, 170, 174, 178, 179, 180, 191, 195, 218, 220, 222, 235, 236, 240, 241, 251, 270, 274, 278, 279, 280, 283, 284, 291, 295, 315, 687 15 - 136, 138, 147, 174, 177, 192, 193, 236, 238, 274, 279, 292, 293, 999 17 - 138, 177, 776, 807, 900, 903 18 - 001, 002, 003, 010, 020 19 - 701, 702, 753, 903 21 - 600 24 - 100, 115, 175, 200, 215, 275, 295, 300, 315, 375, 475, 500, 568, 600, 620, 675, 42 - 020, 021, 025, 030, 031, 032, 033, 036, 037, 038, 128, 150, 153, 158, 159, 48 - 032, 034, 035, 132, 135, 202, 204, 207, 208, 212, 214, 217, 221, 222, 224, 227, 228, 229, 232, 234, 242, 244, 252, 254, 261, 262, 264, 267, 272, 274, 276, 282, 284, 292, 294, 302, 304, 307, 308, 309, 311, 312, 314, 318, 319, 322, 324, 332, 334, 342, 352, 362, 364, 372, 374, 381, 382, 384, 386, 388, 389, 392, 412, 414, 422, 424, 426, 432, 434, 438, 439, 442, 444, 452, 454, 462, 464, 467, 468, 469, 472, 474, 482, 484, 486, 487, 488, 489, 491, 492, 494, 496, 497, 498, 499, 602, 612, 622, 632, 646, 652, 654, 656, 662, 664, 666, 667, 668, 669, 676, 686, 696	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30 μm per coat	--	--	--	--	Red Oxide	60

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat		Total DFT μ m (min)	
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats		Shade
3.3	2	Heat Exchanger Coils: (SH, RH & Economiser Coils) 11 - 036, 037, 038, 074, 077, 078, 095, 135, 136, 138, 170, 174, 175, 178, 179, 235, 236, 237, 238, 248, 250, 251, 271, 272, 274, 275, 277, 278, 279, 280, 336, 337, 338, 340, 342, 356, 358, 370, 374, 377, 378, 395, 585, 587, 591, 606, 608, 616, 618, 682, 683, 684, 685, 686, 687, 688, 691, 694, 716, 717, 718, 767, 768, 769, 787, 791, 882, 883, 884, 885, 887, 916, 917, 918, 957, 968, 969, 986, 987, 988, 991, 994, 999 12 - 135, 136, 170, 174, 178, 184, 187, 335, 395, 495, 515, 535, 551, 619, 800, 803, 805, 850, 851, 852, 900, 901, 903, 906, 914, 917, 924, 927, 928, 944, 948, 954, 968, 988, 999 15 - 077, 079, 132, 235, 236, 237, 238, 256, 275, 277, 279, 281, 377, 379 19 - 001, 104, 105, 114, 124, 184, 802, 814, 824, 884, 914, 924, 984	SSPC - SP2 or SSPC - SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 - 03	1 DFT= 35 μ m per coat	--	--	--	--	--	35
3.4	3	Components coming in Gas Path other than Coils 06 - 033, 036, 037, 041, 043, 046, 047, 052, 054, 089, 090, 091, 092, 093, 094, 130, 133, 136, 137, 141, 143, 146, 147, 152, 154, 189, 190, 191, 192, 193, 194, 231, 331, 350, 400, 430, 466, 467, 500, 530, 609, 611, 613, 614, 616, 620, 621, 623, 624, 630, 631, 633, 634, 636, 637, 639, 640, 641, 643, 644, 646, 647, 649, 650, 651, 652, 653, 654, 655, 657, 658, 659, 670, 689, 690, 691, 692, 693, 694, 695, 709, 713, 714, 715, 716, 720, 723, 730, 731, 733, 734, 737, 740, 741, 743, 744, 747, 749, 750, 751, 753, 755, 789, 790, 830, 840, 850, 851, 857, 895, 896, 897 10 - 182, 183, 184, 185 16 - 988, 999 19 - 703, 704, 708, 763, 783, 850, 851, 900, 988, 999 30 - 010, 104, 105, 211, 212, 216, 217, 218, 219, 220, 223, 227, 228, 233, 235, 993, 31 - 010, 101, 102, 103, 104, 105, 108, 301, 993 32 - 001, 002, 005, 006, 007, 008, 009, 010, 011, 012, 021, 022, 023, 024, 025, 026, 027, 031, 033, 041, 042, 043, 044, 050, 055, 061, 073, 110, 120, 210, 310, 410, 510, 520, 610, 620, 710, 720, 810, 910, 993 42 - 129	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30 μ m per coat	--	--	--	--	Red Oxide	60
3.5	8A	Components > 95 C upto 130 C, un-insulated Fuel Pipes 47 - 229, 265, 266, 267, 268, 269 Duct for Tube Mill: 48 - 802, 804, 812, 814, 817, 822, 824, 832, 834, 842, 844, 852, 854, 857, 862, 864, 867, 872, 874, 882, 884,	SSPC-SP3/ Power Tool Cleaning	General Purpose Aluminium Paint to IS 2339 DFT= 20 μ m per coat	1	--	--	General Purpose Aluminium Paint to IS 2339 DFT= 20 μ m per coat	1	Aluminium	40

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Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
4	15	Constant Load and Variable Load Hangers (CLH / VLH) (See NOTE 14) 07 - 400, 401, 402, 403, 404, 405, 410, 420, 431 10 - 200 17 - 904, 906, 919, 929 19 - 901, 904, 905, 906, 907 24 - 346, 351 Piping Centre: 80-800,801,802,811 to 816, 831 to 839, 861 to 871, 920 to 933	Abrasive blast cleaning to Sa 2 1/2 35- 50 microns	Epoxy zinc rich primer to IS 14589 Gr. II %VS=35 (min)	1 DFT=40 μm / coat	--	--	Aliphatic acrylic Poly-urethane paint %VS=40 (min)	1 DFT=30 μm per coat	Phirozi Blue Shade No. 176 of IS5	70
5.1	1A	Miscellaneous and Casing Sheets: 07-500, 501, 600, 601, 997, 999, 19 - 101, 102, 21 - 601, 987, 24 - 101, 125, 130, 135, 140, 201, 225, 230, 235, 240, 301, 325, 335, 340, 350, 370, 374, 400, 401, 425, 430, 435, 440, 470, 471, 473, 501, 525, 535, 540, 570, 601, 625, 635, 640, 800, 801, 815, 825, 987, 989, 996, 998 35 - 994, 995, 36 - 613, 903, 999, 37 - 010, 110, 210, 310, 410, 510, 610, 38 - 302, 924 Fuel Firing: 41 - 100, 110, 200, 310, 320, 330, 340, 350, 390, 410, 420, 430, 450, 460, 470, 997 Piping: 42 - 002, 003, 005, 010 42 - 040, 045, 050, 055, 060, 065, 070, 111, 112, 113, 114, 118, 119, 120, 121, 122, 123, 124, 130, 131, 132, 151, 152, 154, 155, 156, 157, 160, 165, 170, 176, 180, 195, 196, 989, 997, 998 43 - 000, 001, 002, 003, 004, 005, 006, 007, 008, 997, 999 45 - 050, 120, 160, 161, 180, 181, 220, 221, 260, 261, 321, 325, 326, 401 47 - 121, 122, 123, 124, 125, 129, 140, 141, 142, 143, 144, 145, 146, 149, 161, 162, 163, 164, 165, 169, 180, 181, 182, 183, 184, 185, 189, 200, 201, 202, 203, 204, 205, 209, 221, 222, 223, 224, 225, 241, 242, 243, 244, 245, 246, 247, 248, 249, 261, 262, 263, 264, 647, 648, 649, 650, 746, 953, 959, 963 Duct Plates and Expansion Joints: 48 - 002, 004, 007, 011, 012, 014, 017, 018, 022, 024, 028, 032, 034, 040, 042, 044, 052, 054, 062, 064, 066, 072, 074, 082, 084, 092, 094, 102, 104, 107, 112, 114, 116, 122, 124, 132, 142, 144, 152, 154, 162, 172, 182, 184, 192, 194 Coal Handling: 65 - 051, 060, 070, 260, 402, 403, 460, 724, 736, 738, 786 67 - 204, 251, 256, 261, 266, 271, 272, 276, 277, 283, 286, 400, 801, 802, 803, 804, 999 69 - 201, 299	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	1 DFT= 30 μm per coat	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932	2 DFT= 20	Smoke Grey Shade No. 692 of IS 5	70
5.2	3	Erection Materials and Commissioning Components: 04 - 988, 05-993, 06-993, 07 - 988, 993, 12-993, 24 - 993, 28 - 993, 35 - 993, 36 - 993, 37 - 993, 38 - 993, 39 - 993, 48 - 988, 993, 65 - 988, 97-585, 99 - 045, 099, 501, 502	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30 μm / coat	--	--	--	--	Red Oxide	60

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-III PAINTING SCHEME

Sl. No.	Scheme No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
				Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
6.1	3	Piping (Steam, water) Insulated ■■ – 300 to 385, 389 to 392, 394 to 398, 399 ■■ – 417, 419 to 438, 442, 444 to 458, 462, 493, 494, 650 Insulated tanks 81 – 001 to 017, 020 to 033,	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744	2 DFT= 30 μm per coat	--	--	--	--	Red Oxide	60
6.2	1B	Piping (water, air) Un- insulated ■■ – 386, 387, 388, 393, 80 – 400 to 416, 418, 439, 440, 441, 443, 459, 460, 461, 464 to 4 67, 469 to 481, 495 to 497 80 – 600** to 616** (** Refer Note 6) (Note:- Painting for CW piping viz., 80 – 463, 468 shall be as per drawing/ QP) Un- Insulated tanks 81 – 035 to 067	SSPC-SP3/ Power Tool Cleaning	HB Chlorinated Rubber based Zinc Phosphate Primer DFT= 50 μm per coat	2	--	--	Chlorinated Rubber Based Finish Paint DFT= 30 μm per coat	2	Smoke Grey Shade No: 692 of IS 5	160

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-III PAINTING SCHEME

NOTES:

1. This painting scheme covers a comprehensive list of PGMA's being used in 125 / 210 / 250 / 500 MW and Industrial Boilers under Fossil Boilers working in normal environment, in an effort to standardise the painting scheme. Therefore, the entire list of PGMA's will not be applicable for any specific project and only those PGMA's applicable for the project may be used, while choosing the painting scheme applicable.
2. Rust Preventive coating should be given on HSFG Bolt and Nut threads.
3. All threaded and machined surfaces are to be applied with a coating of Temporary Rust Preventive oil.
4. All surfaces of foundation materials, insulation pins, Anchor channels, Sleeves shall be coated with Temporary Rust Preventive Fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
5. PGMA's under Sub-Vendor items are not indicated. Please refer respective Engineering Document for all sub-vendor items.
6. No painting is required for Stainless Steel components and galvanized items.
7. Wherever **inside surfaces** of components under PGMA 48 – XXX, need protection till erection, two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns shall be applied, after power tool cleaning.
8. The Temporary Rust Preventive coating that has already been applied on any component, tubes, pipes etc., shall be visually inspected for good adherence. If the coating is intact, direct coating of alkyd based red oxide paints over the coating is permitted. In case, the coating has peeled off over a large area, then the coating is to be removed by suitable solvents / heating to 350 –400 °C for an hour before primer paint application –but, in this case, it should be ensured that the minimum surface cleanliness required for primer paint application shall be SSPC – SP2 (equivalent – Hand Tool cleaning).
9. All currently active PGMA's are covered. Requirements for Missing / new PGMA's will be included under the relevant section, following the appropriate paint logic.
10. Ground shade/colour finish paints & identification tag/ band for equipments, piping, pipe service, boiler supporting structures and other boiler components shall be followed as per tender.
11. In components, wherever plates/sheets of thickness less than or equal to 5 mm, tubes/ rods/drain pipe are used, power tool /hand tool cleaning to SSPC-SP3/ SSPC-SP-2 shall be followed and the painting shall be done as described in SI no: 5.1.
12. Touch-up painting of damaged areas shall be carried out as per clause applicable painting scheme.
13. Only weldable primer shall be applied on surfaces, which require to be welded subsequently at site. At those locations no other paint shall be applied.
14. DUs coming under Constant Load Hangers (CLH) shall be painted as per the system - PS 15 indicated in SI. No. 4 of the table. However, for DUs coming under Variable Load Hangers (VLH), the painting shall be as per Painting Scheme PS 1A indicated in SI. No. 5.1 of the table. (i.e., one coat of Red Oxide Zinc Phosphate Primer followed by two coats of Synthetic Enamel Paint –shade smoke grey, total DFT – 70 microns)

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-III PAINTING SCHEME

Painting Scheme – Details for procurement & application purposes

Sl. No	Material Code of Paint	Generic nature of paint	Theoretical Covering Capacity Sq. m per Litre	No. of pack	Volume solids, % (min) **	DFT in microns (min) per coat	Shade	Shade No. to IS5	Mode of appln	Over coating interval, Hrs.
1	120016131800	Heat Resistant Aluminium paint to IS 13183 Grade I	10	1	-	-	Aluminium	--	Brush / Spray	24
2	120011111900	Red oxide Zinc Phosphate primer paint to IS 12744	10	1	--	--	Red Oxide	--	Brush / Spray	12
3	120011121900	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	--	--	Red Oxide	--	Dip	12
4	120011311200	Long oil alkyd synthetic enamel finish paint to IS2932	10	1	--	--	Reqd. shade	Corrpdg. Shade no.	Brush / Spray	12
5	120011140000	Temporary Rust preventive fluid to PR: CHE: 09 - 04	10	1	--	--	Amber	--	Brush / Spray	12
6	120012141700	Epoxy Zinc rich primer to IS14589 Gr. II	8	2	35	40	Grey	--	Spray	24
7	120013310200	Aliphatic acrylic polyurethane paint to IS13213	10	2	40	30	Phirozi - Blue.	176	Spray	24
8	120017101800	De Oxy Aluminate Weldable Primer- Colour Aluminium	10	1	--	--	Aluminium	--	Brush / Spray	24
9	120014111700	HB Chlorinated Rubber Based Zinc Phosphate Primer - Colour Grey	8	1	40	50	Grey	--	Brush / Spray	12
10	120014301200	Chlorinated Rubber Based Finish Paint Smoke Grey	10	1	30	30	Smoke grey	692	Brush / Spray	12
11	120011130000	General Purpose Aluminium Paint to IS 2339	10	Dual	20	20	Aluminium	--	Brush / Spray	24

The covering capacity of paints specified is only approximate.

The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers. ** Values are indicative.

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: General

GENERAL REQUIREMENTS – COMMON TO ALL WORK

11.1

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

11.2

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

11.3

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

11.4

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

11.5

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

11.6

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

11.7

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

11.8

The work shall conform to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to Contractor's fault, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by BHEL and recoveries will be

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: General

effected from the Contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL.

11.9

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

11.10

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

11.11

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

11.12

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

11.13

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

11.14

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

11.15

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

11.16

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

11.17

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

11.18

Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

11.19

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

11.20

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

11.21

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

11.22

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

11.23

Contractor shall lay/install the field-routed/small-bore pipelines to suit site condition/ requirement. Before laying/installing such pipelines, the contractor shall prepare necessary

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sketch for routing these pipe lines and get the same approved by BHEL. Contractor must take care of the location/layout of other systems and equipment before preparing such sketch to avoid interference. There is a possibility of minor change in routing such pipelines even after completion of erection; contractor shall carry out the same without any extra cost to BHEL.

11.24

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

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

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

11.25

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

11.26

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

11.27

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

11.28

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

11.29

In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant

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equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free - returnable basis which shall be returned to BHEL after the use.

11.30

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

11.31

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

11.32

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

11.33 Handling of materials from new storage yard.(SITE FEEDBACK CLAUSE)
Customer has allotted new storage area (outside plant boundary) about 2.4 km from main gate and the transportation distance involved upto erection site will be approx. 4.0 km. Some of the heavy consignments related to boiler & auxiliaries shall be unloaded in this yard also. Contractor has to arrange required capacity crane/trailer and all associated arrangement for loading/transportation of these material upto erection site. No additional claims shall be entertained for this work.

11.34

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

11.35

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

11.36

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

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engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

11.36

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

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

11.37

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

11.38

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

11.39

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

11.40 MEASUREMENT OF THE WORK COMPLETED

- A) Where payment is to be made on the basis of weight, the weight per unit given in the BHEL document only shall be taken in to consideration. In case such an information is not available in BHEL documents, then the latest relevant indian standards in this regard may be applied.
- B) Spares, surplus quantity, erection contingency materials will not be paid for unless the same has been consumed in place of regular item of measurable work as per the rate schedule.
- C) Where the payment is made on the basis of item rate, actual executed quantity measured jointly shall only be paid for.

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- D) It is clarified that as far as weight constituted by welding consumables and other consumables supplied by BHEL as well as by the Contractor, shall not be considered for payment.
- E) BHEL engineer's decision regarding stage of payment corresponding to progress of work, calculation of weight etc will be final and binding on the Contractor.
- F) No separate payment shall be made for grouting of equipments, structures etc specified elsewhere in these specifications.
- G) No separate payment will be made for the weight/volume of lubricant, oils, chemicals, gases, water, preservatives etc.
- H) No payment will be made for the special tools (e.g. Furnace platforms – sky climbers, passenger elevator) etc used in various activities of this work.
- I) No payment will be made for weight of rubber lining.
- J) Weight of packers and shims which become permanent part of equipment, both figuring in shipping list and those fabricated at site will be paid for on shipping list based actual weight.
- K) Certain optimized assemblies / or modules may be made, assembling products from two or more different product group main assembly and dispatched. Payment for erection of these optimized assemblies / or modules will be regulated as per the weight of individual product group main assemblies contributing to the total weight of the module or optimized assembly at the quoted rate for the respective product group main assemblies, in the rate schedule.

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

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

It may be recalled here that:-

Already about 45% of work of Erection is completed in various stages viz. Placement, Levelling/ alignment, Bolting, welding, NDT etc.

Wherever the mention of Scope of work occurs, the same shall construe / refer to the Balance work in respective areas.

12.1 PRESSURE PARTS

- A) Installation of temporary structure for drum lifting is in the scope of the Contractor's work. The required steel for the purpose will be provided in random sizes by BHEL free of charge. These shall be fabricated to suit the requirement, erected and welded as part of work. NDT has to be carried out as per instructions. These structures have to be dismantled at appropriate stage and returned to BHEL as per the instructions of BHEL engineer. Also, the relevant area of permanent structures have to be finished as instructed/ as per relevant codes of practice. Payment for above will be made at the rate accepted for structures; no separate payment will be made for fabrication, dismantling and finishing work and return of materials.
- B) Pressure parts components like headers, panels, coils, loose tubes etc have to be flushed/blown with compressed air, checked for dimensional accuracy and configuration and minor rectifications, if necessary will have to be done before erection. This will involve making appropriate bed of steel structures over the concrete blocks/ steel pedestals. Necessary steel, concrete blocks shall be arranged by the Contractor. bed shall be fabricated as per BHEL requirement.
- C) Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary, the Contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. No gas cutting will be permitted. All fittings like "T" pieces, weld neck flanges, reducers, etc shall be suitably matched with pipes for welding (This is applicable to piping work also).
- D) Welding of all attachments on pressure parts including those required for insulation work is in the scope of work.
- E) Surfaces inside seal box and other areas that are to be applied with castable refractory lining shall be painted with black bitumen paint before boxing up and application of refractory. Seal boxes need to be partially cut open in order to pour refractory. Contractor shall carry out necessary cutting and seal welding of such cutouts. Contractor shall provide the black bitumen paint of required specification for such applications.
- F) Furnace area and heat recovery area of flue gas passage has to be made leak proof by seal welding. Air leak test by pressurization has to be conducted to prove effectiveness of the seal weld and soap bubble or any other similar test will have to be carried out for the entire

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seal welds to ascertain the effective sealing is achieved. The tests may have to be repeated till satisfactory result is achieved.

- G) If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall erect the piping & valves and provide necessary assistance for the same. Required piping, valves and preservative (gas / chemicals) will be provided by BHEL as free issue.
- H) The drum internals, if already installed, may have to be removed to facilitate inspection by statutory authorities and chemical cleaning. The drum internals are to be preserved properly and re-fitted at appropriate stage as part of work.
- I) Superheater and/or reheater system will have HP butt weld joints of T-91 material. Welding of these HP joints shall involve pre-heating and post heating by resistance heating, argon purging of joints during welding process and full TIG weld. Contractor should follow required procedure for T91 welding NDT, etc.
- J) **BOILER DRUM** : Boiler drum may need to be led from the point of unloading to the cavity of boiler. The same is in the Contractor's scope and shall make all arrangements, including fabrication of saddle if required. Structural materials required for the same will be provided by BHEL on free-returnable basis.

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

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

12.2 TRIM & INTEGRAL PIPING OF BOILER AND POWER CYCLE PIPING

12.2.1

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

12.2.2

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

12.2.3

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

12.2.4

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

12.2.5

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

12.2.6

Mechanical freeness of valves have to be ensured prior to erection.

12.2.7

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

12.2.8

Main Steam pipeline up to turbine including the strainer and terminal joint with turbine is included in the scope of work. The material will be SA-335 P-91. Bidder shall follow BHEL approved procedure for welding, pre heating, PWHT & NDT of SA-335 P-91 material. Detailed procedure will be issued to the contractor. The main steam pipeline between strainer and turbine does not undergo steam blowing, therefore this pipeline must be throwly cleaned of dust, scale, burr, any foreign materials and deposits by manual and mechanical cleaning method. Contractor shall take utmost care in the cleaning activity so as to ensure that no undesirable particle enters inside the turbine. Contractor shall obtain specific written clearance from BHEL before and after the cleaning activity.

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

- a. Installation & removal of isolating devices/ NRVS and removal & re-fixing of internals required for hydraulic testing, pre-commissioning and commissioning activities. required gaskets will be supplied by BHEL free of cost.
- b. Matching of flanges for achieving parallelism and alignment resorting to heat correction or other suitable methods as per instructions of BHEL engineers.
- c. To locate the cause of vibrations in pumps or other auxiliaries and to carry out necessary corrections in piping and its supports. This may involve cutting, fresh edge preparation, welding, radiography, stress relieving, etc., of suction,

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discharge, re-circulating and other connected piping and its supports at a number of place.

- d. Fabrication and erection of racks and steel supports for all the piping including critical piping. Steel for this purpose will be supplied by BHEL.
- e. Erection, welding, NDE and stress relieving of certain equipments, e.g. flow nozzles, control valves etc, after completion of certain activities e.g. chemical cleaning, steam blowing etc is part of work. This may involve removal of portions from the already erected pipelines in order to introduce these equipments and resultant edge preparation etc shall be incidental to work. No separate/ additional payment is envisaged for cutting, welding and edge preparation in this regard. The removed pieces of pipes shall be returned to BHEL stores with proper cleaning, dressing and identification marking.
- f. Welding of root valves with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.
- g. Opening of valve actuators, dismantling of actuators from the valves, refitting and rendering assistance connected with the electrical and mechanical problems.
- h. Fixing and welding including due NDE & PWHT etc of carrier plates on to the pipes.

12.2.10

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

12.2.11

The location of drain headers, valves, stations, steam traps of piping as indicated in the BHEL drawings are suggestive only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, it has to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be changed as per the site conditions. All such works shall be carried out expeditiously as per the instructions of BHEL Engineer. The decision of BHEL Engineer is final and binding on the Contractor.

12.2.12

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

12.2.13

Erection of piping systems shall involve co-ordination with the erection of the turbine, turbo-generator, condenser, boiler, boiler feed pumps and other major equipments. Wherever required, approval of concerned BHEL Engineer/other erection agency must be obtained prior to making piping interface connections to such equipments. Sequence of work shall be carefully

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planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of BHEL Engineer and BHEL Engineer may direct the Contractor to reschedule his work to suit the status of the site work.

12.2.14

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

12.2.15

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

12.2.16

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

12.2.17

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

12.2.18

Contractor shall take utmost care and work in co-ordination with BHEL's turbine erection agency to ensure that no undesirable stress/force/load gets transferred to turbine or any other rotating machine that is connected to the pipelines in scope of this contract.

12.2.19

Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of job. Hanger settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

12.3 ROTATING MACHINERY

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

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- b All lubricants for testing, preservation and lubricants for Trial runs of the equipments shall be supplied by BHEL as free issue. All services including labour shall be provided by the Contractor for drawing these from BHEL / customer's stores, transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled / leaking lubricants thoroughly, consumables for such cleaning will be in Contractor's scope.
- c All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.
- d Trial run of the drives in un-coupled state and then coupled with equipment has to be done after necessary alignment.
- e Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc are in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.
- f Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may necessitate disconnection of cabling, removal of certain instruments etc and restoration thereafter.
- g Protective lubricant coats / fill provided on / in the critical area of equipments have to be removed at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied. cleaning / flushing agents / oils will be provided by BHEL.
- h Chemical cleaning, steam blowing and air drying of the connecting pipes for the lube oil system has to be carried out wherever required as per instruction manuals / drawings. chemicals, suiting BHEL specification, for such chemical cleaning is in the scope of Contractor.
- i Eventhough rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.
- j) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.
- k) There are six bowl mills for each boiler, all located in the mill & bunker bay between the boiler and the ESP.

12.4 ERECTION OF ELECTROSTATIC PRECIPITATOR

12.4.1

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

12.12

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

12.4.3

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

12.4.4

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

12.4.5

BHEL will supply Huck bolting M/c with necessary auxiliaries free of charges. However, electrical connections, operation etc shall be arranged by the Contractor.

12.4.6

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

12.4.7

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

12.4.8

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

12.4.9

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

12.4.10 AIR LEAK TEST

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

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

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12.5.1

Contractor shall supply and erect one number passenger cum goods elevator of 1 MT capacity to reach upto the boiler drum level to facilitate erection, movement of person and goods etc. the arrangement shall confirm to applicable safety norms. Contractor shall dismantle and take the elevator back after completion of work. The elevator shall be made ready at the time of drum lifting.

12.5.2

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

12.5.3

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

12.5.4

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

12.5.5

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

12.5.6

It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, to facilitate, say crane boom reach to higher elevation, passage of drum during drum lifting etc. this may necessitate temporary installation of some structural steels at appropriate locations to keep the stability of structure intact. such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the Contractor to suit the requirement.

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

12.5.7

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

12.5.8

Contractor shall arrange materials required for temporary cat ladders & working platforms during erection of columns, platforms and other structural components. Such

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arrangements shall, as far as possible, be only of clamping & bolting type, as welding on columns etc will not be permitted. After the completion of work these shall be removed.

12.5.9

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

12.5.10

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

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

12.5.11

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

12.5.12

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

12.6 OTHER PRODUCTS AND SYSTEMS AND COMMON REQUIREMENTS

- a) The ducting covered under this scope of work is flue gas ducting up to boiler outlet flange, boiler outlet flange to ESP, ESP to ID fans to chimney, hot and cold secondary air ducting from FD fans outlet to wind box, hot and cold primary air ducting from PA fans to mills including interconnections, flowmeters, dampers/gates and their drives, supports and suspensions etc for these systems.
- b) Ducts / expansion bellows (metallic & non-metallic) are normally supplied in loose components / segments and these are to be assembled and welded/ jointed at site before erection. The fabric portion of non-metallic expansion joints (NMEJ) namely

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- bolster, fabric belt and canopy shall be installed by Contractor under supervision/guidence of equipment supplier/BHEL for the first few cases. Contractor shall ensure that all subsequent NMEJ are assembled with due care and proper procedure. In simillar manner all joints, connecting ducts, expansion pieces and dampers shall be seal welded. these welds have to be made leak proof and tested as per technical instruction / requirement.
- c) Certain structural items like silencer supports, roof cladding structure, platform etc will be supplied in running lengths which shall be cut to required suitable sizes and adjusted/trimmed as part of work.
 - d) Contractor has to make canopies for motors, actuators, lub oil units, control valves, etc. material for this will be supplied in random lengths / sizes. no separate payment for fabrication is envisaged. only the erection tonnage rate applicable for structure will be paid for this work.
 - e) BHEL will supply Metapoly Sheets for roof and side cladding of Boiler and elevator structure. These sheets are to be fixed with self tapping screws (supplied by BHEL) in similar manner as in case of Galvanized floor grills. Contractor shall deploy the drilling cum fixing machine required for this purpose as a regular scope of work.
 - f) ID fans are provided with variable frequency drives. Contractor has to erect & commission the only the motor and other mechanical components like coupling etc. Panels, transformers, cabling etc are not in this work specification.
 - g) Actuator / drives of dampers, gates etc may have to be serviced, lubricated before erection, during precommissioning and commissioning, including carrying out adjustments required as incidental of the work.
 - h) All welded joints should be painted with anticorrosive paint / primer immediately after completion of all work. Necessary paints and other consumables for the above work are in the scope of the Contractor.
 - i) Spring suspension / constant load hangers may have to be preassembled for required load and erection carried out as per instruction of BHEL. adjustments, removal of temporary arrests / locks, cutting of excess thread length of hanger, tie rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents / instructions, during various stage of erection and testing and after floating of piping / ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.
 - j) Hangers and suspensions, support steels for ducts and other equipments, piping etc will be supplied in running/random lengths/ sizes, which shall be cut to suitable sizes and adjusted as required.
 - k) Touch up and preservative painting of all components issued to and/or erected by Contractor shall form part of scope of work. The Contractor shall arrange all paints, primer and consumables, T&P and facilities.

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Chapter-XIII: FOUNDATIONS & GROUTINGS

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

13.1

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

Minor adjustment of foundation level, dressing and chipping of foundation surfaces and blue-matching (wherever required) for of all equipments as per BHEL Engineers instructions, should be done by the Contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto 35mm for achieving proper levels will be within the scope of work/specification.

13.2

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

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

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

13.3

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

13.4

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

13.5

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

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

13.6

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

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Chapter-XIV: WELDING, RADIOGRAPHY, NDT, PWHT

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

14.1 WELDING

14.1.1

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

14.1.2

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

14.1.3

Welding of high pressure joints shall be done by IBR certified high pressure welders who have been permitted by cib of state concerned for deployment at the site of work.

14.1.4

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

14.1.5

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

14.1.6

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

14.1.7

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

14.1.8

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

14.1.9

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

14.1.10

In the case of P-91 pipe welding, Contractor shall deploy welders having experience in welding of P-91 material. The welders engaged by Contractor if not qualified for P-91 welding will be trained by BHEL at BHEL welding research institute (WRI) trichy and allowed to work only after

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passing the required test arranged by BHEL. All the expenditure towards such qualification including cost of training, traveling expenses, stay etc., shall be borne by the Contractor.

14.1.11

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

14.1.12 SOCKET WELDING :

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

14.1.13

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

14.1.14

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

14.2 HEAT TREATMENT:

14.2.1

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

14.2.2

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

14.2.3

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

14.2.4

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

14.2.5

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

14.2.6

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

14.2.7

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

14.2.8

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

14.2.9

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

14.2.10

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

14.3 NON DESTRUCTIVE EXAMINATION:

14.3.1

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

14.3.2

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

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Chapter-XIV: WELDING, RADIOGRAPHY, NDT, PWHT

14.3.3

All x-ray / gamma ray films of weld joints shall be preserved properly and be handed over to BHEL/ IBR authorities and requisite clearances shall be obtained by the Contractor.

14.3.4

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

14.3.5

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

14.3.6

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

14.3.7

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

14.3.8

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

14.3.9

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

14.3.10

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

14.3.11

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

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14.3.12

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

14.3.13

No separate payment for any NDE activities, radiography, is envisaged.

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Chapter-XV: LINING & INSULATION

15 LINING AND INSULATION

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

1. Main Boiler
2. Boiler Auxiliaries including ESP.
3. Pipelines, Tanks & Vessels.
4. Other Equipment including BOIs, though not listed above but required for completion of any system in scope.

15.1

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

15.2

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

15.3

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

15.4

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

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

15.5

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

15.6

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

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Chapter-XV: LINING & INSULATION

15.6

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

15.7

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

15.8

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

15.9

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

15.10

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

15.11

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

15.12

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

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

15.13

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

15.14

Wastage allowance for the material issued are envisaged as follows:

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XV: LINING & INSULATION

The wastage allowance will be applicable on the net issued quantity i.e. total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site. Payment for the done will be regulated as per provision given in 'Terms of Payment'.

15.15

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

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

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

15.16

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

15.17

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

15.18

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVI PAINTING

16 PAINTING

16.1

Components of the Boiler & Auxiliaries will in general be supplied by BHEL with one coat of Primer and two coats of finish paint applied at the manufacturing shop; contractor shall apply one coat of finish paint on all such components (which are not insulated) after erection at site unless and otherwise the shop coating is damaged in the meanwhile. Following types of paints shall be used for this project.

- 1) Structure: Chlorinated Rubber
- 2) Safety Valves and their exhaust pipes: Heat Resistant Aluminium
- 3) Equipments: Epoxy / Chlorinated Rubber

6.1

In addition to components/equipment as above, there could be limited few without any prior protective coating. Such components shall first be thoroughly cleaned of all dirt, rust, scale, grease, oil and other surface deposits by wire brushing, scraping, washing, wiping with solvent or any appropriate method and the same being inspected and approved by BHEL followed by application of one coat of primer. Afterwards, the above parts shall be over-coated with two layers of Chlorinated Rubber paint as per application procedure prescribed by the paint manufacturer.

16.2 Touch-up painting on damaged areas -

- a) For coatings damaged up to metal surface

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

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

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

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

16.3

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

- (a.) clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVI PAINTING

- (b.) painting procedure to be followed as mentioned above for touch-up painting on damaged areas.

16.4

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

16.5

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

16.6

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

16.7

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

16.8

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

16.9

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

16.10

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

16.11

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

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Chapter-XVI PAINTING

16.12

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

16.13

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

16.14

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

16.15

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

16.16 PRIMER AND PAINTS FOR FINAL PAINTING

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII TESTING, PRE-COMMISSIONING, COMMISSIONING

17.1

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

17.2

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

17.3

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

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

17.4

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

In accounting of materials following wastage allowances are provided:

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

No wastage allowance for valves & other equipments.

17.5

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

17.6

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

17.7

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

17.8

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

17.9

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

17.10

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

17.11

- ✓ Contractor shall cut / open / dismantle work, if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.
- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as per relevant clauses of 'General Conditions of Contract.

17.12

During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools

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and plants, consumables, scaffolding and approaches etc till such time the commissioned unit undergoes trial operations.

17.13

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

17.14

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

17.15

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

17.16

At various stages of completion boiler has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out all the incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc. The boilers have a permanent N₂ blanketing arrangement.

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

17.17

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

17.18

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

17.19

Conduct of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points, instruments etc and provide necessary assistance in this regard.

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

17.20

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

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Chapter-XVIII PRESERVATION & PROTECTION OF COMPONENTS

18.1 PRESERVATION & PROTECTION OF COMPONENTS

BHEL will issue majority of the plant equipment/components duly applied with primer and one coat of finish paint at shop. Components/equipment that will finally remain exposed to atmosphere will be coated with Chlorinated Rubber painting system (except the steam system silencers and their exhaust pipes – provided with heat resistant aluminium paint); while the remaining components will be coated with synthetic enamel paint. During the course of activities at site, the shop coat of paint may get peeled off/burnt. Contractor at all stages of work, shall ensure appropriate preservation of all such equipment/ component that are in his custody including those erected by him by way of applying touch up paint coating. Such preservation shall conform to preservation procedure of BHEL (if any), else according to the instructions of BHEL engineer. BHEL will provide the necessary primer and paint for Chlorinated Rubber paint system free of charges; while contractor shall arrange for the preservation materials for all other types of surfaces including machined surfaces in his cost.

18.2

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

18.3

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

18.4

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

18.5

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

18.6

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

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BOQ FOR THIS TENDER