T E N D E R S P E C I F I C A T I O N

Sl No	Tender Specification Number	Unit Number
1	BHE/PW/PUR/ MANUT-BLR U # 1/1495	270 MW Boiler Unit # 1
2	BHE/PW/PUR/ MANUT-BLR U # 2/1496	270 MW Boiler Unit # 2
3	BHE/PW/PUR/ MANUT-BLR U # 3/1497	270 MW Boiler Unit # 3
4	BHE/PW/PUR/ MANUT-BLR U # 4/1498	270 MW Boiler Unit # 4

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION , TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS UP TO ESP INLET FUNNEL, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, FANS, POWER CYCLE PIPING, LP PIPING, REGENERATIVE PIPING, COAL MILLS AND COAL FEEDERS, DEAERATOR, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 1x270 MW MANUGURU THERMAL POWER PROJECT

AT

4X270 MW MANUGURU TPS TSGENCO

AT

MANUGURU, DISTT. - KHAMMAM, TELANGANA

VOLUME – I

CONSISTING OF:

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

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

CONTENTS			
Volume No	Description	No. of pages	Hosted in website bhel.com as files titled
NIL	Tender Specification Issue Details		(Part of **Vol-IA-1495-96-97-98**)
NIL	Notice Inviting Tender		(Part of **Vol-IA-1495-96-97-98**))
I-A	Technical Conditions of Contract		Vol-IA-**1495-96-97-98**)
I-B	Special Conditions of Contract		Vol-IBCD-**1495-96-97-98**)
I-C	General Conditions of Contract		(Part of Vol-IBCD-**1495-96-97-98**))
I-D	Forms & Procedures		(Part of Vol-IBCD-**1495-96-97-98**))
II	Price Bid Specification		Vol-II-1495

Tender Specification Issue Details

Sl No	Tender Specification Number	Unit Number
1	BHE/PW/PUR/ MANUT-BLR U # 1/1495	270 MW Boiler Unit # 1
2	BHE/PW/PUR/ MANUT-BLR U # 2/1496	270 MW Boiler Unit # 2
3	BHE/PW/PUR/ MANUT-BLR U # 3/1497	270 MW Boiler Unit # 3
4	BHE/PW/PUR/ MANUT-BLR U # 4/1498	270 MW Boiler Unit # 4

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION , TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS UP TO ESP INLET FUNNEL, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, FANS, POWER CYCLE PIPING, LP PIPING, REGENERATIVE PIPING, COAL MILLS AND COAL FEEDERS, DEAERATOR, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 1x270 MW MANUGURU THERMAL POWER PROJECT

AT

4X270 MW MANUGURU TPS TSGENCO

AT

MANUGURU, DISTT. - KHAMMAM, TELANGANA

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION . Refer Notice Inviting Tender

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date :

1495-
1496-
1497-
1498

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/ MANUT-Blr/1495-96-97-98 Date: 02/07/2015

NOTICE INVITING TENDER (NIT)

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

==========

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHE/PW/PUR/ MANUT-BLR U # 1/1495: Boiler Unit # 1** **BHE/PW/PUR/ MANUT-BLR U # 2/1496: Boiler Unit # 2** **BHE/PW/PUR/ MANUT-BLR U # 3/1497: Boiler Unit # 3** **BHE/PW/PUR/ MANUT-BLR U # 4/1498: Boiler Unit # 4**	
ii	**Broad Scope of job**	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION , TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF **ONE UNIT** of **BOILER AND ITS AUXILIARIES,** AIR PREHEATERS, DUCTS AND DAMPERS UP TO ESP INLET FUNNEL, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, FANS, POWER CYCLE PIPING, LP PIPING, REGENERATIVE PIPING, COAL MILLS AND COAL FEEDERS, DEAERATOR, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING INCLUDING ETC AT **4 X 270 MW MANUGURU THERMAL POWER PROJECT**. Subject tender for 4 Units of Boiler shall be awarded to 4 separate agencies	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings,*	*Applicable*

		Procedures, Bill of Quantities, Terms of payment, etc	
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :*** ***Start : 14/07/2015 ,*** ***Closes: 03/08/2015 , Time : 16.00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 04/08/2015, Time 15.00 Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be submitted at dispatch section of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: 1. Pratish Gee Varghese / Sr Engineer (Purchase 2. Shivkesh Meena / Engineer (Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***1 hour after the latest due date and time of Offer submission*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2,00,000/- (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Date: Atleast 5 days before the due date of offer submission* *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	*Date : Not applicable.*	*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	Shri V.V.R. Sastry, Ex-CMD/ BEL 957, 9th Main 3 Stage, 3 Block Basaveswaranagar	*Applicable(Bidders to submit duly filled & signed Annexure III of NIT)*

		Bangalore- 560079 Email: sastryvvr@gmail.com	
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be intimated by Fax/E-mail. Bidders to keep themselves updated with all such information	***A**pplicable*

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

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

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

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

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

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

Sl no	Description	Remarks
	Part-I A	

	ENVELOPE – I superscribed as : PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**:-	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled-in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. **Note:** a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/ Changes/ Errata etc pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	

ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

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

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

	OUTER COVER	
	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as:	

	TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i	o Envelopes I o Envelopes II o Envelopes III	

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

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

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

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

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

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

i). Total number of Packages
Total number of Packages in hand = P
Where

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

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

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

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

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

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

c) Sum 'S_1 ' of 'Monthly Performance Evaluation' Scores (S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5},…. S_{1-N}) for similar package P_1, for the 'period of assessment' 'T_1' (i.e $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \ldots S_{1-N}$). 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 '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

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

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (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	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix)

	Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)								= $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	---------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

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

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

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

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

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also

consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

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

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

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

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

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

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

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

'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

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

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

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

26.0 Order of Precedence

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

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

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

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Integrity Pact
04. Annexure-4: Important Information.
05 Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION , TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF **ONE UNIT** of **BOILER AND ITS AUXILIARIES,** AIR PREHEATERS, DUCTS AND DAMPERS UP TO ESP INLET FUNNEL, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, FANS, POWER CYCLE PIPING, LP PIPING, REGENERATIVE PIPING, COAL MILLS AND COAL FEEDERS, DEAERATOR, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC AT **4 X 270 MW MANUGURU THERMAL POWER PROJECT**. Subject tender for 4 Units of Boiler shall be awarded to 4 separate agencies
TENDER NO	**BHE/PW/PUR/ MANUT-BLR U # 1/1495: Boiler Unit # 1** **BHE/PW/PUR/ MANUT-BLR U # 2/1496: Boiler Unit # 2** **BHE/PW/PUR/ MANUT-BLR U # 3/1497: Boiler Unit # 3** **BHE/PW/PUR/ MANUT-BLR U # 4/1498: Boiler Unit # 4**

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)	**APPLICABLE**	
B	**Technical** **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**	**APPLICABLE**	

	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** **B.4** E T & C of Atleast One STG of 400 MW or higher, under direct order of BHEL subject to:- **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** **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		
C-1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (audited) of **Rs 1000 Lakhs** or more over last three Financial Years (FY) i.e. 2012-2013, 2013-14, 2014-15 OR 2011-2012, 2012-2013, 2013-14 if Annual Accounts for FY 2014-15 are not audited.	**APPLICABLE**	
C-2	**NETWORTH** (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.	**APPLICABLE**	
C-3	**PROFIT** Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1 above based on	**APPLICABLE**	

	latest Audited Accounts.		
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	**APPLICABLE**	By BHEL
E	Approval of Customer (if applicable) **Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	**APPLICABLE**	BY BHEL
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
F	Technical Tie up criteria (if applicable)	Applicable for PQR B.3 and B.4	

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

1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures
2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.
3. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)
4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above
5. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :~~

~~1. Bidder should have executed similar work of any one of the following:~~

~~a. One (1) work of value not less than Rs XXX~~

~~OR~~

~~b. Two (2) works of not less than Rs YYY~~

~~OR~~

~~c. Three (3) works of not less than Rs ZZZ~~

~~(Value XXX, YYY, ZZZ shall be as indicated by BHEL~~

~~2. 'Similar' work for criteria 5 above means~~

~~a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works~~

~~b. Electrical works in respect of 'ELECTRICAL'~~

~~c. CI works in respect of 'CI' Works~~

~~d. Material Handling and/or Management works in respect of 'MM' works~~

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

    1. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP
    2. Term 'Commissioning' indicated in PQR refers to 'assistance to commissioning' / 'commissioning'
    3. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG
    4. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping
    5. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping
    6. ~~"CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears.~~
    7. ~~"Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~
    8. ~~Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
    9. ~~'Readiness for coal Filling" in respect of Bunker Structure Work.~~
8. Boiler means HRSG or WHRB or any other types of Steam Generator consisting of Boiler structure, Non pressure parts and pressure parts.
9. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines
10. 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.
11. ~~In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR~~.
12. ~~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.~~
13. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR
14. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST

EACH CRITERIA AND FURNISH RELEVANT DOCUMENT IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

BIDDER SHALL CLEARLY INDICATE IN THE TABLE BELOW, HOW THEY ARE SATISFYING TECHNICAL PQR. EXPLANATION AND THE DOCUMENTS REFERRED IN THE TABLE BELOW SHALL ONLY BE CONSIDERD BY BHEL FOR TECHNICAL PQR EVALUATION:

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer	
2	Details about type of the Firm/Company	
3	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Fax No:
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (√) whichever applicable:- ONE TIME EMD / ONLY FOR THIS TENDER

		APPLICABILITY	BIDDER REPLY
5	Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES/NO
6	Whether Audited profit and Loss Account for the last three years submitted	Applicable	YES/NO
7	Whether Copy of PAN Card submitted	Applicable	YES/NO
8	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	YES/NO
9	Whether duly filed & Signed Integrity Pact (Annexure III of NIT) submitted	Applicable	YES/NO
10	Declaration by Authorised Signatory	Applicable	YES/NO
11	Whether No Deviation Certificate submitted	Applicable	YES/NO
12	Whether Declaration confirming knowledge about Site Conditions submitted	Applicable	YES/NO
13	Whether Declaration for relation in BHEL submitted	Applicable	YES/NO
14	Whether Non Disclosure Certificate submitted	Applicable	YES/NO
15	Whether Bank Account Details for E-Payment submitted	Applicable	YES/NO
16	Capacity Evaluation of Bidder for current Tender	Applicable	YES/NO
17	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	Not Applicable
18	Whether Power of Attorney for Submission of Tender/Signing Contract Agreement submitted	Applicable	YES/NO
19	Whether Analysis of Unit rates submitted	Applicable	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE - 3

INTEGRITY PACT

Between

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

And

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

Preamble

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

_____

_____

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

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

Section 1 - Commitments of the Principal

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

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

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

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

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

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

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

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

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

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for

purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

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

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

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

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

Section 4 – Compensation for Damages

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

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

Section 5 – Previous Transgression

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

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

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

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

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

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

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

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

Section – 8 Independent External Monitor(s)

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

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

8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the

monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

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

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

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

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

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

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

8.10 The word ‘Monitor’ would include both singular and plural.

Section 9 – Pact Duration

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

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

Section 10 – Other Provisions

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

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

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

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

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

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

Annexure-4

IMPORTANT INFORMATION

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

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

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

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

Engineer Purchase, Email id: svm@bhelpswr.co.in , Ph: +91 – 712 – 3048715

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

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

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

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

   i. Notice Inviting Tender: Sl No 9

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

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

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

6. PRICE VARIATION CLAUSE

Revision in Price Variation Compensation Clause no. 2.17 of Vol I C GCC:

Clause No. 2.17.9 of Vol IC GCC is revised as below:-
PVC shall be applicable only during the extended period of contract (if any) after the schedule completion date for the portion of work delayed / backlog for the reasons not attributable to Contractor. However total quantum of Price Variation amount payable/recoverable shall be regulated as follows:

i. For the portion of backlog attributable to the contractor and for the portion of backlog due to force majeure condition during contract period, PVC shall not be paid.
ii. For the period of force Majeure during extended contract period, PVC will be as per the indices applicable at the beginning of the force majeure period.
iii. void
iv. The total amount of PVC shall not exceed 20% of the cumulatively executed contract value during the extended contract period. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.

Clause No. 2.17.5 of is modified as below:-

Base date shall be the calendar month of the (schedule completion date of the contract). Schedule Completion date shall be the actual start date plus contract period as defined in Chapter VI 'Vol IA TCC'

7. OVER RUN COMPENSATION

Modification in Price Variation Compensation Clause no. 2.12 of Vol I C GCC:

Clause No. 2.12 of Vol IC GCC is Revised as below:-

IF THE CONTRACT IS EXTENDED BEYOND THE CONTRACT PERIOD FOR ANY REASON OTHER THAN THOSE ATTRIBUTABLE TO THE CONTRACTOR OR FORCE MAJEURE CONDITIONS, THE CONTRACTOR WILL BE COMPENSATED BY PAYMENT OF OVERRUN CHARGES AT THE RATE OF **RS.1,00,000/- (Rupees One Lakh Only)** PER MONTH. OVERRUN COMPENSATION WILL BE PAID FOR THE EXTENSION ATTRIBUTABLE TO BHEL ONLY. NO OVERRUN COMPENSATION WILL BE PAYABLE FOR THE EXTENSION ON ACCOUNT OF REASONS ATTRIBUTABLE TO CONTRACTOR AND/OR FORCE MAJEURE

CONDITIONS. OVERRUN COMPENSATION FOR ELIGIBLE PERIOD SHALL BE IN PROPORTION TO THE PROGRESS ACHIEVED AGAINST THE PLAN FOR RESPECTIVE PERIOD.

8. Acceptance of Bank Guarantee (BG)

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

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

"Bank Guarantee issued by:

a. Any of the BHEL consortium bank listed below :

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

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

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

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

9. **VOID**

10. 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:

10.1. 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).

10.2. 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.

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

10.4. 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.

10.5. 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.

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

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

10.8. 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.

10.9. 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.

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

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

10.12. 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.

10.13. 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.

10.14. 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.

10.15. 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.

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

10.17. 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.

11. **MODALITY FOR AWARD OF VARIOUS CIVIL & STRUCTURAL PKGS AT SUBJECT PROJECT**:

11.1

Following 11 packages of Mechanical E&C jobs is envisaged under the Project:

a. **Package 1**: Boiler U # 1
b. **Package 2:** Boiler U # 2
c. **Package 3:** Boiler U # 3
d. **Package 4:** Boiler U # 4

} One combined tender

e. **Package 5:** ESP Unit#1&2
f. **Package 6:** ESP Unit#3&4

} One Combined tender

g. **Package 7:** STG Unit#1&2
h. **Package 8:** STG Unit#3&4

} One Combined tender

i. **Package 9:** CW Piping Unit#1 & 2
j. **Package 10:** CW Piping Unit#3 & 4

} One Combined tender

k. **Package 11:** Misc Pumps and Piping

Subject tender is for **Package 1, Package 2, Package 3 and Package 4** at sl no a and d respectively. Successful tenderer of any of the package above shall not be considered for other packages i.e any bidder who has been awarded any of the package above (listed at Sl No 11.1 a to k), shall not considered in the tender for other packages except for the specific case indicated in Sl No 11.2.6 below. In case more than one package is tendered simultaneously, then BHEL reserves the right to open the price bids of any tender in any order.

11.2MODALITY FOR AWARD OF SUBJECT TENDER

There are 4 Units of 270 MW Boiler package (up to ESP inlet funnel but Including ID Fan), which is divided into 4 Blocks.

1. Tender specification (Volume I) and Volume-II Price Bid Specification are common for all the 4 units.
2. **All the 4 Units shall be awarded to separate agencies.**
3. **Single Notional Rate** for E & C of **One unit** of 270 MW Boiler Package has been invited in Volume II price bid specification.
4. Bidders are required to submit their Single Notional Rate for E & C of One unit of 270 MW Boiler Package only in Volume II Price bid Specification
5. L-1 Bidder shall be considered for award of Unit-1.
6. For award of remaining Boiler packages (Unit 2, 3 & 4), next bidder in the order of their price competitiveness (i.e. L-2, then L-3 and hence forth) shall be given an option to match awarded Single Notional Rate of Unit # 1 Boiler Package. In case any unit/s remains un-awarded, then BHEL may consider awarding that Boiler package to the bidder/s who is/are already awarded the job, in the order of their price competitiveness (i.e. L-1 then L-2 and hence forth) or opt any other suitable method to finalize that Boiler package.
7. In case after award of job, the agency fails to display satisfactory performance in execution of job and BHEL feels it is necessary to make alternate arrangement to execute balance work or any portion of work on risk purchase basis or otherwise, then BHEL reserves the right to finalize another/additional agency.
8. **Sub-contractor will be required to work on 24 hour (round the clock) basis**.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

1.0	Project Information
1.1	**BACKGROUND** TELANGANA STATE GENERATION COMPANY (TSGENCO) is setting up a coal based 4x270 MW Thermal Power Project at Bhadradri, Manuguru, Distt.-Khammam, Telangana. Site is located at a distance of 100 KM from Khammam Railway station. Location: 10 Kms from Manuguru Town Nearest Railwaiy Station: Manuguru (20 Kms) Nearest Airport/ seaport: Vijayawada (220 Kms from site) Access By Road/Major Cities: 38 KM from Bhadrachalam, 345 KM from Hyderabad Source of Coal: Singareni Coal Mines/Imported Coal Source of Water: Godavari River Meteorological Data: Dry Bulb Temperature (Max/Min): 44.8o C/13oC Humidity (Max/Min): 82%/31% Average Rainfall: 1250 mm annually Wind Speed: Basic wind speed of 44 m/sec as per IS - 875(Part-3) Seismic Zone: Zone III

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

2.0 SCOPE OF WORK

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

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION , TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF BOILER AND ITS AUXILIARIES, AIR PREHEATERS, DUCTS AND DAMPERS UP TO ESP INLET FUNNEL, FUEL PIPING, BOILER INTEGRAL PIPING & ASSOCIATED VALVES, FANS, POWER CYCLE PIPING, LP PIPING, REGENERATIVE PIPING, COAL MILLS AND COAL FEEDERS, DEAERATOR, CHEMICAL DOZING SYSTEM, INSULATION, FINAL PAINTING ETC OF 1x270 MW MANUGURU THERMAL POWER PROJECT

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

- ✓ Boiler Supporting Structures
- ✓ Boiler Pressure Parts and Deaerator
- ✓ Boiler Trim & Integral Piping and Mountings
- ✓ Fuel Oil Piping
- ✓ Non-Pressure Parts, Ducts, Dampers up to ESP inlet
- ✓ **Duct up to ESP Inlet funnel & its welding with ESP inlet funnel**
- ✓ Rotating Machines (e.g. Air Heaters, Coal Mills, Coal Feeders, Fans **(including ID Fan),** Blowers etc. with their drives & Lube Oil System etc.)
- ✓ ID Fan erection (excluding ID casing inlet and outlet bolting/welding with respective duct)
- ✓ Pulverized Fuel Piping
- ✓ External structures (e.g. Duct supporting, deaerator platform, pipe rack structures (for oil piping support released under PGMA 80-923 by PC Chennai) etc. Including elevator structure.
- ✓ Handling arrangements for Rotating Machines
- ✓ Power Cycle Piping (Main Steam, HRH, CRH etc.) and valves including HP/LP Bypass, BFD Strainer
- ✓ Regenerative piping
- ✓ Chemical Dozing System
- ✓ Entire piping supplied by PC Chennai (SG piping, TG piping, LP piping)
- ✓ High pressure Valves, Hydraulic devices, Flow meter/nozzles, valves (PEM/PC supplied) associated with all equipment & piping of Contractor scope
- ✓ Yard/ LP Piping (PG 80-650,80-612,80-616) from pump house to boiler.
- ✓ Insulation of entire Blr, Deaerator, Piping (HP & LP), Re generative & Misc. tanks and equipment's etc.
- ✓ Painting of entire un insulated areas. Applicable paints and primer shall be arranged by Agency within the quoted price.

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

4) Transportation / Dragging of boiler drum from unloading bay to inside boiler structures and positioning on ground, erection using Strand Jack Method including final alignment. **Strand & Jack is in scope of BHEL-PSWR.**

5) Non-Destructive Examination & post weld heat treatment

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

7) Surface preparation and Final Painting of erected items

8) Trial Operation and associated tests

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

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

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

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Open space for labour colony		Yes	Contractor has to make their own arrangements for labours accommodation (Labour colony)
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	**ELECTRICITY**			
3.2.1	**Electricity For construction purposes of Voltage 415/440 V**			FREE
a	Single point source	Yes		At a distance of 500 M from site (Distance is only approximate, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Cables, switchboards Protection devices and its service etc.		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

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Single point source	Yes		At a distance of 500 M from site (Distance is only approximate, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**		Yes	Contractor has to make their own arrangement.
a	Single point source		**YES**	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	**WATER SUPPLY**			
3.3.1	**For Construction purposes:**			FREE
a	Making the water available at single point	Yes		

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	**Water supply for bidder's office, stores, canteen etc**			FREE
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			Contractor has to make their own arrangements
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	

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

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

Sl.No	Description **PART II** **3.9.0 ERECTION FACILITIES**	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done **once in every fortnight.**		Yes	**Special care shall be given from top management of contractor for this fast track project**
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself		Yes	
L	Arranging the materials required for preassembly		YES	

				FOR EACH UNIT
SN	**DESCRIPTION**	**CAPACITY (MINIMUM)**	***MINIMUM* QUANTITY**	***REMARKS***
1	Crawler Crane	75 MT	1	**From BES to Synch. (17th Month)**
1	Mobile Crane/Hydra	18 MT	2	
2	Pick & Carry Crane	8-12 MT	3	
3	Trailer with Prime Mover	30 MT	1	
4	Trailer with Prime Mover	20 MT	2	
5	Truck/Tractor Trolley	9 MT	2	
6	Passenger cum Goods Elevator	1.5 MT	1	
7	Air Compressor (Electric/Diesel operated)	140 CFM, 7 Kg/cm^2	1	
10	TIG Welding Set	As required	As required	
11	Plasma Cutting M/c.	For cutting up to 10 mm thick Stainless Steel	As required	
12	3-Phase Distribution Board with Complete Set Up for Drawl of Construction Power	As required	As required	
13	Power Cable for drawl of Construction Power	As required	As required	
14	Pre Heating / Stress Relieving Set (Heating Control Panel, Cables, Heating Elements, Thermometers etc.)	As required	As required	
15	Radiography Arrangement with Radioactive Isotope Source	Iridium-192	2 sets	
16	Radiography Arrangement with Radioactive Isotope Source	Cobalt-60	1 set	
17	Theodolite of Required Accuracy	To ensure verticality of structural columns	1	
18	Self Drilling Cum Tapping Machine for Screws of Boiler Roof Sheets	As required	4	

19	CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION, OPR TEMP 80 DEG CEL, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT ETC. SUGGESTED RATING: 200 M^3, 120 – 150M WC, WITH COMPATIBLE ELECTRIC DRIVE MOTOR. However, Contractor shall deploy the required capacity pump with accessories after obtaining written approval of BHEL.	As required	4 nos	For Boiler EDTA and Detergent/Pre-Boiler flushing
	CHEMICAL TRANSFER PUMPS OF RATING 30M3/HR WC 10M. HOWEVER, CONTRACTOR SHALL DEPLOY THE REQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.		2 Nos	For Boiler EDTA and Detergent/Pre-Boiler flushing
20	Arrangement for UT of higher thickness joints with recording facility	Type USN 50 or equivalent/ upgraded type	1 Set	
21	Electro-hydraulic pipe bending machine	Up to 2" Nb and 12 mm thick pipes	1 No	
22	Welding Generator (Electrical)	300 Ampere rating	40 Nos	
23	Welding Generator (Diesel Operated)	300 Ampere rating	4 Nos	
24	Radiography Film Viewer	As required	As required	
25	Hydraulic Pipe Bending Machine (manual)	For bending of pipes up to 50 mm Nb size	4 Nos	
26	Baking Oven with thermostat and temperature gauge for welding electrodes	As required	3 Nos	
27	Holding Oven with thermostat and temperature gauge for welding electrodes	As required	2 Nos	
28	Portable Oven for welding electrodes	As required	40 Nos	
29	Electric Winch	5/10 Ton Capacity	4	

30	Electric Winch	3 Ton Capacity	4	
31	FILLING PUMP AND PRESSURIZING PUMP FOR HYDRO TEST	600 & 450 Kg per cm^2	01 No EACH	For Hydraulic test of Boiler and HP pipelines.
34	Furnace Maintenance Platform (Sky Climber)	0.5 MT	1	
35	Hand Winch	0.5 Ton Capacity	2	
36	Scaffolding Materials	Suitable for working at various heights	2,000 Pipes with 6000 clamps	Adequate qty for parallel working in multiple work fronts.
37	Profile making M/c	for aluminium sheet cladding work	As required	
38	Nibbling M/c		As required	
39	Shearing M/c		As required	
40	Water Pump to lift water to top of boiler	for refractory and other required activities	1 Set	
41	Portable Grinding M/c	As required	As required	
42	Portable Drilling M/c	As required	As required	
43	Chain Pulley Blocks	Up to 15 MT Capacity	As required	
44	Fire retardant Tarpaulins	As required	As required	
45	Fire Extinguisher	As required	As required	
46	DG SET	As required	01 sets	For continuos/ uninterrupted back up power during welding & post weld heat treatment of HP joints.

47	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy		as required	
48	Digital and Analogue Multimetres		as required	
49	U Tube Manometer 0-2000 mm Water Column		as required	
50	Inclined Manometer 0-50 mm Water Column		as required	
51	Calibrated Pneumatic Torque wrench		4 nos.	
52	Bolt Tension Calibrator		as required	
53	Dewatering pumps		as required	
54	Various sizes of clamps/ fixtures for assembling		as required	
55	Portable hardness tester		as required	
56	Hardness testing equipment (Equotip or Microdur make) 33 Stress relieving equipment with temperature		(min 2 nos)	
57	Magnetic particle testing equipment-DRY & WET Type		as required	
58	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		as required	Since Boiler erection start
59	Spectrometer for metal testing		as required	
60	Alco meter for paint thickness checking		as required	
61	Hand Operated Megger 500 / 1000 V		as required	
62	Concrete Blocks		30 nos.	For making bed of steel structure for checking dimensional accuracy, configuration and minor rectification.

63	Wooden sleeper 1.5 Mtr length	Since beginning	50 No's	For material storage at site.
64	Safety Net	Since beginning	04 Nos	

PASSENGER CUM GOODS ELEVATOR

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

The probable suppliers for the elevator are:

1. M/s Avon cranes pvt ltd, Gurgaon

2. M/s Mekaster engineering & equipment pvt ltd, Halol, Gujarat

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:

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

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

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

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

a) IN RESPECT OF 18 MT CRANE- @ RS 3000/-
b) IN RESPECT OF 8-12 MT CRANE- @ RS 1000/-

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

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	Cranes		All cranes (except Contractor scope) required for mentioned work will be arranged by BHEL as per requirement.
2	Strand and Jack Arrangements for Boiler Drum Erection	01	For Drum lifting
3	Induction Heating machine	As required	For welding of P-91 pipeline.
4	Air Leak Test equipment with all auxiliaries.	01 SET	For leakage test of Ducts.

Note: For Crane:

1. The HLHR crane will be used for erection of ceiling structures and equipment/components above boiler ceiling structure or components/equipment out of reach of other cranes or non-availability of other BHEL cranes or for activities that essentially require services of this crane as decided by BHEL. This crane will accordingly be deployed at appropriate time as decided by BHEL for suitable duration and intended purpose. Contractor shall make necessary arrangements like lying of special sleeper beds and steel plates (all arranged by contractor), assembly and dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane.

Common for All:

2. The cranes may be BHEL owned or may be obtained on hiring basis including operating and maintenance crew.
3. Operator and O&M for BHEL owned crane will be provided by BHEL.
4. Operator and O&M for hired crane will be provided by the hiring agency.
5. Contractor shall provide the fuel for BHEL provided cranes (Hired/owned) for his use.
6. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work. Contractor shall also make necessary arrangements like laying of special sleeper beds and steel pates (all arranged by contractor) for movement and operation of the crane.

Cranes provided by BHEL will be on sharing basis with other agencies / contractors of BHEL. The allocation of cranes shall be the discretion of BHEL engineer, which shall be binding on the contractor. Cranes will be deployed at appropriate time as decided by BHEL for suitable duration and intended purpose. Augmentation of BHEL T & P under special circumstances shall be discretion of BHEL.

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

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

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

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

6.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

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

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

SL No.	Milestones	UNIT - 1	UNIT - 2	UNIT - 3	UNIT - 4
1	Start Boiler Erection	20.10.15	20.10.15	20.10.15	20.10.15
2	Boiler Drum Lifting	18.01.16	18.01.16	02.02.16	02.02.16
4	Boiler Hydro Test	18.08.16	18.08.16	02.09.16	02.09.16
5	Boiler Light Up (BLU)	03.11.16	03.11.16	18.11.16	18.11.16
6	EDTA/Detergent flushing/Acid Cleaning	03.12.16	03.12.16	18.12.16	18.12.16
7	Steam Blowing completion and S V Floating	03.01.17	03.01.17	18.01.17	18.01.17
8	Synchronization with oil	03.02.17	17.02.17	28.02.17	15.03.17
9	Synchronization with coal firing	15.02.17	01.03.17	15.03.17	31.03.17
10	Completion of trial run	27.02.17	13.03.17	28.03.17	10.04.17

The milestones above shown is tentative and may change based on the actual site condition. In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

6.1.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be **17 (Seventeen) months** for Unit-1&2 and **18 (Eighteen) months for Unit-3 & 4** from the "start of contract period" as specified earlier.

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

Sub-contractor will be required to work on 24 hour (round the clock) basis.

6.1.5 **GRACE PERIOD**

Grace period of 3 (Three) months beyond the contract period of 17 months may be provided for this contract at the discretion of BHEL.

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

SL NO	Contract (Main Package) Identitification ---->	Boiler				Rotating Machine	PIPING			INSULATION
	Rate schedule Identification ------->	**Structure**	**Pressure Parts**	**Non Pressure Parts (upto ESP inlet Funnel)**	**Air Pre Heaters**	**1) RM 2) Handling Eqpts**	**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	20	15	--	--
1.2	PLACEMENT IN POSITION	15	10	10	--	20	20	25	--	50
1.3	ALIGNMENT	15	15	10	--	20	10	15	--	15
1.4	WELDING/BOLTING/FIXING	15	20	15	--	20	15	30		20
1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)	5	10	--	--	--	5	--	--	--
1.6	On Drum Lifting	--	--	--	--	--	--	--	--	--
1.7	COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS	--	5	--	--	--	--	--	--	--
1.8	COMPLETION OF ROOF SKIN CASING	--	5	--	--	--	--	--	--	--
1.9	INSTALLATION OF TEMPORARY PIPING	--	--	--	--	--	--	--	60	--

1.10	DISMANTLING OF TEMPORARY PIPING, EDGE PREPARATION AND RETURN TO BHEL STORES, AREA CLEANING	--	--	--	--	--	--	--	25	--
1.11	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG	--	--	25	--	--	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	--	--	--	--	--	--			--
1.16	COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC	--	--	--	--	--	--	--	--	--
1.17	ERECTION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES	--	--	--	--	--	--	--	--	--
1.18	EQUIPMENT TRIAL OPERATION	--	--	--	--	10	--	--	--	--
1.19	HYDRAULIC TEST OR PNEUMATIC TEST	--	--	--	--	--	3	--	--	--
1.20	FLOATING OF LINES, FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES (if not applicable, this portion to be clubbed along with hydraulic test/pneumatic test)	--	--	--	--	--	2	--	--	--

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

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

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

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 04 dated 14/05/2015)

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

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

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

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

8.2 'Enabling Works'

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

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

~~liability of BHEL under reverse charge mechanism. BHEL reserves the right to determine such liability based on the invoice submitted by the contractor or otherwise independently and remittance of the same with the Government.~~

8.3 New Taxes/Levies

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

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

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

8.4 BOCW Cess

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

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

10.0 EXCLUSIONS

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

i) Sub-delivery items and electrical components such as push-buttons, junction boxes etc.
Ii) E&C work of cable trays, cables and earthing etc
Iii) Control panels, EPMS, MCC etc.
iv) Electrical & C&I items of handling system (PG 99)
v) All electrical and control & instrumentation items except those specified elsewhere in these specifications.
vi) Civil works except to the extent specifically indicated elsewhere in this tender.
vii) Pneumatic copper tubing and fittings thereof.
(viii) Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
(ix) Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications.
(x**)** ***ID casing inlet and outlet bolting/welding with respective duct (It is in scope of ESP Erection contractor)***
xi) ***MS/HRH Strainer, MS/HRH Control valves is in scope of TG Erection agency****.*

SPECIFIC INCLUSIONS

PRIMER & PAINTS AS PER PAINTING SPECIFICATION MENTIONED IN ANNEXURE-II OF THIS SPECIFICATION SHALL BE ARRANGED BY CONTRACTOR WITHIN THE QUOTED PRICE FOR WHICH a SEPARATE SUPPLY ORDER SHALL BE PLACED AS MENTIONED IN PRICE BID DOCUMENT.

APPENDIX -1
LIST OF APPLICABLE PGMA'S

TRICHY SUPPLY

PACKAGE -1 BOILER,DUCT SUPPORTING STR, DUCTING,PC/LP PIPING ,INSULATION & PAINTING

SL N	PGMA	DESC	Weights(T)	CAT	Rate identifier
1	35010	Foundation Material	10.90	Str	1.1
2	35110	Main Columns Left	228.30	Str	1.1
3	35120	Main Columns Right	228.30	Str	1.1
4	35130	Main Columns Mid	111.80	Str	1.1
5	35140	Auxiliary Column	82.60	Str	1.1
6	35150	Auxiliary Column	82.60	Str	1.1
7	35160	Airheater Column	63.80	Str	1.1
8	35190	Girder Pin Conne	6.90	Str	1.1
9	35210	Boiler Ceiling S	322.90	Str	1.1
10	35220	Boiler Ceiling S	66.20	Str	1.1
11	35230	Boiler Ceiling S	14.40	Str	1.1
12	35310	Horizontal Braci	19.80	Str	1.1
13	35320	Horizontal Braci	21.00	Str	1.1
14	35330	Horizontal Braci	18.10	Str	1.1
15	35340	Horizondal Braci	20.80	Str	1.1
16	35350	Horizondal Braci	15.10	Str	1.1
17	35360	Horizondal Braci	17.50	Str	1.1
18	35380	Landing Platform	24.50	Str	1.1
19	35381	Land Platform Ti	23.10	Str	1.1
20	35390	Misc Structures	48.30	Str	1.1
21	35441	Horil Beams Firs	105.00	Str	1.1
22	35443	Horil Beams Firs	103.60	Str	1.1
23	35511	Front Bracing-Ti	17.80	Str	1.1
24	35513	Front Bracing-Ti	17.30	Str	1.1
25	35521	Side Bracing-Tie	56.50	Str	1.1
26	35523	Side Bracing-Tie	48.90	Str	1.1
27	35531	Rear Bracing-Tie	38.40	Str	1.1
28	35533	Rear Bracing-Tie	30.10	Str	1.1
29	35700	Hsfg Fasteners	8.60	Str	1.1
30	35811	Floor Grills And	93.90	Str	1.1
31	35821	Stairs – Lower	25.10	Str	1.1
32	35823	Stairs – Upper	8.60	Str	1.1
33	35851	Handrails And Po	42.80	Str	1.1
34	35993	Consumables And	19.70	Str	1.1
35	36310	Main Floor I	87.70	Str	1.1
36	36311	Main Floor I Mbl	68.20	Str	1.1
37	36320	Main Floor Ii	69.00	Str	1.1

38	36321	Main Floor Ii Mb	53.80	Str	1.1
39	36322	Main Floor Ii Mb	90.00	Str	1.1
40	36330	Main Floor Iii	25.40	Str	1.1
41	36331	Main Floor Iii M	28.60	Str	1.1
42	36332	Main Floor Iii M	35.00	Str	1.1
43	36340	Main Floor Iv	22.00	Str	1.1
44	36341	Main Floor Iv Mb	45.80	Str	1.1
45	36350	Main Floor V	43.50	Str	1.1
46	36351	Main Floor V Mbl	23.60	Str	1.1
47	36352	Main Floor V Mbl	7.80	Str	1.1
48	36360	Main Floor Vi	9.10	Str	1.1
49	36361	Main Floor Vi Mb	32.80	Str	1.1
50	36391	Miscellaneous Pl	12.70	Str	1.1
51	36392	Miscellaneous Pl	6.80	Str	1.1
52	36393	Aph, Scaph, Cw P	8.20	Str	1.1
53	36610	Boiler Roof Stru	68.00	Str	1.1
54	36611	Boiler Roof Shee	19.10	Str	1.1
55	36612	Weather Protecti	18.80	Str	1.1
56	36620	Boiler Side Clad	46.00	Str	1.1
57	36621	Boiler Side Clad	11.40	Str	1.1
58	36740	Posts And Hanger	35.00	Str	1.1
59	36811	Floorgrillsandgu	28.70	Str	1.1
60	36813	Floorgrillsandgu	52.40	Str	1.1
61	36820	Stairs And Ladde	11.20	Str	1.1
62	36851	Handrails And Po	23.70	Str	1.1
63	36853	Handrails And Po	10.70	Str	1.1
64	38299	Mill Handling Mo	36.00	Str	1.1
65	38310	Inter Conn Platf	30.00	Str	1.1
66	38410	Mill Maintanance	41.50	Str	1.1
67	38810	Floorgrills And	47.50	Str	1.1
68	38820	Stairs And Ladde	3.60	Str	1.1
69	38850	Hand Rails And H	16.50	Str	1.1
70	38993	Consumables And	10.50	Str	1.1
71	**HYD**	**Deaerator plateform structure**	12.00	HYD-Str	1.1
		BOILER STRUCTURE TOTAL	**3235.80**		
		Boiler pressure parts			
1	04126	Drum Without Internal	133.20	PP	1.2
2	04136	Drum Internal	4.10	PP	1.2
3	04146	Drum Suspension	13.90	PP	1.2
4	05137	Front WW Inlet Hdr.	13.80	PP	1.2

5	05147	Rear WW Inlet Hdr.	13.80	PP	1.2
6	05155	Side WW Inlet Hdr.	16.80	PP	1.2
7	05175	Extended Side WW Inlet Hdr.	1.30	PP	1.2
8	05227	Rear Hgr WW Out let Hdr	2.90	PP	1.2
9	05229	Rear WW Screen Out let Hdr.	5.30	PP	1.2
10	05231	Front WW Out let Hdr.	3.70	PP	1.2
11	05251	Side WW Out let Hdrs.	6.80	PP	1.2
12	06400	Fur Burner Panel	15.90	PP	1.2
13	06631	Front Upper WW Panel.	31.10	PP	1.2
14	06634	Front Intermediat WW panel.	41.30	PP	1.2
15	06637	Front Lower WW Panel.	23.00	PP	1.2
16	06644	Rear Intermediat WW panel	43.20	PP	1.2
17	06647	Rear Lower WW panel.	23.00	PP	1.2
18	06651	Side Upper WW Panel	64.10	PP	1.2
19	06655	Side Lower WW Panel.	57.70	PP	1.2
20	06670	Extended Side WW Panel.	8.40	PP	1.2
21	07108	Down Comer Piping Upper.	64.80	PP	1.2
22	07109	Down Comer Piping Lower.	86.50	PP	1.2
23	07215	Relief Tubes Front	23.60	PP	1.2
24	07216	Relief Tubes Side.	21.90	PP	1.2
25	07218	Relief Tubes Rear.	7.60	PP	1.2
26	07223	Fur Screen tube.	22.50	PP	1.2
27	07225	Furnace Rear Hanger.	9.70	PP	1.2
28	07226	Furnace Rear Arch.	19.50	PP	1.2
29	07231	Furnace LCT.	1.80	PP	1.2
30	07232	Fur UCT.	0.50	PP	1.2
31	07401	Waterwall Suspension	22.70	PP	1.2
32	07410	Downcomer Suspension.	7.70	PP	1.2
33	07420	Downcomer Guides	3.30	PP	1.2
34	07431	Riser Tube Support.	2.10	PP	1.2
35	07500	Misc Components	0.70	PP	1.2
36	07501	Furnace Insert Tube.	2.20	PP	1.2
37	07601	Pressure Parts Seals	0.80	PP	1.2
38	07700	Bulked Bps Items	0.90	PP	1.2
39	07992	Welding Electrode	0.10	PP	1.2
40	07993	Consumables & Eren material.	0.50	PP	1.2
41	08101	Furnace Upper Buckstay	52.00	PP	1.2
42	08104	Furnace Intermediate buckstay	43.00	PP	1.2
43	08107	Furnace Lower Buckstay	30.00	PP	1.2
44	08111	Furnace Rear Arch Buckstay	2.20	PP	1.2

45	08380	Furnace Bottom Buckstay	33.50	PP	1.2
46	08400	Furnace Guides	12.80	PP	1.2
47	08500	Furnace Backpass Buckstay	58.00	PP	1.2
48	08700	Expn.Movement Me	0.10	PP	1.2
50	08900	Furnace Key Buckstay	3.10	PP	1.2
51	09001	Seal Boxes For Furnace	5.90	PP	1.2
52	09002	Seal Boxes For Instruements.	1.20	PP	1.2
53	09003	Material For Ins	0.20	PP	1.2
54	28700	Bps Fasteners	0.70	PP	1.2
55	10135	LTSH In-let Hdr.	7.20	PP	1.2
56	10174	Final SH Inlet Hdr.	11.10	PP	1.2
57	10178	SH Platen Inlet Hdr	6.90	PP	1.2
58	10182	Bp Lower Rear Hdr	3.80	PP	1.2
59	10183	Bp Upper Side Inlet Hdr	5.40	PP	1.2
60	10184	Bp Extended Side Hdr	0.60	PP	1.2
61	10185	Bp Lower Front Hdr	3.70	PP	1.2
62	10191	SH Radient roof Inlet Hdr.	2.80	PP	1.2
63	10235	LTSH Out-let Hdr.	8.60	PP	1.2
64	10274	Final SH Outlet Hdr.	17.40	PP	1.2
65	10278	SH Platen Outlet Hdr	7.80	PP	1.2
66	10283	Bp Lower Side Hdrs	5.00	PP	1.2
67	10284	Bp Ext Floor Out-let Hdr.	1.00	PP	1.2
68	10291	SH Radient roof Outlet Hdr.	5.60	PP	1.2
69	10687	Sh Bp Junction Header.	3.20	PP	1.2
70	11236	SH Horizantle Spaced Upper LTSH Coil.	111.00	PP	1.2
71	11237	SH Horizantle Spaced Lower LTSH Coil.	144.00	PP	1.2
72	11274	SH Vertical Spaced Coils	135.00	PP	1.2
73	11278	Platen SH Vertical Spaced Coils	96.00	PP	1.2
74	11616	SH Rear Upper Panels	14.30	PP	1.2
75	11618	SH Rear Lower Panel	6.90	PP	1.2
76	11684	Bp Extended Side panels	3.60	PP	1.2
77	11685	SH Front Wall Panels	13.00	PP	1.2
78	11686	SH Side Wall Upper panels	15.40	PP	1.2
79	11687	SH Rear Roof Panels	11.50	PP	1.2
80	11688	SH Side Wall Lower panels	15.10	PP	1.2
81	11691	Sh Radiant roof tubes	20.50	PP	1.2
82	11694	Bp Extended Side panels	2.70	PP	1.2
83	12174	Vertical Spaced	8.20	PP	1.2
84	12184	Bp Extended Side	2.30	PP	1.2
85	12187	Sh Bypass Pipes	1.50	PP	1.2

86	12535	Sh Hor Spaced Ha	34.50	PP	1.2
87	12803	Sh Steam Cooled	0.80	PP	1.2
88	12805	Bp Frnt Wall Scr	4.70	PP	1.2
89	12850	Sh Connecting Pi	5.30	PP	1.2
90	12852	Links To Sh Plat	11.50	PP	1.2
91	12900	Sh Desuperheater	2.40	PP	1.2
92	12903	Sh Miscl Compone	27.50	PP	1.2
93	12906	Sh Suprts For Li	4.90	PP	1.2
94	12914	Suspension Of Sh	0.90	PP	1.2
95	12917	Suspension Of Ra	3.50	PP	1.2
96	12924	Suspension Of Sh	14.20	PP	1.2
97	12927	Suspension Of Re	2.10	PP	1.2
98	12928	Suspension Of Sh	5.00	PP	1.2
99	12944	Suspension Of Sh	2.00	PP	1.2
100	12948	Suspension Of Ve	19.80	PP	1.2
101	12954	Suspension Of Ve	4.70	PP	1.2
102	12968	Suspension Of Pl	14.60	PP	1.2
103	12992	Welding Electrod	0.10	PP	1.2
104	12993	Consumables & Er	2.70	PP	1.2
105	15174	Reheater Vert Sp	4.70	PP	1.2
106	15274	Reheater Vert Sp	16.90	PP	1.2
107	16275	Rh Vertical Spac	61.50	PP	1.2
108	16277	Vert Rear Platen	76.00	PP	1.2
109	17904	Rh Hdr Suprts &	5.10	PP	1.2
110	17919	Rh Front Suspens	13.60	PP	1.2
111	17929	Rh Rear Suspensi	13.50	PP	1.2
112	17992	Welding Electrod	0.10	PP	1.2
113	18001	Furnace Roof Ski	10.50	PP	1.2
114	18010	Pr Pts Attachmnt	2.10	PP	1.2
115	18020	Vibration Snubbe	0.30	PP	1.2
116	19114	Coils And Suppor	134.00	PP	1.2
117	19124	Coils And Suppor	134.00	PP	1.2
118	19701	Eco Inlet Hdr	5.60	PP	1.2
119	19702	Eco Outlet Hdr	4.80	PP	1.2
120	19753	Eco Junction Hdr	2.70	PP	1.2
121	19763	Eco Junction Hdr	2.70	PP	1.2
122	19783	Eco Junction Hdr	2.70	PP	1.2
123	19802	Eco Lwr Hanger T	13.10	PP	1.2
124	19850	Eco Inlet Links	3.00	PP	1.2
125	19851	Links From Eco O	10.50	PP	1.2

126	19904	Eco Suprts & Sus	11.00	PP	1.2
127	19905	Eco Suprts & Sus	6.80	PP	1.2
128	19906	Eco Suprts For L	0.60	PP	1.2
129	19907	Eco Supports/Fee	0.30	PP	1.2
130	19992	Welding Electrod	0.10	PP	1.2
131	21600	Soot Blower Pipi	6.60	PP	1.2
132	21601	Sootblower Pipin	5.70	PP	1.2
133	21700	Bulked Bps Compo	0.80	PP	1.2
134	21800	Soot Blower Valv	0.50	PP	1.2
135	21825	Soot Blower Valv	0.30	PP	1.2
136	21850	Soot Blower Safe	0.00	PP	1.2
137	21992	Imported Electro	0.10	PP	1.2
140	24260	Valves (Bhel)	22.80	PP	1.2
143	24265	Valves & Fitting	5.60	PP	1.2
144	24273	Direct Water Lev	0.00	PP	1.2
145	24275	Headers For Trim	0.10	PP	1.2
146	24280	Erv And Safety V	4.30	PP	1.2
147	24285	Safety Valve/Erv	33.10	PP	1.2
151	24700	Bulked Bps Compo	0.00	PP	1.2
152	24950	Special Tools	0.00	PP	1.2
153	24955	Lapping Tools Fo	0.10	PP	1.2
154	24960	Lapping Tools Fo	0.10	PP	1.2
155	24992	Imported Electro	0.00	PP	1.2
156	24993	Consumables & Er	0.00	PP	1.2
157	24994	Name Plates	0.30	PP	1.2
158	28220	Doors	5.70	PP	1.2
159	31010	Skin Casing Comp	3.50	PP	1.2
160	31102	Fornace Bottom S	1.10	PP	1.2
161	31104	Furnace Rear Arc	5.50	PP	1.2
162	31105	Second Pass Skin	0.00	PP	1.2
163	32010	Fixing Comp For	7.50	PP	1.2
164	32110	Fixing Comp For	3.70	PP	1.2
165	32120	Fixing Comp For	1.50	PP	1.2
166	32310	Fixing Comp For	33.00	PP	1.2
167	32410	Fixing Comp For	8.00	PP	1.2
168	32710	Fixing Comp For	1.50	pp	1.2
169	42001	Pneumatic Fittin	0.10	PP	1.2
170	42002	Steam Blow Mater	2.00	PP	1.2
171	42005	Instrument Fitti	0.80	PP	1.2
172	42010	LFO Pump set	3.50	PP	1.2

173	42020	HFO Pump set	10.70	PP	1.2
174	42030	HFO Heater set	11.00	PP	1.2
175	42046	Drain Oil Pump-M	0.10	PP	1.2
176	42065	Drain Oil Tank	6.00	PP	1.2
177	42070	Burner Station S	4.50	PP	1.2
178	42120	Piping, Pump Hou	11.00	PP	1.2
179	42128	Piping, Pump Hou	1.30	PP	1.2
180	42150	Piping, Operatin	5.20	PP	1.2
181	42152	Piping,Opr'G Flo	1.60	PP	1.2
182	42154	Piping,Opr'G Flo	2.10	PP	1.2
183	42157	Piping,Opr'G Flo	1.20	PP	1.2
184	42158	Piping,Opr'G Flo	2.50	PP	1.2
185	42200	Subdelivery Fuel	3.20	PP	1.2
186	42300	Bhel Valve F.O.	1.50	PP	1.2
187	42358	Bhel Valve,Opr'G	0.60	PP	1.2
188	42700	Bps Fasteners	1.30	PP	1.2
189	42992	Imported Electro	0.00	PP	1.2
190	45220	Wind Box Assemble	63.00	PP	1.2
191	45221	Wind Box Support	6.40	PP	1.2
192	50510	STEAM COIL A P H	3.03	RP-PP	1.2
193	52000	SPECIAL TOOLS/CONTRA	0.42	RP-PP	1.2
194	52010	LARG AH-ROTOR ASSY	343.23	RP-PP	1.2
195	52011	LARG AH-ROTOR POST	15.55	RP-PP	1.2
196	52012	LARG AH-ROTORPINRACK	3.80	RP-PP	1.2
197	52013	LARG AH-ROTORSEALS	4.58	RP-PP	1.2
198	52030	LARG AH-ROTORHOUSING	42.76	RP-PP	1.2
199	52041	HOT END CONN PLATE	39.66	RP-PP	1.2
200	52042	COLD END CONN PLATE	60.07	RP-PP	1.2
201	52054	LARG AH-AXIAL SEAL	0.42	RP-PP	1.2
202	52055	LARG AH-BY PASS SEAL	0.88	RP-PP	1.2
203	52100	LARGE AH ROTOR DRIVE	3.54	RP-PP	1.2
204	52211	LARG AH-AIRSEAL PIPE	0.67	RP-PP	1.2
205	52220	LARG AH-GENS DETAILS	2.33	RP-PP	1.2
206	52261	LARG AH-GUIDE BEARNG	2.92	RP-PP	1.2
207	52262	LARG AH-SUPRT BEARNG	4.26	RP-PP	1.2
208	52271	OIL PIPING GUIDE BRG	0.52	RP-PP	1.2
209	52272	OIL PIPING SUPRT BRG	0.54	RP-PP	1.2
210	52274	LUB OIL CIRCULATION	1.10	RP-PP	1.2
211	52275	LARGE AIR HEATER-LUB	0.59	RP-PP	1.2
212	52301	WASH MANIFLD GAS INL	0.60	RP-PP	1.2

213	52302	WASH MANIFLD GAS OUT	0.57	RP-PP	1.2
214	52326	CLEANG EQPT GAS OUT	0.26	RP-PP	1.2
215	52329	CLE EQPT DRIVE UNIT	1.63	RP-PP	1.2
216	52600	LARGE AH E,C&I COMPO	0.12	RP-PP	1.2
217	52988	LARG AH COMMISSIONIN	0.29	RP-PP	1.2
218	97088	Electronic Level	1.50	PP	1.2
219	97195	Pressure & Vessel	0.30	PP	1.2
220	97196	Electrodes & Gas	0.00	PP	1.2
221	97282	Flow meters	0.50	PP	1.2
222	97284	Field Gauges	0.00	PP	1.2
223	97285	Field Switches	0.00	PP	1.2
224	97287	Inst. & Acc. In St	0.10	PP	1.2
225	97297	MTM Clamps And P	0.00	PP	1.2
226	97298	MTM Thermocouple	0.50	PP	1.2
227	97577	ERV Control Equip	0.10	PP	1.2
228	97585	Acoustic Steam L	1.30	PP	1.2
229	97590	Erection Material	3.00	PP	1.2
230	97592	Pneumatic Tubing	1.20	PP	1.2
231	97599	Pneumatic Actuate	0.30	PP	1.2
232	97960	Face Cutter Tool	0.00	PP	1.2
233	HYD	Deaerator Storage tank section -1	20.50	HYD-PP	1.2
234	HYD	Deaerator Storage tank section -2	19.50	HYD-PP	1.2
235	HYD	Deaerator Storage tank section -3	18.00	HYD-PP	1.2
236	HYD	Heater with stand pipe	16.50	HYD-PP	1.2
		BOILER PRESSURE PARTS TOTAL	**3362.53**		
		Boiler Non Pressure Parts			
1	20051	Long Retractable	23.40	NPP	1.3
2	20054	Wall Box Non Pre	0.50	NPP	1.3
3	20201	Wall Deslagger R	8.90	NPP	1.3
4	20204	Wall Box Non Pre	1.10	NPP	1.3
5	20511	Da Head Valve As	0.10	NPP	1.3
6	20794	Wall Box Non 7re	0.10	NPP	1.3
7	20972	Temp Probe Duple	1.60	NPP	1.3
8	20998	Special Tools Fo	0.00	NPP	1.3
9	24225	Silencer supporting Structure	17.40	NPP	1.3
10	24235	Silencer supporting Structure	1.20	NPP	1.3
11	30103	Seal Plate Assy	2.90	NPP	1.3
12	30105	Furnace Bottom Enclouser	5.40	NPP	1.3
13	30211	Furnace Rear Arc Enclouser.	1.90	NPP	1.3
14	30212	Furnace Extd Sid Wall Enclouser	8.00	NPP	1.3

15	30215	Main Boiler	3.90	NPP	1.3
16	30219	Vertical Roof Enclouser	42.00	NPP	1.3
17	30220	Deck Support And	27.00	NPP	1.3
18	30224	Antivibration Ba	6.00	NPP	1.3
19	39101	Columns Before	45.80	NPP	1.3
20	39301	Struc And Platfo	6.40	NPP	1.3
21	39302	Struc For Motor	9.20	NPP	1.3
22	39303	Monorail Beams F	65.60	NPP	1.3
23	39304	Fan Handling Str	29.70	NPP	1.3
24	39305	Fan Handling Str	23.20	NPP	1.3
25	39810	Floor Grill	19.00	NPP	1.3
26	39820	Stairs	4.20	NPP	1.3
27	39850	Hand Rail And Ha	10.30	NPP	1.3
28	39993	Consumables And	12.50	NPP	1.3
29	39700	Hsfg Fasteners F	0.70	NPP	1.3
30	41350	Air Cooled Oil G	0.10	NPP	1.3
31	41390	Oil Gun Vice Ass	0.10	NPP	1.3
32	41500	High Energy Arc	0.10	NPP	1.3
33	43004	Assy Comp Scanne	1.70	NPP	1.3
34	43005	Assy Comp Mill S	18.00	NPP	1.3
35	43104	M/C Comp Scanner	12.00	NPP	1.3
36	43105	M/C Comp Mill Se	17.00	NPP	1.3
37	43200	Subdel,Ignitor,	10.00	NPP	1.3
38	47229	St Pipes,Shop Be	280.00	NPP	1.3
39	47223	Fuel Pipe Coupln	24.30	NPP	1.3
40	47221	Fuel Piping Supp	20.00	NPP	1.3
41	48012	Duct - Bet F.D	50.00	NPP	1.3
42	48014	Expn Jt - Bet F.	8.00	NPP	1.3
43	48015	Supportsetcbet F	12.00	NPP	1.3
44	48019	Foundation Mater	3.00	NPP	1.3
45	48112	Duct - S Pri Fan	45.00	NPP	1.3
46	48114	Expn Jt - Pri Fa	5.00	NPP	1.3
47	48115	Supportsetcpri F	15.00	NPP	1.3
48	48141	Seal Air Hag And	5.00	NPP	1.3
49	48142	Duct - Coldair	35.00	NPP	1.3
50	48144	Expn Jt - Coldai	6.00	NPP	1.3
51	48145	Supportsetccolda	5.00	NPP	1.3
52	48200	Instrument Tappi	5.00	NPP	1.3
53	48202	Duct - Sairheate	60.00	NPP	1.3
54	48204	Expn Jt - Airhea	15.00	NPP	1.3

55	48205	Supportsetcairhe	8.00	NPP	1.3
56	48207	Flowmeters For S	8.00	NPP	1.3
57	48212	Wind Box Connect	15.00	NPP	1.3
58	48214	Expn Jt - Windbo	5.00	NPP	1.3
59	48222	Sq Duct Ah-Hot A	28.00	NPP	1.3
60	48224	Expn Pcs Ah-Hot	7.00	NPP	1.3
61	48225	Support Ah-Hot A	8.00	NPP	1.3
62	48382	Duct - Eco-Hopp	72.00	NPP	1.3
63	48384	Expnjt - Eco-Ho	15.00	NPP	1.3
64	48385	Support - Eco-	25.00	NPP	1.3
65	48432	Duct - Airheate	50.00	NPP	1.3
66	48434	Expn Jt - Airhea	6.00	NPP	1.3
67	48435	Supportsetcairhe	7.00	NPP	1.3
68	48462	Duct - Boiler O	120.00	NPP	1.3
69	48464	Expn Jt - Boiler	16.00	NPP	1.3
70	48465	Bof To Ep Ductin	12.00	NPP	1.3
71	48662	Circular Duct Ho	65.00	NPP	1.3
72	48664	Expn Pcs Hot Bus	9.00	NPP	1.3
73	48665	Supports Hot Bus	8.00	NPP	1.3
74	48667	Flow Meter	9.00	NPP	1.3
75	48700	Bulked Bps Compo	5.00	NPP	1.3
76	48993	Erection Materi	4.00	NPP	1.3
77	57013	DAMPER-FD FAN OUTLET	7.30	RP-NPP	1.3
78	57033	DAMPER-SA SCAPH INLE	2.77	RP-NPP	1.3
79	57053	DAMPER GAS RECIRCLN	1.10	RP-NPP	1.3
80	57063	DAMPER-SA SCAPH OUTL	3.40	RP-NPP	1.3
81	57083	DAMPER-SA SCAPH BYPA	4.50	RP-NPP	1.3
82	57110	GATE-PA FAN OUTLET	11.00	RP-NPP	1.3
83	57143	DAMPER-COLD AIR TO M	3.40	RP-NPP	1.3
84	57160	GATE-COLD AIR TO MIL	11.10	RP-NPP	1.3
85	57173	DAMPER-PA APH INLET	4.20	RP-NPP	1.3
86	57203	DAMPER-SA APH OUTLET	8.20	RP-NPP	1.3
87	57209	MTG BKT FOR CL DAMPE	3.28	RP-NPP	1.3
88	57223	DAMPER-PA APH OUTLET	4.70	RP-NPP	1.3
89	57270	GATE-HOT AIR TO MILL	16.60	RP-NPP	1.3
90	57273	DAMPER-HOT AIR TO MI	6.30	RP-NPP	1.3
91	57293	DAMPER HOT SA FOR GA	1.10	RP-NPP	1.3
92	57303	DAMPERS GR FAN SUCTI	2.80	RP-NPP	1.3
93	57313	DAMPERS GR SYSTEM OU	2.80	RP-NPP	1.3
94	57323	DAMPERS FLOWGAS ECO	1.10	RP-NPP	1.3

95	57343	DAMPER	1.10	RP-NPP	1.3
96	57373	DAMPER-FGAS TRISECTO	16.50	RP-NPP	1.3
97	57433	DAMPER-GAS APH OUTLE	18.20	RP-NPP	1.3
98	57460	GATE-ESP INLET	19.50	RP-NPP	1.3
99	57466	PLATFORMS AND LADDER	21.00	RP-NPP	1.3
100	57988	DUCTS COMMISSIONING	0.02	RP-NPP	1.3
101	95088	Fsss Flame Scann	0.30	NPP	1.3
102	95089	Fsss Local Gun M	0.10	NPP	1.3
103	95091	Fsss Field Inter	31.00	NPP	1.3
104	95092	Fsss Control Cab	30.00	NPP	1.3
105	95485	Gravimetric Feed	2.40	NPP	1.3
106	95487	Gravi.Feeder Ele	0.10	NPP	1.3
107	95488	Feeder Mounted C	0.70	NPP	1.3
108	95495	Gravimetric Feed	10.00	NPP	1.3
109	96088	Bearing Vibratio	0.80	NPP	1.3
110	96186	Soot Blower Moto	5.60	NPP	1.3
111	96187	Soot Blower Cabl	40.00	NPP	1.3
112	96188	Furnace Temparat	0.10	NPP	1.3
113	96189	Soot Blower Loca	0.20	NPP	1.3
114	96193	Miscellaneous St	0.20	NPP	1.3
115	96485	Ac Power Distrib	0.50	NPP	1.3
116	97588	Cables & Glands	0.20	NPP	1.3
117	97591	Miscellaneous It	0.10	NPP	1.3
119	99512	Furnace Cradle 2	1.50	NPP	1.3
		BOILER NPP TOTAL	**1828.07**		
		Boiler Rot /Machine			
1	55000	AXL FAN TOOL & FIXTU	0.75	RPT-R/MC	2.1
2	55011	FD FAN FOUNDATION MA	1.60	RPT-R/MC	2.1
3	55017	FD FAN C&I ITEMS	0.03	RPT-R/MC	2.1
4	55031	PA FAN FOUNDATION MA	1.70	RPT-R/MC	2.1
5	55037	PA FAN C&I ITEMS	0.03	RPT-R/MC	2.1
6	55214	AXIAL FD FAN ROTOR	2.60	RPT-R/MC	2.1
7	55334	AXIAL PA FAN ROTOR	6.00	RPT-R/MC	2.1
8	55514	AXIAL FD FAN STATOR	12.00	RPT-R/MC	2.1
9	55534	AXIAL PA FAN STATOR	13.40	RPT-R/MC	2.1
10	55810	AXIAL FDFAN COUPLING	0.60	RPT-R/MC	2.1
11	55830	AXL PAFAN COUPLING	1.25	RPT-R/MC	2.1
12	55910	AXIAL FD FAN LUBE OI	2.70	RPT-R/MC	2.1
13	55911	AXIAL FDFAN SILENCER	19.00	RPT-R/MC	2.1
14	55919	AXIAL FD FAN INSULAT	7.00	RPT-R/MC	2.1

15	55930	AXIAL PA FAN LUBE OI	2.75	RPT-R/MC	2.1
16	55931	PA FAN SILENCER	23.00	RPT-R/MC	2.1
17	55939	AXIAL PA FAN INSULAT	8.70	RPT-R/MC	2.1
18	56021	ID FAN FOUNDATION MA	4.00	RPT-R/MC	2.1
19	56027	ID FAN C&I ITEMS	0.02	RPT-R/MC	2.1
20	56057	GR FAN C&I ITEMS	0.01	RPT-R/MC	2.1
21	56077	SEAL AIR FAN C&I ITE	0.01	RPT-R/MC	2.1
22	56091	RAD FAN-FIRST FILL L	6.00	RPT-R/MC	2.1
23	56155	RADIAL GR FAN ROTOR	1.95	RPT-R/MC	2.1
24	56161	RADIAL PENT HOUSE VE	0.60	RPT-R/MC	2.1
25	56172	RADIAL SEAL AIR FAN	1.20	RPT-R/MC	2.1
26	56227	RADIAL ID FAN ROTOR	28.00	RPT-R/MC	2.1
27	56355	RADIAL GR FAN BEARIN	1.03	RPT-R/MC	2.1
28	56372	RADIAL SEAL AIR FAN	0.23	RPT-R/MC	2.1
29	56455	RADIAL GR FAN STATOR	15.50	RPT-R/MC	2.1
30	56472	RADIAL SEAL AIR FAN	3.50	RPT-R/MC	2.1
31	56527	RADIAL ID FAN STATOR	75.00	RPT-R/MC	2.1
32	56650	GR FAN MOTOR	3.00	RPT-R/MC	2.1
33	56670	RADIAL SEAL AIR FAN	1.40	RPT-R/MC	2.1
34	56820	RADL IDFAN COUPLING	12.50	RPT-R/MC	2.1
35	56850	GR FAN RADL-COUPLING	0.14	RPT-R/MC	2.1
36	56870	SEAL AIR FAN COUPLIN	0.06	RPT-R/MC	2.1
37	56920	RAD IDFAN ACCESSORY	2.50	RPT-R/MC	2.1
38	56950	GR FAN ACCESSORIES	2.50	RPT-R/MC	2.1
39	56979	RADIAL SEAL AIR FAN	0.80	RPT-R/MC	2.1
40	61388	INNER CONE	14.10	HYD-R/MC	2.1
41	61188	MILL DRIVE AND BOWL ASSEMBLY	144.00	HYD-R/MC	2.1
42	61288	MILL SIDE AND LINER ASSEMBLY	106.14	HYD-R/MC	2.1
43	61388	SEPARATOR BODY	57.00	HYD-R/MC	2.1
44	61388	SEPRATOR TOP	59.10	HYD-R/MC	2.1
45	61088	JOURNAL ASSEMBLY	39.63	HYD-R/MC	2.1
46	65736	Coal Feeders.	38.20	TRY-R/MC	2.1
47	67272	Bunker Outlet Ga	5.80	TRY-R/MC	2.1
48	67276	Coal Feeder Inlet Gate	6.50	TRY-R/MC	2.1
49	67283	Feeder Outlet Is	7.50	TRY-R/MC	2.1
50	67801	Down Spout	20.00	TRY-R/MC	2.1
51	67802	Bunker Emptying	15.00	TRY-R/MC	2.1
52	67803	Feed Pipe To Mil	10.00	TRY-R/MC	2.1
53	67204	Raw Coal Gates N	10.00	TRY-R/MC	2.1
54	99400	Airheater,Steamc	1.00	TRY-R/MC	2.1

55	BPL	ID FAN MOTOR -02 N0'S	30.00	BPL-R/MC	2.1
56	BPL	FD FAN MOTOR -02 N0'S	14.00	BPL-R/MC	2.1
57	BPL	PA FAN MOTOR -02 N0'S	27.00	BPL-R/MC	2.1
58	BPL	MILL MOTOR -06 N0'S	34.80	BPL-R/MC	2.1
		Rot M/C Total	**902.82**		
	99100	Fan Handling Equ	10.00	Rot M/C	2.2
		FAN HANDLING TOTAL	**10.00**		
		PIPING-P 91			
1	80300	MS FROM SUPERHEATER TO BOILER STOP VALVE	8.90	P 91	4.1
2	80301	MS FROM BOILER STOP VALVE TO ESV	65.10	P 91	4.1
3	80304	MS HEADER TO HPBP VALVE	5.30	P 91	4.1
4	80310	HRH FROM REHEATER TO INTERCEPTOR VALVE	119.70	P 91	4.1
5	80312	LPBP VALVE UPSTREAM & DOWNSTREAM	31.70	P 91	4.1
6	80320	CRH FROM TURBINE TO REHEATER	45.50	P 91	4.1
		PIPING-P 91 TOTAL	**276.20**		
		PIPING- AS			
1	80303	MS HEADER TO AUX PRDS	8.50	AS	4.2
2	80307	HP & LP BYPASS WARM UP	1.50	AS	4.2
3	80321	HPBP VALVE TO CRH PIPING	5.40	AS	4.2
4	80336	EXTRACTION STEAM TO HP HEATER NO.1	3.00	AS	4.2
5	80341	AUX STEAM HEADER INTERCONN BETWEEN UNITS	13.10	AS	4.2
		PIPING- AS TOTAL	**31.50**		
		PIPING- CS (HP)			
1	80322	CRH PIPING TO DEAERATING HEATER	4.70	CS HP	4.3
2	80324	CRH HEADER TO AUX.PRDS	1.00	CS HP	4.3
3	80330	EXTRACTION STEAM TO LP HEATER-1	7.00	CS HP	4.3
4	80331	EXTRACTION STEAM TO LP HEATER-2	3.20	CS HP	4.3
5	80332	EXTRACTION STEAM TO LP HEATER-3	3.20	CS HP	4.3
6	80335	EXTRACTION STEAM TO DEAERATING HEATER	9.10	CS HP	4.3
7	80337	EXTRACTION STEAM TO HP HEATER-2	1.50	CS HP	4.3
8	80340	AUX STEAM HEADER	4.10	CS HP	4.3
9	80343	AUX STEAM TO AH SOOT BLOWERS	0.90	CS HP	4.3
10	80344	AUX STEAM TO FO SYSTEM TP	35.30	CS HP	4.3
11	80345	AUX STEAM TO DEAERATING HEATER	4.00	CS HP	4.3
12	80348	AUX STEAM TO GLAND SEALS - SG SCOPE	0.60	CS HP	4.3
13	80351	AUX STEAM TO UNLISTED USERS - SG SCOPE	5.90	CS HP	4.3

14	80395	AUX STEAM TO FUEL OIL ATOMISING	0.60	CS HP	4.3
15	80355	STEAM TRACING PIPING	6.00	CS HP	4.3
16	80418	ERECTION MATERIALS FOR INSTRUMENTS	0.30	CS HP	4.3
17	80420	BOILER FEED PUMP SUCTION	7.30	CS HP	4.3
18	80421	BOILER FEED PUMP RECIRCULATION	9.00	CS HP	4.3
19	80423	BOILER FEED PUMP TO HPH INCLUDING BYPASS	34.10	CS HP	4.3
20	80424	BFD BETWEEN HTRS & GROUP PROTECTION VLV	24.20	CS HP	4.3
21	80425	BFD FROM FINAL HPH TO SG TP	38.20	CS HP	4.3
22	80430	SPRAY WATER TO HPBP	0.70	CS HP	4.3
23	80431	SPRAY WATER TO AUX PRDS	1.60	CS HP	4.3
24	80432	SPRAY WATER TO BOILER DESH UPTO SG TP	1.00	CS HP	4.3
25	80450	CBD AND EMERGENCY DRUM DRAIN	5.60	CS HP	4.3
26	80451	BOILER INTEGRAL PIPING DRAINS	4.60	CS HP	4.3
27	80452	HP PIPING DRAINS - SG SCOPE	4.10	CS HP	4.3
28	80992	IMPORTED ELECTRODES	2.50	CS HP	4.3
29	80993	MISC ERECTION MATLS	2.80	CS HP	4.3
		PIPING- CS (HP) TOTAL	**223.10**		
		TEMPORARY PIPING			
1		TEMPORARAY PIPING FOR STEAM BLOWING	25.00		4.7
2		TEMPORARAY PIPING FOR CHEMICAL CLEANING	20.00		4.8
		PIPING- TEMPORARY(CS (HP)) TOTAL	**45.00**		
		PIPING -CS (LP)			
1	80325	RESERVE	2.20	CS LP	4.4
2	80364	CBD TANK VENT TO SYSTEM	0.60	CS LP	4.4
3	80365	CBD TANK VENT/SV EXHAUST TO ATMOSPHERE	0.40	CS LP	4.4
4	80366	IBD TANK VENT TO ATMOSPHERE	8.60	CS LP	4.4
5	80369	HP DRAIN FLASH TANK VENT TO SYSTEM	3.80	CS LP	4.4
6	80373	AUX STEAM HEADER SV EXHAUST	7.30	CS LP	4.4
7	80375	UNLISTED SV EXHAUSTS - TG SCOPE	0.90	CS LP	4.4
8	80381	HP HEATER VENTS - TG SCOPE	1.80	CS LP	4.4
9	80382	LP HEATER VENTS	0.20	CS LP	4.4
10	80385	VENT FROM UNLISTED PPG/EQPT TO COND	3.70	CS LP	4.4
11	80387	CONDENSATE PUMP VENT	0.30	CS LP	4.4
12	80400	CONDENSATE SUCTION	3.00	CS LP	4.4

13	80401	CD FROM PUMP TO LPH1/DC INLET TEE&RECIR	2.50	CS LP	4.4
14	80402	CD FROM LPH1/DC INLET TEE TO TG TP	16.20	CS LP	4.4
15	80407	CONDENSATE FOR SEALING OF VACUUM	1.60	CS LP	4.4
16	80408	CONDENSATE DUMP FROM HEADER	0.90	CS LP	4.4
17	80413	UNLISTED CONDENSATE	2.90	CS LP	4.4
18	80440	CONDENSER DRAINS	2.00	CS LP	4.4
19	80442	GLAND STEAM COOLER DRAINS	1.20	CS LP	4.4
20	80443	LP HEATER-1 TO CONDENSER	1.90	CS LP	4.4
21	80444	LP HEATER-2/3/4/5 DRAINS&DRIP PUMP INCL	2.30	CS LP	4.4
22	80446	DEAERATING HEATER OVER FLOW AND DRAIN	1.20	CS LP	4.4
23	80447	HP HEATER DRAINS	4.90	CS LP	4.4
24	80449	TG CYCLE PIPING DRAINS & VENTS	6.90	CS LP	4.4
25	80453	LP PIPING DRAINS - SG SCOPE	7.70	CS LP	4.4
26	80455	DRAIN FROM UNLISTED EQPT/VESSEL-SG SCOPE	2.20	CS LP	4.4
27	80457	MANIFOLDS FOR HP FLASH BOX & CONDENSER	0.80	CS LP	4.4
28	80460	SG AUX COOLING WATER UNIT SYSTEM	29.30	CS LP	4.4
29	80463	TG AUX COOLING WATER	161.80	CS LP	4.4
30	80468	MAIN CIRCULATION WATER PIPING	171.80	CS LP	4.4
31	80471	BOILER WATER WASH TO & FROM UNIT	7.40	CS LP	4.4
32	80473	DEMINERALISED WATER SYSTEM	10.30	CS LP	4.4
33	80477	SERVICE WATER PIPING	12.50	CS LP	4.4
34	80478	DRINKING WATER PIPING	2.50	CS LP	4.4
35	80480	FIRE WATER-OTHER AREAS	7.80	CS LP	4.4
36	80610	SERVICE AIR-COMP SUCT & DIS TO RECEIVER	5.30	CS LP	4.4
37	80612	SERVICE AIR FOR INDIVIDUAL UNITS	4.80	CS LP	4.4
38	80614	INST AIR COMP SUC & DIS TO RECEIVER	5.00	CS LP	4.4
39	80616	INSTRUMENT AIR FOR INDIVIDUAL UNIT	5.40	CS LP	4.4
40	80650	FUEL OIL SUPPLY AND RETURN PIPING	58.40	CS LP	4.4
41	80673	LUBE OIL PIPING SYSTEM	6.90	CS LP	4.4
42	80901	SUB DELIVERY VALVES FOR LIGHT UP	1.40	CS LP	4.4
		PIPING -CS (LP) TOTAL	**578.60**		
		PIPING- SS			
1	80600	HIGH PRESSURE DOSING PIPING	0.50	SS	4.5
2	80601	LOW PRESSURE DOSING PIPING	0.90	SS	4.5
		PIPING- SS TOTAL	**1.40**		

		PIPING HANGERS & SUPPORTS			
1	24201	Supports For Tri	6.70	BLR-H & S	4.6
2	24351	Hangers And Supp	2.00	BLR-H & S	4.6
3	80920	H&S FOR HYDRO TEST	0.94	H & S	4.6
4	80921	H&S FOR LIGHT UP STEAM LINE	4.08	H & S	4.6
5	80923	H&S FOR STEAM BLOWING	149.60	H & S	4.6
6	80928	H&S FOR BOILER LIGHT UP - TG	10.54	H & S	4.6
7	80930	H&S FOR SYNCHRONISATION - TG	6.55	H & S	4.6
8	80933	H & S FOR LP PIPING	38.00	H & S	4.6
9	80934	STANDARD HANGER COMPONENTS	36.20	H & S	4.6
10	81003	CONTINUOUS BLOW DOWN EXPANDER-D1500 MM	2.40	H & S	4.6
11	81009	INTERMITTENT BLOW DOWN EXPANDER-D2500 MM	6.70	H & S	4.6
12	81128	HIGH PRESSURE DOSING SYSTEM	3.00	H & S	4.6
13	81411	DIRECT GAUGES FOR STEAM LINES	0.70	H & S	4.6
14	81412	DIRECT GAUGES FOR NON-STEAM LINES	0.70	H & S	4.6
15	81415	TEST THERMOWELLS	0.50	H & S	4.6
16	81416	PERFORMANCE GUARANTEE TEST MATERIALS	1.00	H & S	4.6
17	80935	H&S FOR HYDRO TEST	0.17	H & S	4.6
18	80936	H&S FOR LIGHT UP STEAM LINE	0.72	H & S	4.6
19	80937	H&S FOR STEAM BLOWING	26.40	H & S	4.6
20	80941	H&S FOR BOILER LIGHT UP - TG	1.86	H & S	4.6
21	80942	H&S FOR SYNCHRONISATION - TG	1.16	H & S	4.6
		PIPING HANGERS & SUPPORTS TOTAL	**299.90**		
		INSULATION			
1	33021	Blr Pr Parts Min	96.00	INSL	5.1
2	33121	Blr Mountings Mi	5.00	INSL	5.1
3	33126	Sb Pipes Mineral	3.50	INSL	5.1
4	33201	Main Blr Formed	0.50	INSL	5.1
7	33321	Air Ducts Minera	105.00	INSL	5.1
8	33421	Air Heater And G	22.00	INSL	5.1
9	33721	Oil System Miner	4.00	INSL	5.1
10	33924	Misc Eqpts Packi	0.20	INSL	5.1

11	33970	Misc Eqpts Expan	8.00	INSL	5.1
12	33971	Misc Eqpts Woven	0.70	INSL	5.1
13	33975	Misc Eqpts Seali	0.20	INSL	5.1
14	33212	Main Blr Castable	72.00	INSL	5.2
15	33230	Main Blr Pourable	150.00	INSL	5.2
16	37010	Blr Outer Casing	17.00	INSL	5.3
17	37810	Blr Outer Casing	31.00	BLR/INSL	5.4
18	PEM	INSULATION- IRON PARTS	15.00	PEM/INSL	5.3
19	PEM	INSULATION- INSULATION -WOOL	200.00	PEM/INSL	5.1
20	PEM	INSULATION- ALUMIMIUM CLADDING	25.00	PEM/INSL	5.4
21	81318	FIX COM FOR MISC PPG INSULATION	2.60	PC INSL	5.3
22	81325	MINERAL WOOL MATTRESS	22.20	PC INSL	5.1
23	81341	SEALING COMPOUND FOR INSL	0.30	PC INSL	5.3
24	81350	ALUMINIUM CLADDING FOR INSULATION	10.30	PC INSL	5.3
		INSULATION TOTAL	**790.50**		
TOTAL			**11585.41**		

SUMMARY OF WEIGHTS FOR DIFFERENT PAKAGES

S N	Package	Trichy	BAP	PC	Hyd	PEM	Bpl	Total
1.1	Structure	3223.80			12.00			3235.80
1.2	Pressure Parts	2753.70	534.33		74.50			3362.53
1.3	Non Pressure Parts (Upto ESP Inlet Funnel)	1656.10	171.97					1828.07
2.1	Rotating Machines	114.00	263.05		419.97		105.80	902.82
2.2	Handling Equipment of Rotating Machines	10.00						10.00
3.1	Piping-P91			276.20				276.20
3.2	Piping-AS			31.50				31.50
3.3	Piping - CS (HP)			223.10				223.10
3.4	Piping - CS (LP)			578.60				578.60
3.5	Piping - SS			1.40				1.40
3.6	Piping - Hangers and Support	8.70		291.20				299.90
3.7	Piping - Temporary (Steam Blowing)			25.00				25.00
3.8	Piping - Temporary (Chemical Cleaning)			20.00				20.00
4.1	Insulation- Wool Matress	245.10		22.20		200.00		655.30
4.2	Insulation- Pourable and Castable	222.00						222.00
4.3	Insulation- Iron Parts	17.00		2.90		15.00		34.90

4.4	Insulation- Aluminium Cladding Sheets	31.00		10.30		25.00		66.30
	TOTAL	**8281.40**	**969.35**	**1482.40**	**506.47**	**240.00**	**105.80**	**11585.42**

Items supplied by Bhopal				
S No	PGMA	Description	Wt. in MT	Category
1	BPL	Butter Fly Valve Dia. 500 (RL)	1.52	CS-LP
2	BPL	Butter Fly Valve Dia. 450 (RL)	0.27	CS-LP
3	BPL	Butter Fly Valve Dia. 450 (RL)	0.83	CS-LP
4	BPL	Butter Fly Valve Dia. 400 (RL)	1.08	CS-LP
5	BPL	Butter Fly Valve Dia. 400	1.17	CS-LP
Items supplied by PEM				
S No	PGMA	Description	Wt. in MT	Category
1	PEM	Hydrazine Dosing system	0.38	NPP
2	PEM	Ammonia Dosing system	0.38	NPP
3	PEM	NaOH Dosing System	0.19	NPP
4	PEM	Control Valves	13.50	PP
5	PEM	Flow Nozzle	7.00	PP
6	PEM	Flow Orifice	3.00	PP
7	PEM	Rota meter	9.00	PP
8	PEM	ULTRASONIC FLOW METER	0.10	PP
9	PEM	SFI(SIGHT FLOW INDICATOR)	2.40	PP
10	PEM	VALVES & TRAPS	1.50	CS-HP

Note:

1. The weights given above are for one unit only.
2. Besides product groups indicated herein, there is likelihood of addition of new product groups by BHEL' s unit for release of some items, integral to this work. Tenderers' quoted unit rates shall be applicable for such product groups also.

.

3. The weights given against PGMA's listed above are tentative. It may change after detailed engineering is done. Rate quoted by the Contractor shall not change due to variation in weight.

4. Rate Schedule Identified for PGMAs of Piping and Insulation are Indicative only and based on envisaged material specification. Payment shall be made on the basis of material specification of actual material received and erected at site.

5. BHEL's decision with regard to classification of a particular product group for applicable rate category shall be final & binding on the Contractor.

6. Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipment's etc. for carrying out hydraulic test, chemical cleaning,

steam blowing and other tests, as stated elsewhere will get added.

7. Electrical & C&I items of handling system is excluded from the scope of work.

8. Weight of valves, fittings, supports etc. are including in weight of piping (for all C.S. A.S. And S.S.) of respective scheme / systems of piping. The site welding of site weld joints and NDT/pre-post heat treatment requirements both for IBR & Non-IBR, CS, AS & SS piping's/system shall be as per BHEL drawings/documents and site requirement.

9. Erection of ACW, DMCW piping along with PEM supplied Butter fly valves, Self-cleaning filter from terminal point to individual equipment's is the part of individual Boiler vendors, Whose payment shall be made on the basis of actual material received and erected at site.

10. Power Cycle Piping, Re-generative piping, flow nozzle, valves supplied by PEM related to IBR and is required to erect for system completion are the part of Boiler erection Vendors, Whose payment shall be made on the basis of actual material received and erected at site.

11. Grouting of columns and equipment's are the part of erection vendors with supply of specific cement.

9. There will be no payment for consumables like welding electrode /filler wire, gases etc.

10. In case of Piping category, payment rates will be derived on actual type of material received/used at site.

Example- If a material falls under SS Category as per Tech Bid. However if actual material supplied is of CS, then payment will be made under CS rate category and vice versa.

ANNEXURE - 2

PAINTING SCHEME

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

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

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

GENERAL REQUIREMENTS – COMMON TO ALL WORK

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

11.18
The distance between storage area and erection site is approx. 3 to 5 KM**.** Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

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

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

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

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

11.23

Layout of field routed/ small bore piping shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the Contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection.

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

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

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

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

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

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

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

11.29
In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work.

Requisite materials for such temporary arrangements will be provided by BHEL on free - returnable basis which shall be returned to BHEL after the use.

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

11.31
All works such as cleaning, leveling, 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 disposing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, lapping, fitting up etc. as may be applicable in such erection works and which are treated incidental to the erection work and necessary to complete the work satisfactorily shall be carried out by the Contractor as part of the work.

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

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

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

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

11.36

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

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

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

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

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

DETAILS OF SCOPE OF WORK FOR BOILER & AUXILIARIES & PIPING

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

12.1 PRESSURE PARTS

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

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

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

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

E) Surfaces inside seal box and other areas that are to be applied with cast able 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 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) Super heater and/or re-heater 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. Strand & Jack will be provided by BHEL.** Contract has to provide necessary assistance during installation & handling.

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

12.2 TRIM & INTEGRAL PIPING OF BOILER AND POWER CYCLE PIPING

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

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

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

12.2.4
Connection (either flanged, bolted or welded) of piping to the terminal points/equipment's 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 along with BHEL/customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, is also within the scope of work/ specification.

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

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

12.2.8
Main steam piping up to turbine stop valve released in PG 80 is included in the scope of work. The material will be SA-335 P-91. Bidder shall follow BHEL approved procedure for welding, pre heating, PWHT & NDT of SA-335 P-91 material. Detailed procedure will be issued to the Contractor.

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

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

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

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

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

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

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

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

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

12.2.10
As far as possible pre-assay 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 point's 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 planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of BHEL Engineer and BHEL Engineer may direct the Contractor to reschedule his work to suit the status of the site work.

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

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

12.2.16

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

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

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

12.2.19
Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of job. hanger settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

12.3 ROTATING MACHINERY

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

b All lubricants for testing, preservation and lubricants for Trial runs of the equipments shall be supplied by BHEL as free issue. All services including labor 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 equipment's 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 Even though rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.

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

k) There are 6 no's of XRP 943 Bowl Mills.

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

12.5.1
Contractor shall arrange and erect one number passenger cum goods elevator of 1.5 MT capacity to reach up to the boiler drum level to facilitate erection, movement of person and goods etc. the arrangement shall confirm to applicable safety norms. Contractor shall dismantle and take the elevator back after completion of work. The elevator shall be made ready at the time of drum lifting.

12.5.2
Boiler main supporting structures have to be erected in a sequential manner.

12.5.3
Quality norms with regard to verticality of column, inter-alia, have to be adhered to strictly, at various stages of erection.

12.5.4

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

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

12.5.5
Each of the ceiling girders will be sent in 2 to 3 pieces and will have to be assembled, welded and NDE & PWHT (SR) done on ground prior to their erection in position.

12.5.6
It is likely that, in deviation from prescribed sequence, erection of certain elements of structure may be deferred for later stage, to facilitate, say crane boom reach to higher elevation, passage of drum during drum lifting etc. this may necessitate temporary installation of some structural steels at appropriate locations to keep the stability of structure intact. such temporary installations shall be removed subsequently and returned to BHEL stores/ storage yard. Finishing work in the related permanent structures shall be done as per the instruction of BHEL engineer. BHEL will provide necessary steels on free issue basis in random sizes for such installations, which shall be fabricated by the Contractor to suit the requirement.

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

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

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

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

12.5.10

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

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 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, 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, flow meters, dampers/gates and their drives, supports and suspensions etc. for these systems.

b) Ducts / expansion bellows (metallic & non-metallic) are normally supplied in loose components / segments and these are to be assembled and welded/ jointed at site before erection. The fabric portion of non-metallic expansion joints (NMEJ) namely bolster, fabric belt and canopy shall be installed by Contractor under supervision/guidance 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 similar 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, lube oil units, control valves, etc. material for this will be supplied in random lengths / sizes. No separate payment for fabrication is envisaged. Only the erection tonnage rate applicable for structure will be paid for this work.

e) Boiler roof sheets shall be erected on boiler roof structure.

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

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

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

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

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

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

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

13.1
Building foundations and other necessary civil works for supporting structures, equipment's 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 up to 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-enforcement 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.

Neutralization 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 leveled before handing over of area to owner.

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

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

13.4
BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL, will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting / chiseling / grinding and de-burr the same. However, machining of the packers wherever necessary shall be arranged by 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 labor, building materials including cement, ordinary Portland as well as quick setting – free flow - non-shrink grout mix (e.g. conbextra gp1/gp2), form work, shuttering, and any other requirements is in the Contractor's scope. Contractor shall obtain approval of BHEL for cement (ordinary Portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.

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

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

14.1 WELDING

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

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

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

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

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

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

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

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

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

14.1.10

In the case of P-91 pipe welding, Contractor shall deploy welders having experience in welding of P-91 material. The welders engaged by Contractor if not qualified for P-91 welding will be

trained by BHEL at BHEL welding research institute (WRI) trichy and allowed to work only after passing the required test arranged by BHEL. All the expenditure towards such qualification including cost of training, traveling expenses, stay etc., shall be borne by the Contractor.

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

14.1.12 SOCKET WELDING:

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

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

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

14.2 HEAT TREATMENT:

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

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

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

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

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

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

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

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

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

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

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

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

14.2.10
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

14.3 NON DESTRUCTIVE EXAMINATION:

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

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

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

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

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

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

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

14.3.8

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

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

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

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

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

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

LINING AND INSULATION

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

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

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

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

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

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

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

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

15.6
Wool insulation is received at site as loose bonded mattresses in standard sizes. These are to be dressed/cut to suite the equipment's. Multiple layers of wool have to be applied as directed

and as per drawings and specifications for all equipment's/ systems covered under the scope of work.

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

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

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

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

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

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

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

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

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

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

➢	a	Pourable & cast able insulation	-	2%
➢	b	Insulation bricks and motor	-	2%
➢	c	Wool mattresses	-	2%

- d Cladding sheets - 2%

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

15.15

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

Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. **Black Bituminous Paint will be arranged by Contractor within quoted price.**

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 cast able 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 arranged by Contractor within the quoted price. No separate payment will be made for application of paint.

PAINTING

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

16.2 Touch-up painting on damaged areas -

a) For coatings damaged up to metal surface

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

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

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

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

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

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

16.4
The scope of work includes painting of color bands, lettering, marking and signs for direction of flow/rotation, names etc. of approved colors as per the standard color 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 arranged by Agency within the quoted price.

16.5
All exposed metal parts of the equipment including piping, structures, hand railing, grating etc. shall be thoroughly cleaned off dust, rust, scales and other foreign materials by manual or mechanized wire brushing, scrapping, sand blasting etc. and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

16.6
In certain isolated instances where it is not possible to clean the 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. Agency will make available the necessary primer and paints.

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

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

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

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

16.13
In general, painting of structural parts and color bands, lettering, marking of direction of flow/rotation etc. will be carried out by brush painting. However, areas/equipments inaccessible for manual painting have to be painted by spray painting. The decision of BHEL engineer, in this

regard, shall be final and binding on the Contractor. For the purpose of spray painting, air at one point will be made available by BHEL free. Laying of air hose pipe and any other line required shall be done by Contractor at his cost. The Contractor shall provide spray equipment set.

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

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

16.16 PRIMER AND PAINTS FOR FINAL PAINTING

All primer and paints (including Black Bituminous paint) required for final painting shall be in the scope of the contractor for which a separate supply order shall be placed as mentioned in price bid document.

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 equipment's.

17.5
Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

17.6

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

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

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

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

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

17.11

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

- ✓ Similarly, during the course of erection, if certain portion of equipments erected by the Contractor has to be undone for enabling other Contractors / agencies of BHEL / customer to carry out their work, Contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other Contractors / agencies of BHEL / customer as per BHEL engineer's / agencies of BHEL / customers instructions. Claims, if any, in this regard shall be governed as clauses of General conditions of contract

17.12
During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools

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

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

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

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

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

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

17.17
Commissioning activities will continue till the completion of trial run, trial operation. During this period Contractor shall make available the services of separate dedicated labor force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

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

17.19
Conducting of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points; instruments etc. and provide necessary assistance in this regard**.**

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

17.20
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

18.1 PRESERVATION & PROTECTION OF COMPONENTS

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

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

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

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

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

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