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

NO: BHE/PW/PUR/KHZI-MECH/1012

RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, REINFORCEMENT & STRUCTURAL STEEL FOR CIVIL WORKS AND OTHER MATERIALS RELATED TO PROJECT IN BHEL / CUSTOMER'S STORES/STORAGE YARD DESPATCHED BY ROAD/RAIL FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT,
RECEIPT / COLLECTION / LOADING/ UNLOADING / TRANSPORATION OF MATERIALS FROM BHEL / CLIENT'S STORES/STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING OF 1x190TPH HEAT RECOVERY STEAM GENERATOR & AUXILIARIES,PIPING,CHIMNEY,APPLICATION OF THERMAL INSULATION, FINAL PAINTING, CO-GENERATION OPERATION AND HANDING OVER.
COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF GAS TURBINE AND GENERATOR SET AND ITS AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING ,FINAL PAINTING CO-GENERATION OPERATION AND HANDING OVER FOR 1x72 MW CPP REVAMP KRIBHCO PROJECT.

AT

KRIBHCO (KRISHAK BHARATI COOPERATIVE LIMITED) PROJECT

HAZIRA, DIST. SURAT, STATE- GUJARAT

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 Region345-Kingsway, Nagpur-440001

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I-B	Special Conditions of Contract	47	Vol-IBCD----
I-C	General Conditions of Contract	29	(Part of Vol-IBCD----)
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II	Price Bid Specification	3	Vol-II----

Tender Specification Issue Details

Tender Specification No: NO: BHE/PW/PUR/KHZI-MECH/1012

RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, REINFORCEMENT & STRUCTURAL STEEL FOR CIVIL WORKS AND OTHER MATERIALS RELATED TO PROJECT IN BHEL / CUSTOMER'S STORES/STORAGE YARD DESPATCHED BY ROAD/RAIL FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT,
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AT

KRIBHCO (KRISHAK BHARATI COOPERATIVE LIMITED) PROJECT

HAZIRA,DIST. SURAT ,STATE- GUJARAT

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:

1012

NOTICE INVITING TENDER

(Document No PS:MSX:NIT:Rev 01 dated 1st Jun 2012)

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/HZI-MECH/1012 Date: 07/07/2012

NOTICE INVITING TENDER (NIT)

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

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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/KHZI-MECH/1012**	
ii	**Broad Scope of job**	RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, REINFORCEMENT & STRUCTURAL STEEL FOR CIVIL WORKS AND OTHER MATERIALS RELATED TO PROJECT IN BHEL / CUSTOMER'S STORES/STORAGE YARD DESPATCHED BY ROAD/RAIL FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING/ UNLOADING / TRANSPORATION OF MATERIALS FROM BHEL / CLIENT'S STORES/STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING OF **1x190TPH HEAT RECOVERY STEAM GENERATOR** & AUXILIARIES,PIPING,CHIMNEY,APPLICATION OF THERMAL INSULATION, FINAL PAINTING, CO-GENERATION OPERATION AND HANDING OVER. COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF **GAS TURBINE AND GENERATOR SET** AND ITS AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING ,FINAL PAINTING CO-GENERATION OPERATION AND HANDING OVER FOR 1x72 MW CPP REVAMP KRIBHCO PROJECT.	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	

e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS WR office at NAGPUR :*** ***Start : 7/07/2012:*** ***Closes: 17/07/2012 , 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/* ~~*Not applicable*~~
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 18/07/2012 , Time : 15.00 Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be handed over to any of the following BHEL officials after making entry/registration at the reception: RK Ranade/ Sr. Manager (Purchase) Pratish Gee Varghese/Engineer(Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***Date : 18/07/2012 , Time : 16.00 Hrs*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2,00,000/- (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable/*~~*Not Applicable*~~
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Atleast 3 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)**	*NOT APPLICABLE*	*NOT APPLICABLE.*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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.

ii) Weightage "A" assigned to bidders based on Total number of Packages 'P':

a) If 'P' = 0-9, : "A" will be equal to '4'
b) If 'P' = 10-18, : "A" will be equal to '3'
c) If 'P' = 19-36, : "A" will be equal to '2'
d) If 'P' = 37-60, : "A" will be equal to '1'

e) If 'P' is above 60 : "A" will be equal to '0'

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:
This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

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

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

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

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

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions →	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
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) Weightage "B" assigned to bidders based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions, for the respective Package:

a) If $\mathbf{R_{BHEL}}$ is ≥ 80%, "B" will be equal to '6'
b) If $\mathbf{R_{BHEL}}$ is ≥ 75% < 80%, "B" will be equal to '5'
c) If $\mathbf{R_{BHEL}}$ is ≥ 70% < 75%, "B" will be equal to '4'
d) If $\mathbf{R_{BHEL}}$ is ≥ 65% < 70%, "B" will be equal to '3'
e) If $\mathbf{R_{BHEL}}$ is ≥ 60% < 65%, "B" will be equal to '2'
f) If $\mathbf{R_{BHEL}}$ is < 60%, "B" will be equal to '0'

III. 'Assessment of Capacity of Bidder' to be Qualified for the tender:

Shall be based on the sum of the weightages obtained in 'LOAD' (A) and 'PERFORMANCE' (B) as below:

a) If the sum (A+B) is 6 or above for each of the applicable Package, then the Bidder is considered 'Qualified' for the tender

b) If the sum (A+B) is less than 6 for any of the applicable Package, then the Bidder is considered 'NOT Qualified' for the tender

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

	Civil	Electrical & CI	Mechanical
	i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	i). Electrical ii). 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 viii). Turbo Blower (including Steam Turbine) ix). Material Handling x). Material Management xi). Material Handling & Material Management xii). Others (Mechanical)

c) Vendors who are first timers to any BHEL Region, may be considered subject to satisfying other tender conditions. Eligibility of the party for the next tender of any package in that Region, shall be subject to the bidder satisfying the 'Assessment of Capacity of Bidder' for a period of first **nine months** after commencement of work or contract duration whatever is lesser.

In case the first timer is executing any other packages in any BHEL Region, then the performance evaluation will be based on the data available for the other packages though not similar, for the 'Period of assessment', for the purpose of 'Assessment of Capacity of Bidder'

d) Vendors who are not first timers and who have not been executing any package or packages similar to the packages under the tender in the 'Period of assessment', shall be considered qualified subject to them satisfying all other tender conditions.

e) 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', 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**.**

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

i. upto Boiler Steam Blowing in case of Steam Generator and Auxilliaries

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

iii. upto execution of at least 75% of anticipated contract value (unit wise), in case of Enabling works or Civil & Structures.

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.

g) 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

for BHARAT HEAVY ELECTRICALS LTD

AGM/Purchase

Enclosure

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

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	RECEIPT / COLLECTION, UNLOADING, HANDLING, STACKING, VERIFICATION OF ENTIRE PROJECT MATERIALS OF GT & HRSG, ELECTRICAL AND C&I EQUIPMENTS, REINFORCEMENT & STRUCTURAL STEEL FOR CIVIL WORKS AND OTHER MATERIALS RELATED TO PROJECT IN BHEL / CUSTOMER'S STORES/STORAGE YARD DESPATCHED BY ROAD/RAIL FROM MANUFACTURING UNITS / TRANSPORTERS GODOWN UNDER MATERIALS MANAGEMENT, RECEIPT / COLLECTION / LOADING/ UNLOADING / TRANSPORATION OF MATERIALS FROM BHEL / CLIENT'S STORES/STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING OF **1x190TPH HEAT RECOVERY STEAM GENERATOR** & AUXILIARIES,PIPING,CHIMNEY,APPLICATION OF THERMAL INSULATION, FINAL PAINTING, CO-GENERATION OPERATION AND HANDING OVER. COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF **GAS TURBINE AND GENERATOR** SET AND ITS AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / POWER CYCLE PIPING ,FINAL PAINTING CO-GENERATION OPERATION AND HANDING OVER **FOR 1x72 MW CPP REVAMP KRIBHCO PROJECT.**
TENDER NO	**BHE/PW/PUR/KRIBHCO-HRSG+MMS+GTG/1012**

SL NO	**PRE QUALIFICATION CRITERIA**	**Bidders claim in respect of fulfilling the PQR Criteria**	
		Name and Description of qualifying criteria	Page no of supporting document. **Bidder must fill up this column as per applicability**
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	NOT APPLICABLE	
B	**Technical** **c)** Bidder must satisfy C.1 and C.2 below: **C.1)** Bidder must have Executed ET & C (Erection, Testing and Commissioning) 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 a unit of 190 MW or higher rating in last seven years as on the latest date of offer Submission. **c.2)** Bidder must have, in last seven years as on latest due date of offer submission must have achieved any one of the following: C.2.1) Executed ET & C of One GTG or STG job of one units of 30 MW or higher rating OR	APPLICABLE	

	C.2.2) Executed ET & C of One Boiler (With Rotating Machinery executed upto synchronization) of one unit of 100 MW or higher, under direct order of BHEL OR C.2.3) Executed Atleast three numbers of overhauling works of STGs against BHEL's direct orders. Rating of individual STG unit shall be atleast 250 MW OR C.2.4) Executed One R & M job of Steam turbines of capacity 100 MW or higher.		
C-1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of **Rs 248 Lakhs** or more over last three Financial Years (FY) i.e. 2009-2010, 2010-2011, 2011-12 OR 2008-2009, 2009-2010 and 2010-11 if Annual Accounts for FY 2011-12 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 latest Audited Accounts.	APPLICABLE	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	APPLICABLE	By BHEL
E	Approval of Customer (if applicable) **Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	APPLICABLE	BY BHEL
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E	APPLICABLE	BY BHEL
F	Consortium criteria (if applicable)	NOT APPLICABLE	
	Explanatory Notes for the PQR (unless otherwise specified in the PQR): 1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures 2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.		

3. 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
8. 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. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG
    3. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping
    4. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping
    5. ~~"CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears~~
    6. ~~"Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~
    7. ~~Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
    8. ~~'Readiness for coal Filling" in respect of Bunker Structure Work.~~
9. Boiler means HRSG or WHRB or any other types of Steam Generator
10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines
11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.
12. In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.
13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.
14. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR.

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

ANNEXURE - 2

CHECK LIST

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

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

16	Bank Account Details for E-Payment	Applicable	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable/	YES/NO
18	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable	YES/NO
20	Analysis of Unit rates	Applicable	YES/NO

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

DATE : **AUTHORISED SIGNATORY**
(With Name, Designation and Company seal)

ANNEXURE 3: **IMPORTANT INFORMATION**

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. This is a Combined Technical Specification for Material Handling & Management, E&C of 190 TPH HRSG with Auxl, and E&C of GTG with Auxl. Entire scope of work is broadly trifurcated as:

    - Section A: Material Handling and Materials Management
    - Section B: E&C of HRSG and Auxl
    - Section C: E & C of GTG and Auxl

3. Volume II Price Bid Specification is also trifurcated as:

    - Section A: Material Handling and Materials Management
    - Section B: E&C of HRSG and Auxl
    - Section C: E & C of GTG and Auxl

4. Price Evaluation for arriving at relative standing (L-1, L-2 etc) shall be done based on the Sum Total of Prices quoted in Section A, Section B and Section C.

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

NOTE: ONE NUMBER DRAWING IS ATTACHED AT THE END OF VOLUME IA

1.0 Project Information

1.1 INTROUCTION

KRIBHCO is operating a mega Fertilizer Complex at Hazira, District Surat, in the State of Gujarat, India. The fertilizer complex comprises of two streams of Ammonia plants of 1520 MT/day capacity each and four Urea streams of 1310 MT/day each.

KRIBHCO has undertaken a major revamp project of Ammonia & Urea plants for capacity enhancement. The project is under implementation and has been scheduled to be completed by Dec. 2011. Present requirement of Power & HP steam by the fertilizer complex is 24MW and 260 MT/hr respectively.

On completion of this revamp project, surplus HP steam will be generated in the Ammonia plants which will be exported to Urea plants. Under this scenario HP steam requirement from the SGPG plant shall reduce to 174 MT/hr from present level of 260 MT/hr. The power requirement of the complex however shall increase to 37 MW from present requirement of 24 MW. Thus the CPP (i.e. Steam and Power Generation plant), after revamp of fertilizer plant needs to produce 174 MT/hr HP steam and 37 MW power for in-house consumption. Beside this, the surplus power generated from CPP shall be exported to outside consumers through state / central grid.

BHEL has been awarded Project Management, System Design, Detailed Engineering, Manufacturing, Procurement, Civil Works, Supply, Fabrication, Inspection, Transportation, Storage, Installation, Comprehensive MCE Insurance, Testing, Mechanical Completion, Pre-commissioning, Commissioning and performance Guarantee test runs of 1xFr 6 FA GTG + 1x190 TPH HRSG based Cogen CPP .

Zero Date of contract	05/09/2011
Completion date of Contract	28/02/2013

Site information

a)	Location	KRIBHCO Hazira PO – KRIBHCO Nagar, Surat-394515, Gujarat
b)	Nearest Railway Station	Surat (20km from project site)
c)	Nearest Air port	Surat

1.2 **CLIMATIC CONDITIONS**

1)	**Seismic data**	
	Seismic Intensity	Acc to BIS- 1893 (1975)
	Zone	III
	Importance Factor	1.75
2)	**Ambient Air Temperature**	
	Design ambient dry bulb temperature	35° C
3)	**Relative Humidity**	65% (Average)
4)	**Barometric pressure**	1005 mbar (Average)
5)	**Rain fall**	
	Average in a month	325 mm
	Heaviest in a day	270 mm
	Maximum in one hour	100 mm
6)	**Wind data**	
	Wind code	IS-875-1964
	Base wind pressure	150 kg/m^2
	Wind load Upto 30 M	150 kg/m^2

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

2.0 SCOPE OF WORK

The scope of work covers the complete work of receipt/collection, unloading, handling, stacking, verification of entire project materials including electrical, control & instrumentation equipments / items and other materials in BHEL/customer's stores/storage yard as received by road / Rail from manufacturing units/ transporters Godown under materials management, receipt / collection / loading / unloading/ transportation of materials from BHEL / client's stores / storage yards to site of work, erection, testing, commissioning, final painting and handing over of 1x190 TPH Heat Recovery Steam Generator with Auxiliaries, Stack/ Steel Chimney with associated Aux, 1 xFr6FA Gas Turbine-Generator set with their auxiliaries, Balance of plant equipments / systems with related auxiliaries, Integral piping, Field / Power Cycle Piping and application of Thermal Insulation of equipments / piping/vessels & tanks etc. for 1x72 MW Cogeneration power plant unit at 1x72 MW cogeneration power PLANT 1x72 MW CPP REVAMP KRIBHCO PROJECT HAZIRA (Gujarat)

The work under these specifications broadly comprises of the following:

A) Receipt / collection / loading / unloading / transportation of materials from BHEL/client's stores / storage yards to site of work, erection, testing, commissioning and final painting of 1x190 TPH HRSG and its auxiliaries, insulation, including assembly, fit up, welding, NDT/ radiography/ pre-heat treatment/post-heat treatment requirement, supporting of Integral piping, Field Piping & Power Cycle Piping.

B) Assembly, erection including welding & NDE etc. of Steel Stack / Chimney of 40 meter height, total no of shells 16, each will have 2.5 m height with associated electrical works of aviation lamp/lights, earthing & lightening arrestors, Ladder & landing platforms and Insulation with claddings etc. as per drawing requirements. The chimney is tentatively to be insulated to the height of about 25 Meters, however the actual height of insulation & cladding shall be as per drawing requirement and same shall be carried out by contractor.

C) Receipt / collection / loading / unloading / transportation of materials from BHEL/client's stores / storage yards to site of work, erection, testing, commissioning and final painting of 1xFr. 6 FA Gas Turbine - Generator set with Bypass Stack and their auxiliaries, Tanks, Vessels & Pumps etc.

D) Receipt/collection/ loading/ unloading/ transportation of materials from BHEL/client's stores /storage yards to site of work, assembly, fit up, erection, welding including NDT/ radiography/ pre-heat treatment/post-heat treatment requirement, supporting and preservative & final painting of Integral Piping, valves/fittings and supports all piping schemes like fuel, lube oil, Pressure Oil, Control oil / Governing oil, Gas, Instrument Air & Service Air, Main steam/aux. Steam, Feed water, DM water, Condensate Piping, Cooling Water Piping etc. For GT system with aux and Balance of plant equipments ~~including Deaerator (FST & Heater) & associated approach platform~~.

E) Receipt/collection/ loading/ unloading/ transportation of Thermal insulation/cladding materials from BHEL/client's stores /storage yards to site of work, application of thermal insulation of Integral Piping, Field /Power Cycle piping, valves with fittings, Equipments, tanks & vessels ~~including Deaerator~~ with heater, GTG auxiliaries including Bypass Stack and Balance of plant (mechanical) equipments & auxiliaries.

F) Receipt, unloading/ handling of materials, stacking, verification, preservation, generation of shortages/damages report of all materials received by road and from transporter's Godown for 1x190 TPH Heat Recovery Steam Generator and its auxiliaries, Insulation, chimney/steel stack, Piping, 1XFr6FA Gas Turbine - Generator set & its auxiliaries, Bypass Stack, Balance of plant (mechanical) and related equipments of all packages and Electrical, Control & Instrumentation Equipments / Items including Heavy equipments like HRSG Drums, Gas Turbine, Gas Turbine Generator, Accessory Base, Generator Transformer, Station Transformer, LT Aux. Transformer etc. and all other items supplied by BHEL units, their sub-vendors, bought-out items, any other material like BHEL's T&P, furniture etc. under material handling and material management.

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

1) Receipt of materials of HRSG, GT, and GTG, Electrical and Control & Instrumentation at BHEL's stores / storage yard, verification, stacking, and preservation. This will also include receipt and unloading of ODC consignments like GT, GTG, Boiler Drums, Generator Transformer, Station Transformers, LT Aux. Transformer etc.
2) Materials management services involving preservation of materials, manual and computerized record keeping and generating MIR and allied services
3) Collection of material from BHEL/ client's stores/storage yard and transportation to site of work/ pre-assembly
4) Receipt, unloading & transportation to BHEL stores/stage yard of materials received by Rail (railway siding within the project premise)
5) Pre-assembly, if any, pre-erection checks as applicable
6) Erection, alignment and welding/bolting/fastening/ grouting
7) Non-destructive examination & post weld heat treatment
8) Pre-commissioning checks/tests, trial runs/testing and commissioning
9) Trial operation
10) Preparation & chipping of civil foundations and grouting of foundation / packers / foundation bolts / frames etc.
11) Application of Thermal Insulation & lining on HRSG with associated auxiliaries / equipments, steel stack, Bypass Stack, tanks / vessels, pipings with valves & fittings including Gas Turbine, ~~Deaerator with~~ heater, tanks, vessels & pipings etc.
12) Chemical cleaning/ flushing, flushing with air / water / oil etc., hydro testing, steam blowing including lube oil flushing etc. of equipments, pipings and other associated systems covered under the scope

13) Final painting including surface preparation, cleaning, marking of identification marks, colour bands, direction of rotation / flow marks, legends etc. as per site requirement

THE WORK TO BE CARRIED OUT UNDER THE SCOPE OF THESE SPECIFICATIONS IS BROADLY AS UNDER: -

2.0 A – SCOPE OF WORK OF MATERIAL HANDLING AND MATERIALS MANAGEMENT SERVICES

2.0 BROAD SCOPE OF WORK

THE SCOPE OF WORK OF THIS TENDER SPECIFICATION OF MATERIAL HANDLING AND MATERIALS MANAGEMENT SERVICES FOR KRIBHCO (KRISHAK BHARATI COOPERATIVE LIMITED) AT HAZIRA - SURAT DISTRICT IN GUJARAT SHALL BE BROADLY AS UNDER:

1 Receipt, Unlading, Stacking, Verification of HRSGs & all related auxiliaries, Packages, Piping, Tanks, Insulation, Ducts, Dampers, HRSG modules, including Chimney items, Electrical and C&I items etc..

2 Receipt, unloading, Stacking, Verification of Gas Turbines, Gas Turbine generators, Bypass Stacks, Various Skids, ~~Feed Storage Tank with Deaerator~~ Header, Tanks etc. with their auxiliaries/items, integral piping, Insulation Materials, Balance Of Plant Equipments with related Aux., Electrical and C&I items, Panels etc. of all total related packages/systems.

3 Receipt, Unloading Stacking, Verification of Other items supplied by BHEL units, their sub-vendors, bought-out items including Paints, Lubricants etc.

4 Receipt, Unloading Stacking, Verification of any other material like BHEL's T&P (except heavy duty cranes), Furniture, Erection materials etc.

5 Receipt, Unloading Stacking, Verification of Electrical equipments like Transformers, Switchgear Systems, Control and instrumentation packages including Station C&I and Control Room Equipments/items/Panels etc., Motors, Cable trays, Cables, Structural Steel, Earting materials, Plant Illumination/Lighting materials.

6 Receipt, Unloading, Stacking, Verification of Insulation and refractory/Lining materials for HRSGs, Chimney, Bypass Stack, Ducts, Piping and Equipments, Tanks, Vessels and related Equipments of GT & GTG, Skids and all other Packages etc.

7 Receipt, Unloading, Stacking, Verification of Reinforcement Steel, Structural Steel and other Civil works related Items.

8 Receipt of materials dispatched by road transport on door delivery basis at the BHEL/KRIBHCO stores inside the project premises and unloading thereof.

9 Preliminary verification of materials at the time of unloading from road transport vehicle, reporting discrepancies like damages and shortages noticed immediately.

10 Detailed verification of materials with reference to packing list and loading advice slip after unpacking of boxes & crates; repacking after detailed verification; preparation of receipt inspection reports.

11 Stacking and Storing at BHEL/KRIBHCO storage yard or covered stores or semi-closed sheds, submission of stacking/storing records.

12 Preservation of the materials received inside the project premises in accordance with BHEL/KRIBHCO's preservation manual or as per BHEL/KRIBHCO's instructions.

13 General cleaning, grass cutting and upkeep of storage yard, covered and semi-closed stores sheds within the quoted rates of unloading, verification and stacking.

14 Providing services for Materials Management Services (operation of computerized materials management system – feeding data, updation, generation of status reports etc.

15 Re-handling and restacking of materials as and when called for by BHEL. This also includes excess/redundant materials returned to stores by BHEL's erection contractors.

16 Handling and loading of outgoing materials that are to be sent to other destinations.

17 Collection/receipt of materials, verification, Transportation of materials from Transporter's Godown which are supplied on Godown delivery basis from units/vendors/sub-vendors etc.

18 Providing services of secretarial assistance for office & stores and office up-keeping/messengers at BHEL Site Office and Stores.

19 To provide one set of computer with printer and all required accessories at BHEL store office for Material entry/ report generation and updation of material records etc. its subsequent maintenance to keep it in fully working condition and operational.

20 To provide required quantity and size of concrete / wooden sleepers for material storing and handling work as per requirement as scope of work.

21 Receipt, Unlading, Stacking at Stores/Store Yard of Heavy Consignments and /Or OD consignments/Equipments such as Boiler Drums, Chimney Shells/ Sections, Gas Turbines, Gas Turbine Generators, Brushless Exciters, Accessory System Skid, Main filter house, GT MCC,

Diverter Damper, Guillotine Damper, Cylindrical Stack, Water Injection Skid, Naptha Storage Tank, HSD storage Tank, ~~Feed Storage Tank with Deaerator headers~~, Generator Transformers, Station Transformers, Unit Aux. Transformers, Load Gear Box, Switchgear MCC, Boiler Feed Pump Motors etc.

2.1 SYSTEMS AND PACKAGES IN SCOPE OF WORK

2.1.1 MAJOR PACKAGES TO BE HANDLED ARE AS UNDER:

1. HRSGs and their auxiliaries, Modules, Coils/Tubes, CBD & IBD & Tanks, Valves, Structures & Supports, Ducts, Silencers and Chimney sections including Boiler Drums.

2. Gas turbines, Gas turbine-generators and their auxiliaries including Bypass Stacks.

3. Thermal insulation, Refractory and lining

4. HRSGs Electrical and Controls & instrumentation and accessories.

5. GT & TG Electrical and Controls & Instrumentation, Protection and accessories.

6. Balance of Plants (Mechanical equipments & Skids, such as Naphtha Filter Skids, HSD Filter Skids, Hitech Additive Skids, Naphtha day Tanks, HSD day Tanks, Naphtha Fuel Forwarding skid, HSD Fuel forwarding Skids, Drain Tanks, Gas Conditioning Skids, Gas Filter Skids, Naphtha Calescent Skids, Water Injection Skids, Water to Water Heat Exchangers, DM Water Circulating Pump Skids, HSD Centrifuge, Compressor water wash Skids, Diverter Dampers, Guillotine Dampers, BFP Motors, Accessory bases, Gas Valve Modules) Equipments, Skids and Packages etc..

7. Generator transformers, Station Transformers & Unit auxiliary transformer packages and other related Transformers.

8. 6.6KV, 11KV & 33KV Switchgear System, LT Switchgears with associated items/accessories.

9. Electrical motors, Panels, Switchgears, Junction Boxes, and bus ducts etc

10. HT, LT, Control & Signal Cables and Cable trays with support materials etc.

11. Power cycle and field piping, ~~Feed Storage Tanks with Deaerators~~, Tanks, Vessels and Balance of plant equipments & related items/packages etc.

12. Plant illumination / Electrification items like Poles, Electrical fittings, Cable Trays, Plant Earthing materials, Switch Boards, Junction Boxes, Breakers, Cables etc..

13. Other BHEL supplied (manufactured/bought out items) packages

14. Other items sent by BHEL sites/regions etc.

15. Civil & Structural work items like Reinforcement Steel (TMT Bars) and Structural Steel items (like ISMB beams, Channels, Angles, Plates etc.)

SOME OF THE MAJOR HEAVY CONSIGNMENTS FOR EACH UNIT OF GTG, HRSG & BOP ARE:

S.NO	DESCRIPTION	APPROX WT OF SINGLE ASSEMBLY in MT
1	HRSG BOILER DRUM	80 MT
2	Assembled Gas Turbine Unit	91.5
3	GT off base Enclosure	25 MT
4	Inlet Filter Unit	25
5	Inlet Ducting including Silencer	25
6	Lube Oil & Gas Fuel Module	49
7	Exhaust Duct & Bypass Duct	25
8	GT Inlet Chilling System	25
9	Generator	150.6
10	Generator Transformer	100
11	Unit Aux. Transformer	90

Note: The several of above listed items shall be dispatched in dismantled parts. The weights mentioned above are the max. weight of single component among various dismantled parts, however there shall be no. of heavy dismantled components in each item.

2.1.3 SUMMARY OF TOTAL WEIGHT FOR MATERIAL HANDLING

S No.	Description	Approx. Wt.(MT)
1.	HRSG AND AUXILIARIES	1648.0
2.	GT AND AUXILIARIES	1220
3	GENERATOR & AUXILLARIES	260
4	BOP EQUIPMENTS (MECH.) WITH PIPING	789
5	ELECTRICAL AND C&I (INCLUDING TARNSFORMERS, CABLES, TRAYS ,NGR, STATIC FREQUENCY CONVERTER, CONTROL PANELS, BUS DUCTS, SWTICH GEARS, INSTRUMENTS ETC.)	1978
6	REINFORCEMENT STEEL	550
7.	STRUCTURAL STEEL	1450
8	MISC LOOSE ITEMS LIKE OIL, T&P AND OTHERS ITEMS	325
	TOTAL	8220

The weight indicated above are only the tentative indication and should in no way become a basis for any claim on account of any variation in actual weight. Work shall be carried out for all the Equipments received from various manufacturing units and their vendors for the project under these specifications.

2.0 B: SCOPE OF WORK OF ERECTION TESTING & COMMISSIONING OF HRSG & Aux

THE WORK TO BE CARRIED OUT UNDER THE SCOPE OF THESE SPECIFICATIONS IS BROADLY AS UNDER: -

The scope of work for Erection, Welding, Alignment, Testing, Commissioning, Chemical Cleaning/Flushing, Final Painting and Handing over of 1x190 TPH Supplementary fired HRSG with Aux., Equipments, Systems, Piping, Insulation, Final Painting of 1x72 MW GTG Based Co-gen, KRIBHCO HAZIRA Project shall broadly be as under:

1. Receipt/collection/loading/ unloading/ transportation of materials from BHEL/client's stores /storage yards, Transportation to site of work /Erection site including the heavy consignment like Boiler Drums etc.

2. Pre-assembly, Assembly and pre-assembly checks as applicable.

3. Lifting, Placement, Erection, Fit-up, Alignment etc. of Equipments with Aux., Systems, Piping etc. as the scope of these specifications.

4. Erection, Alignment, Fit-up and welding/bolting/fastening, Pre-heat treatment/Post Heat treatment etc. of Equipments with Aux., systems, Field piping & Integral Piping with supports etc. including primer painting of site weld joints with Chlorinated based Zinc Phosphate primer.

5. Assembly, Fixing, Welding of HRSGs casings (Comprising of Stainless Steel Sheet, Insulation, Outer sheet with Stainless Steel fixing components/ retainers/hooks etc.), welding etc. at site and erection.

6. Non Destructive Examination, Radiography etc.

7. Chipping, Preparation of equipments & structures foundations.

8. Secondary grouting of Equipments & Structures with related Aux., Rotating machines etc. including the associated form works like shuttering and related facilities & process for grout mixing.

9. Testing, Pre-commissioning, Commissioning, Hydraulic Testing, Chemical cleaning/ Air Blowing/ Flushing, Alkali Boil out, Steam Blowing, Safety Valve etc.

10. Assembly of Chimney shells, Fit-up, Welding with NDE/Radiography etc. of Chimney.

11. Application of refractory/lining & thermal insulation with retainers, fixing components, cladding sheet etc. of HRSGs with Aux., Equipments, Ducts, Piping, Tanks, Vessels including Chimney and other associated equipments as per scope under these specifications.

12. Erection, Laying, Welding, NDE/Radiography of temporary Piping, Valves, Tanks, Supports etc. for Air Blowing, Steam Blowing, Chemical Cleaning/ Flushing etc. and their subsequent dismantling after completion of work.

13. Handling and filling of Chemicals, Lubricants/gas/ preservatives during, erection, preservation, Chemical cleaning / flushing / blowing, pre-commissioning, Commissioning and subsequent topping up till Trial operation completion.

14. Pre-commissioning checks, Trial runs, testing and commissioning.

15. Surface preparation and Final painting of equipments, related Aux., Systems, Structures, Piping with valves, fittings, supports etc.

16. Safety Valve Floating, Trial operation.

17. Completion of facility points (as applicable)

2.0 C SCOPE OF WORK OF ERECTION TESTING & COMMISSIONING OF Gas Turbine & Aux

THE WORK UNDER THESE SPECIFICATIONS BROADLY COMPRISES OF THE FOLLOWING

A) ERECTION, TESTING AND COMMISSIONING OF 1XFr6 FA GAS TURBINE-GENERATOR SET AND IT'S AUXILIARIES.

THE DETAILS OF WORK TO BE CARRIED OUT UNDER THE SCOPE OF THESE SPECIFICATIONS IS BROADLY AS UNDER:

1) COLLECTION OF MATERIAL FROM BHEL/ CLIENT'S STORES/STORAGE YARD AND TRANSPORTATION TO SITE OF WORK/ PRE-ASSEMBLY

2) PRE-ASSEMBLY, IF ANY, PRE-ERECTION CHECKS AS APPLICABLE

3) ERECTION, ALIGNMENT AND WELDING, BOLTING, FASTENING, GROUTING ETC

4) NON-DESTRUCTIVE EXAMINATION & POST WELD HEAT TREATMENT

5) PRE-COMMISSIONING CHECKS/TESTS, TRIAL RUNS/TESTING AND COMMISSIONING

6) OPEN AND COMBINED CYCLE OPERATION

7) FINAL PAINTING AND HANDING OVER OF THE UNIT

8) TRIAL OPERATION

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***			
a	Open space for labor colony (as per availability)		Yes	Contractor has to make his own arrangements for space, shelter and transportation of labors as per their requirement.
b	Labor Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	***ELECTRICITY***			
3.2.1	***Electricity for construction purposes 3 Phase*** *415/440 V* ***(To be specified whether chargeable or free)***			Free

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Single point source	Yes		Shall be provided by BHEL/KRIBCO free of cost (three phase, 415 V/ 440 V) at one point near the site at a distance of approx. 500M
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	***Electricity for the office, stores, canteen etc of the bidder.***			
a	Single point source	Yes		As provided by Customer
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 his 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: (to be specified whether chargeable or free)***			

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Making the water available at single point	Yes		Shall be provided by BHEL/KRIBCO free of cost.
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***			
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 his own arrangement.
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	Contractor has to make his own arrangement.
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	Contractor has to make his own arrangement.

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	Contractor has to make his own arrangement.
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	Téléphone, 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 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/constructions drawings for all the equipments covered under this scope	Yes		
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL

Sl.No	Description PART II *3.9.0 ERECTION FACILITIES*	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
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	Changes are to be marked in drawing & handover to BHEL on completion of work.
d	Shipping lists etc for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on Sl No. e		Yes	In consultation with BHEL
h	Daily erection / work plan based on Sl No. g		Yes	In consultation with BHEL
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself		Yes	

Sl.No	Description PART II ***3.9.0 ERECTION FACILITIES***	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
L	Arranging the materials required for preassembly		Yes	

SL. NO.	DESCRIPTION OF EQUIPMENTS	CAPACITY	MINIMUM QUANTITY
01	CRAWLER CRANE	75 T	1 NO.(To be deployed from the beginning of erection activities till completion)
02	CRANE (WITH TELESCOPIC BOOM, HYDRAULICALLY OPERATED WITH TURRET FUNCTION)	40 Ton	1 No (TO BE ARRANGED BY THE BIDDER AS PER THE REQUIREMENT FOR MM WORKS)
03	CRANE	55 Ton	1 No (TO BE ARRANGED BY THE BIDDER AS PER THE REQUIREMENT FOR MM WORKS)
03	HYDRA (MOBILE PICK AND CARRY) CRANE FOR MATERIAL HANDLING AND ERECTION WORK	10-12 T	2 NOS.
04	JACKS WITH SLEEPERS / OTHER SUITABLE ARRANGEMENTS FOR UNLOADING AND HANDLING OF GAS TURBINES, GAS TURBINE GENERATORS, TRANSFORMERS	AS PER REQUIREMENT	AS REQUIRED
05	CONCRETE /WOODEN SLEEPERS FOR MATERIAL HANDLING (Assorted sizes 3 FT length, 6 Inch width and 6 Inch height) FOR MAREIAL HANDLING	AS PER REQUIREMENT Minimum. 3000nos	DEPLOYMENT SCHEDULE : COMMENCEMENT OF WORK-1000nos. BY THE END OF 1ST MONTH-CUMULATIVE - 2000 NOS, BY THE END OF 3ND MONTH CUMULATIVE 3000 NOS ANY ADDITIONAL QTY OF SLEEPERS REQUIRED FOR STACKING SHALL BE ARRANGED BY THE CONTRACTOR .
06	TRAILER WITH HORSE	15 TON / 20 TON	01
07	AIR COMPRESSOR (ELECTRIC)	140 CFM	01
08	TIG WELDING SET	-	4 SETS, AS PER REQUIREMENT
09	3 ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF CONSTRUCTION POWER & FITTED	200 Amps, 400	AS PER

	WITH ENERGY METER	Amp	REQUIREMENT
10	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS ETC.)	AS PER REQUIREMENT	3 SETS, AS PER REQUIREMENT
11	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE	IR 192	2 SETS, AS PER REQUIREMENT
12	ELECTRO-HYDRAULIC PIPE BENDING MACHINE	FOR UP TO 100 mm Nb PIPES	AS PER SITE REQUIREMENT
13	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED
14	RADIOGRAPHY FILM VIEWER	AS PER REQMT	1 NO.
15	ELECTRIC WINCH	3 TON / 2 TON	AS PER REQMNT
16	HAND WINCH	1 TON	-DO-
17	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS PER SITE REQUIREMENT	AS PER SITE REQUIREMENT
18	PIPE BENDING MACHINE – HAND OPERATED	UP TO 50 mm Nb PIPES	AS PER SITE REQUIEREMENT
19	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS PER REQUIREMENT	01 EACH
20	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER REQUIREMENT	15
21	ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC.	250 Kg/Cm^2	1 NO.
22	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS	AS PER REQUIREMENT	AS PER REQUIREMENT
23	VACUUM CLEANER (INDUSTRIAL)	AS PER REQUIREMENT	AS PER REQUIREMENT
24	24V TRANSFORMERS	24 V OUTPUT	4 NOS.
25	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES	AS PER REQUIREMENT	AS PER REQUIREMENT
26	GANG OPERATED AND HAND OPERATED HYDRAULIC JACKS WITH SUFFICIENT LONG HOSES OF VARIOUS CAPACITIES FOR GT, AND GTG, GENERATOR TRANSFORMER ETC.	50 MT, 100 MT ADEQUATE NOS.	AS PER REQUIREMENT
27	TORQUE WRENCH 0 TO 200 N-M CAP	AS PER REQUIREMENT	AS PER REQUIREMENT
28	SLINGS OF VAROIUS CAPACITY AND QUANTITIES FOR HANDLING OF EQUIPMENTS	AS PER REQUIREMENT	AS PER REQUIREMENT
29	BOLT STRETCHING DEVICE	AS PER	AS PER

		REQUIREMENT	REQUIREMENT
30	FEELER GAUGE S OF VARIUOS SIZES	AS PER REQUIREMENT	AS PER REQUIREMENT
31	SPANNERS / EYE BOLTS (OF ALL SIZES)	AS PER REQUIREMENT	AS PER REQUIREMENT
32	ANY OTHER MAJOR T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS.	AS PER REQUIREMENT	AS PER REQUIREMENT

The Manufacturing year of all major T&Ps deployed by the contractor (55T, 40T, Mobile Crane, and 12/10 Ton Hydra Crane) should be in good working condition with valid License and not be more than 10 years as on the 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 replace another similar capacity crane in good working condition else BHEL WILL DEPLOY THE CRANE AND RECOVER WITH ADDITIONAL 30% OVERHEADS FROM THE Contractors' RUNNING BILL.

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. THIS ABOVE LIST IS ONLY INDICATIVE AND NEITHER EXHAUSTIVE NOR LIMITING. QUANTITIES INDICATED ABOVE ARE ONLY THE MINIMUM REQUIRED. CONTRACTOR SHALL DEPLOY ALL NECESSARY T&P TO MEET THE SCHEDULES & AS PRESCRIBED BY BHEL ENGINEER AND REQUIRED FOR COMPLETION OF WORK.

2. **IF ABOVE MENTIONED T&P ARE NOT DEPLOYED IN SPECIFIED TIME AS INTIMATED BY BHEL ENGINEER, BHEL WILL DEPLOY THE CRANE AND RECOVER WITH ADDITIONAL 30% OVERHEADS FOR NON AVAILABILITY OF T&P OR LEVY A DAY WISE PENALTY FOR DELAYED DEPLOYMENT AS PER ABOVE MANNER.**

3. IF WORK GETS DELAYED DUE TO NON AVAILABILITY OF T&P, BHEL RESERVES THE RIGHT TO GET THE WORK DONE AT THE RISK AND COST OF CONTRACTOR WITHOUT PREJUDICE TO RIGHTS OF BHEL AS IN GCC.

4. IN ADDITION TO ABOVE CONTRACTOR SHALL PROVIDE ALL NECESSARY ARRANGEMENTS INCLUDIG ADDITIONAL CRANES / ALTERNATE ARRANGEMENT, T&P ETC. FOR UNLODING AND HANDLING OF HEAVY AND VOLUMINOUS EQUIPMENTS / ITEMS AS A SCOPE OF WORK WITHIN THE AGREED CONTRACT PRICE WHICH ARE REQUIRED FOR THE PROJECT AND ARE BEYOND THE CAPACITY & REACH OF CONTRACTOR'S 40-50 MT CRANE AND OTHER CRANES.

5. Heavy Consignments more than 50MT shall be handled by Jack ,Chain Pulley Block and sleepers from the trailer preferably nearer to foundation

SN	DESCRIPTION AND CAPACITY OF T&P	QUANTITY	REMARKS
01	CRAWLER CRANE 250 T	01 NO.	This crane shall be suitably made available as per requirement
02	CRAWLER CRANE 150 T	01 SET	THIS CRANE WILL BE PROVIDED AFTER 1 MONTHS FROM START OF ERECTION
04	AIR LEAK TEST EQUIPMENT MACHINE WITH ALL ACCESSORIES	01 SET	POWER CABLE FOR AIR LEAK TEST EQUIPMENT TO BE PROVIDED BY THE CONTRACTOR.

NOTE:

1. THESE CRANES ARE OWNED OR HIRED BY BHEL. OPERATOR FOR BHEL OWNED CRANE SHALLL BE ARRANGED BY BHEL.

2. 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

3. BHEL MAY OBTAIN THESE CRANES ON HIRING BASIS INCLUDING OPERATING AND MAINTENANCE CREW.

4. OPERATORS FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY.

5. CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES FOR HIS USE.

6. 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.

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 HRSG and progressively augment the resources to match schedule of the project.

6.1.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

6.1.3.A

COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE FOR MATERIAL HANDLING AND MATERIALS MANAGEMENT SERVICES

THE CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE **09 (NINE) MONTHS** FROM START OF CONTRACT PERIOD OR HANDING OVER OF PROJECT WHICHEVER IS EARLIER.

THE DATE OF RECEIPT / UNLOADING THE VERY FIRST CONSIGNMENT BY THE CONTRACTOR AS DEFINED IN SCOPE OF THIS CONTRACT SHALL BE RECKONED AS THE START OF THE CONTRACT PERIOD.

6.1.3.B

COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING of HRSG & Aux ETC.

Erection/placement on its designated foundation / location, of the first major permanent equipment / component / column covered in the scope of these specifications shall be recognized as "**Start of contract period for erection, testing, assistance for commissioning etc** ". 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 Owner the schedule of important milestones is as follows

SL No.	Milestones	UNIT - 1
	Zero Date	**5-Sep-11**
1	HRSG Erection start	Jul'12
2	Drum Lifting Completion)	Nov'12
3	Hydraulic Test	Dec'12
4	HRSG Gas in	Jan'13
5	Safety Valve Floating	Feb-13
6	Reliability Run(CoGen)	Feb-13
7	PG Test	Feb-13

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.

The contract period for completion of entire work of HRSG under this scope shall be **8 (Eight months)** from the "**Start of contract period for erection, testing, assistance for commissioning etc**" 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.

6.1.3 C

COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING for GTG & Aux ETC

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

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

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

S.No	ACTIVITY	UNIT-1
	Zero Date	**5-Sep-11**
1	GT/GTG ERECTION START	Aug-12
2	GTG ERECTION COMPLETION	Dec-12
3	GT RACHETING	Dec-12
4	GT FSNL	Dec-12
5	GT SYNCHRONISATION	Dec-12
6	RELIABILITY RUN(CO-GEN) & HANDOVER	Feb-13
7	PG TEST	Feb-13

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 as per the instructions of BHEL.

The contract period for completion of entire work of GTG under this scope shall be **7 (Seven months)** from the "**Start of contract period for erection, testing, assistance for commissioning etc**" 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.

6.1.4 CONTRACT DURATION

The total contract period for completion of entire scope of work shall be upto **9 (Nine)** months from the start of erection/MM activities till handing over to Customer.

However the contractor shall have to mobilize his resources one month earlier than the start of contract period for preparatory work like taking over and chipping of foundations, blue-matching and grouting of packer plates etc.

The contractor shall complete all the works in the scope of this contract within the contract period. Pending points identified by the customer/BHEL during the execution of the contract are to be liquidated during the contract period itself.

The progressive payment for Material Handling and Management Services on accepted price of contract value (**Rate schedule SECTION A**) will be released as per the break up given hereinafter:

SL NO	Description of Activity	% of payment
7.1.0	**UNLOADING FROM TRUCKS/TRAILERS (For item nos A & D of Rate Schedule Section A)**	60%
7.1.1	UNLOADING, SHIFTING TO OPEN/ COVERED STORES	
7.1.2	UPDATION OF RECEIPT DETAILS, IN STORE MATERIAL REGISTERS/BHEL MM PACKAGE SYSTEM	
7.1.3	STACKING AND VERIFICATION	
7.1.4	UPDATION OF VERIFICATION DETAILS IN MATERIAL STOCK REGISTERS, SUBMISSION OF REPORTS AS PER SPECIFIED FORMATS FOR SHORTAGE/OPEN DELIVERY, LODGING OF POLICE REPORTS IF REQUIRED, DOCUMENTS FOR INSURANCE CLAIMS ETC, AND PREPARATION OF MATERIAL RECEIPT CERTIFICATES IN PRESCRIBED FORMATS WHERE EVER APPLICABLE	25%
7.1.5	IDENTIFICATION OF MATERIAL IN READY TO LIFT POSITION FOR ISSUE TO BHEL/ERECTION AGENCY, AND UPDATION OF ISSUE DETAILS IN STORES RECORDS	12%
7.1.6	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
7.2.0	**UNLOADING FROM RAILWAY WAGONS AND COLLECTION FROM TRANSPORTER GODOWN (For item B & C of Rate Schedule Section A)**	
7.2.1	UNLOADING FROM RAILWAY WAGONS OR COLLECTION FROM TRANSPORTER GODOWNS, RE-LOADING, TRANSPORTATION TO SITE AND UNLOADING	

7.2.2	UPDATION OF RECEIPT DETAILS, IN STORE MATERIAL REGISTERS/BHEL MM PACKAGE SYSTEM	60%
7.2.3	STACKING AND VERIFICATION	
7.2.4	UPDATION OF VERIFICATION DETAILS IN MATERIAL STOCK REGISTERS, SUBMISSION OF REPORTS AS PER SPECIFIED FORMATS FOR SHORTAGE/OPEN DELIVERY, LODGING OF POLICE REPORT IF REQUIRED, DOCUMENTS FOR INSURANCE CLAIMS ETC, AND PREPARATION OF MATERIAL RECEIPT CERTIFICATES IN PRESCRIBED FORMATS WHERE EVER APPLICABLE	25%
7.2.5	IDENTIFICATION OF MATERIAL IN READY TO LIFT POSITION FOR ISSUE TO BHEL/ERECTION AGENCY, AND UPDATION OF ISSUE DETAILS IN STORES RECORDS	12%
7.2.6	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
7.3	**MATERIAL RE-SHIFTING/RE STACKING WITHIN THE PROJECT PREMISE (For item E of Rate Schedule Section A)**	
7.3.1	MATERIAL RE-SHIFTING/RE STACKING	85%
7.3.2	UPDATION OF STORE MATERIAL REGISTERS/BHEL MM PACKAGE SYSTEM	12%
7.3.3	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
7.4	**OUTGOING MATERIALS (For item F of rate Schedule Section A)**	

7.4.1	IDENTIFICATION OF MATERIALS, TAGGING, PACKING IF REQUIRED, PREPARATION OF GATE PASSES ETC	40%
7.4.2	LOADING OF MATERIALS, INCLUDING T&P OF BHEL, INTO TRUCKS/CARRIERS AT SITE STORES/ERECTION SITE FOR ONWARD TRANSPORTATION TO OTHER DESTINATIONS (TRANSPORTATION BY OTHER AGENCIES.)	45%
7.4.3	UPDATION OF STORE DOCUMENTS/BHEL MM PACKAGE SYSTEM	12%
7.4.4	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
7.5	**OTHERS**	
	% from every RA Bill to be paid only after satisfactory completion of the following otherwise forfeited	
1	REMOVAL OF GRASS/WEEDS AND OTHER PLANT GROWTH IN THE STORE AREA	1%
2	PRESERVATION planned for the month	1%
3	Safe working & availability of adequate illumination at the place of work	1%
7.6	**SPECIAL PRESERVATION OF MAJOR COMPONENT(for item G of rate Schedule Section A)**	
1	On Completion of Specific Preservation Work	100%

The progressive payment for Erection, Testing and Commissioning on accepted price of contract value (**Rate Schedule SECTION B**) will be released as per the break up given hereinafter:

TERMS OF PAYMENT FOR HRSG

SL NO	**Contract (Main Package) Identitification ---->**	**HRSG**				**Rotating Machine**	**ESP**		**PIPING**			**INSULATION**
	Rate schedule Identification ------->	**Structure**	**Pressure Parts**	**Non Pressure Parts (upto ESP inlet Funnel)**	**Air Pre Heaters**	**1) RM 2) Handling Eqpts**	**ESP**	**NPP (ESP outlet Funnel to Chimney)**	**1)P-91 2) AS 3) CS (HP) 4) CS (LP) 5) SS**	**Hangers & Supports**	**Temporary Piping 1) Steam Blowing 2) Chemical Cleaning**	**1) Castable & Pourable 2) Iron Components 3) Wool mattresses 4) Aluminium sheeting**
I	**PRO RATA PAYMENTS (85%)**											
1.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION)	20	20	25					15	15		--
1.2	PLACEMENT IN POSITION	15	10	10					15	15		50
1.3	ALIGNMENT	15	15	10					15	15		15
1.4	WELDING/BOLTING/FIXING	15	20	15					25	25		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	--								--
1.6	On Drum Lifting	0										

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		--	0					--			--
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											
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											
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											
1.21.3	Completion of erection and alignment of modules											
1.21.4	Completion of erection, alignment and welding of Pin Rack assembly and Drive assembly											
1.21.5	Completion of seals setting											
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											
1.21.7	Completion of PGMA											
1.21.8	Air preheater Trial Run											
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	**85**	**85**	**85**					**85**	**85**	**85**	**85**

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

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

TERMS OF PAYMENT

The progressive payment for erection, testing and commissioning on accepted price of GTG Package rates (**Rate Schedule SECTION C**) will be released as per the break up given hereinafter:

A	**GAS TURBINE (25%)**	
1.	Foundation Preparation and soleplate grouting	1%
2.	Placement of Gas Turbine	3%
3.	Alignment of GT with Load Gear Box	2%
4.	Erection of GT off base enclosure	3%
5.	A) Erection of Lube Oil & Gas Fuel Modules including LO Centrifuge	3%
6.	GT vent fans & Exhaust frame cooler fans	1%
7.	GT CO_2 Fire Protection Systems	1%
8.	Erection of Piping works in GT, including Oil / Fuel piping works and enclosures	8%
9.	Miscellaneous works on GT	3%
	TOTAL	**25%**
B.	**DUCTING (24%)**	
1.	Inlet Filter Unit	5%
2.	Inlet Ducting, inlet Silencer	2%
3.	Exhaust Diffuser	1%
4.	Exhaust Duct & by pass Duct	9%
5.	Support Structures	2%
6.	Dampers with seal air fans	5%
	TOTAL	**24%**
C.	**GENERATOR: (15%)**	
1.	Preparation of Foundation and leveling of Base plates & packers etc.	1%
2.	Erection of Generator Stator	5%
3.	Erection of bearings	2%
4.	Rotor insertion	2%

5.	Erection of Excitation system	1%
6.	Mist Eliminator with blower	1%
7.	Alignment of GTG with Load Gear Box	1%
8.	Miscellaneous items	2%
	TOTAL	**15%**
D.	**GAS COMPRESSOR & AUX. : (18%)**	
1.	Compressor, Gear Box assembly on base frame with oil and Gas piping around machine	7%
2.	Compressor drive motors	2%
3.	Lube Oil console & Lube Oil overhead Tank	2%
4.	Piping & other Misc. works	5%
5.	All Coolers	2%
	TOTAL	**18%**
E.	**BOP FOR GT (8%)**	
1.	Fuel System	2%
2.	Pumps	1%
3.	Heat Exchangers & Any Other Equipments	2%
4.	Field piping & Supports	3%
	TOTAL	**8%**
F.	**FINAL PAINTING: (2%)**	**2 %**
G.	**COMMISSIONING; (8%)**	
1.	Cranking of GT	2%
2.	FSNL	2%
3.	Synchronisation	2%
4.	Trial Operation & PG Test	2%
	TOTAL	**8%**
	GRAND TOTAL	**100%**

Note:
Wherever application of INSULATION is required as per specification, same shall be carried out under the respective item/equipment within allocated % as per 'Terms of Payment'

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 00 dated 07/06/2012)

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

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

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

I. **The name, address and the registration number of the contractor,**
II. **The name and address of the party receiving taxable service,**
III. **Description, classification and value of taxable service provided and,**
IV. **The service tax payable thereon.**

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

8.1.3 VAT (Sales Tax /WCT)

(i) Applicable for All Tenders excepting sl no 8.1.3 (ii)

As regards Value Added Tax (VAT) on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) applicable as per local laws, the price quoted by the contractor shall be **exclusive** of the same. Where such taxes are required to be paid by the contractor, this will be reimbursed on production of proof of payment made to the authorities by the Contractor. In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. The contractor has to take all necessary steps to **minimize**

tax on input goods by purchasing the materials from any registered dealer of the concerned state only. In case contractor opts for composition, it will be with the prior express consent of BHEL. Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

(ii) Civil Works in Gujarat

~~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.~~

8.1.4 Modalities of Tax Incidence on BHEL (Applicable for All Tenders Other Than Civil in Gujarat)

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

8.2 '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**)~~

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 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.

In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-

i. It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.

ii. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on the extant of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.

iii. It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.

iv. It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.

SPECIFIC INCLUSIONS

9.1
All terminal connections for equipment & piping covered in this specification.

9.2
Impulse/ pneumatic piping between customer's battery limit and equipments.

9.3
Servicing and assembly of control valves/regulating valves, fixing of filter elements/strainers etc. is the part of scope of work.

9.4
It may be specifically noted that it should not be construed or claimed by the contractor that with the technical specification and "exclusions and/or inclusions" detailed in this tender specification, BHEL has covered the entire scope of work and/or the details thereof to be executed by the contractor .

9.7
Chipping of foundation, placement, erection, alignment, commissioning, grouting, mounting of equipment mount instruments, panels and other fittings of BHEL Hyderabad (PE & SD bought out items) supplied are in scope of the work. Erection and commissioning of these equipments/pumps & BOP packages will be required to complete and meet the commissioning schedule/ milestone activities of other areas like HRSG, etc. Contractor shall plan and complete erection & commissioning of these equipments on priority as per decision of BHEL engineer/customer requirement. Details of such systems are furnished in relevant appendix.

9.8
Most of the Misc. Pumps with drive motors, base frame, fittings etc will be supplied in loose parts/ dismantled condition as skid mount. These pumps along with drive and fittings shall be assembled at site. The Delivery of these will be taken from BHEL stores/storage yard and will be assembled/ installed at different locations as per drawing and instruction of BHEL Engineer at site. The work involved is preservation, assembly, installation, erection, alignment, foundation grouting including providing non-shrink free flow grout mix material, fixing of loose items, filling of lubricants, greasing, commissioning, no load/ load trial run of motors & pumps. All the works shall be carried our as part of scope of work.

These Misc. pumps will be required for erection and commissioning of other systems, pipings, equipments which will be under scope of erection of other agencies. Contractor shall carry out the installation, erection and alignment works etc. as per priority decided by BHEL Engineer at site to enable the other agencies to proceed with their work. Contractor shall carry out the welding of terminal point/interface/matching & connected flanges joints, pipe joints etc. of other system & other agencies as scope of work. The decision of BHEL Engineer shall be final and binding on contractor.

9.10
CONSUMABLES
The contractor shall provide all consumables required for carrying out the work covered under these specifications excepting those which are specifically indicated as BHEL scope.
TG special consumables like hylomar / golden hermetite / stag-b / molykote/ anabond compounds / rubber fixing compounds etc. will have to be arranged by the contractor.

9.11
All consumables to be used for the work shall have prior approval of BHEL engineer with regard to brand and quality specifications. Test reports / certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer.

9.13
WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

All welding consumables including filler wires are in the contractor's scope.

9.14
All the required welding electrodes as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc. on receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc. Batch test certificates shall be made available for verification & record before the actual use of the welding consumables.

BHEL reserves the right to reject the use of any electrodes, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type / brand etc.

9.15
The contractor shall provide all consumables required for carrying out the work covered under this scope of work including TIG wires for welding of piping joints.

9.16
All the required gases like argon, oxygen, and acetylene etc. including required high purity nitrogen gas (for purging of generator stator water system) shall be arranged by the contractor at his cost.

9.0 EXCLUSIONS

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

- Civil works except to the extent specifically indicated elsewhere in this tender.
- Supply of primer and paints for final painting
- Sub-delivery items and electrical components such as push-buttons, junction boxes etc.
- E&C work of cable trays, cables and earthing etc
- Control panels, EPMS, MCC etc.

- All electrical and control & instrumentation related to items except those specified elsewhere in these specifications.
- Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
- Pneumatic copper tubing and fittings thereof.Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications

- All cable connections, except those specified as scope of work.
- Measuring instruments, monitoring, relaying, protection and signaling equipments other than those supplied with the equipments by / on behalf of BHEL and which have been indicated as scope of work.
- Electrical testing of motors, turbo-generator. However erection of these items will be under the scope of this tender specification.
- Impulse piping and fittings from the tapping points of various equipments other than those specified as scope of work.
- Civil works to the extent not specifically provided for in this tender.
- Supply of materials for temporary piping (pipe, valve, structural steel etc.) required for hydraulic test, chemical cleaning, flushing or steam/air blowing of the pipelines.
- Supply of chemicals and lube oil for pre-commissioning and commissioning activities.
- Some sub-delivery items and electrical components such as push-buttons, junction boxes etc.
- E&C work of cable trays, cables and earthing etc.
- All electrical and control & instrumentation items except those specified elsewhere in these specifications.
- Supply of primer and paints for final painting.
- Pneumatic copper tubing and fittings thereof.

APPENDIX -1
AA: LIST OF APPLICABLE PGMA

STRUCTURES			
CUST No.	**PGMA**	**DESCRIPTION**	**DESIGN Wt.(MT)**
5760	35010	FOUNDATION MATER	17.4
5760	35110	MAIN COLUMNS LEF	43.8
5760	35120	MAIN COLUMNS RIG	43.8
5760	35131	INLET DUCT SUPPO	16.0
5760	35140	AUXILIARY COLUMN	4.1
5760	35220	PIPING SUPPORT -	0.3
5760	35391	MODULE TRANSPORT	45.0
5760	35392	SINGLE MODULE LI	1.5
5760	35393	MODULE UPRIGHTIN	4.0
5760	35540	AUXILIARYCOLUMN	4.0
5760	35591	BOTTOM BRACING B	16.6
5760	35592	TOP BRACING BEAM	20.0
5760	35593	BASE BEAMS OR MO	11.2
5760	35594	DUCT STIFFENER B	17.8
5760	35595	LATERAL SUPPORT	6.6
5760	35596	LATERAL SUPPORT	15.1
5760	35597	MODULE AND DRUM	14.5
5760	35610	BOILER ROOF STRU	32.0
5760	35611	BOILER ROOF SHEE	9.0
5760	36210	MAIN FLOOR 1ST L	9.0
5760	36220	MAIN FLOOR 2ND L	6.0
5760	36230	MAIN FLOOR 3RD L	5.5
5760	36240	MAIN FLOOR 4TH L	12.5
5760	36250	MAIN FLOOR 5TH L	4.5
5760	36390	MISCELLANEOUS PL	3.5
5760	36810	FLOOR GRILLS AND	14.0
5760	36820	STAIRS AND LADDE	10.0
5760	36850	HANDRAILS AND HA	12.0
SUB-TOTAL			399.7

PRESSURE PARTS			
CUST No.	**PGMA**	**DESCRIPTION**	**DESIGN Wt.(MT)**
5760	04116	BOILER DRUM WITH	90.0
5760	04148	DRUM SLIDE BEARI	0.1

5760	04158	FASTENERS FOR DR	0.0
5760	07206	RISER PIPES	4.0
5760	07210	RISER HEADERS &	5.0
5760	07411	DOWNCOMER SUSPEN	0.6
5760	07504	DISC SPRING FOR	0.5
5760	07505	EVAP. MODULE SUP	1.0
5760	07506	EVAP. MODULE SUP	1.9
5760	07507	EVAP. MODULE SUP	0.5
5760	07992	IMPORTED ELECTRO	0.1
5760	07993	ERECTION MATERIA	0.5
5760	08910	EXPANSION MOVEME	0.3
5760	10100	Saturated Steam	1.5
5760	10121	Final SH Inlet H	1.8
5760	10135	DESH Inlet Heade	2.5
5760	10221	Final SH Outlet	1.8
5760	10235	DESH Outlet Head	2.5
5760	12850	Saturated Steam	2.0
5760	12851	Main Steam Line	3.0
5760	12852	DESH Links	11.2
5760	12900	DESH	1.5
5760	12901	Supports for Sat	2.0
5760	12902	Supports for DES	2.0
5760	12911	Supports for SH	0.8
5760	12912	Supports for SH	1.0
5760	12992	Welding Consumab	0.1
5760	12993	Erection materia	0.5
5760	19101	WPH INLET LINE	0.8
5760	19102	WPH OUTLET LINE	0.8
5760	19702	Economiser outle	1.0
5760	19850	Economiser feed	1.7
5760	19851	Eco to Drum link	1.5
5760	19852	Eco stage-II int	2.0
5760	19853	Eco part bypass	1.0
5760	19856	Eco stage-I inte	2.0
5760	19901	Supports for eco	1.0
5760	19902	Supports for eco	1.0
5760	19908	WPH INLET AND OU	0.2
5760	19911	WPH MODULE SUPPO	0.1
5760	19912	Supports for Eco	0.8

5760	19913	Supports for Eco	1.8
5760	19914	Supports for Eco	1.8
5760	19915	Supports for Eco	1.8
5760	19916	Supports for Eco	1.6
5760	19992	Welding Consumab	0.1
5760	19993	Erection materia	0.5
5760	24400	HP DRAINS,VENTS&	27.0
5760	24401	BLR TRIM PIPING	7.5
5760	24420	HP SAFETY VALVE	4.0
5760	24425	HP SAFETY VALVE	4.0
5760	24460	BHEL VALVES	11.0
5760	24465	SUB DELIVERY VAL	7.0
5760	24473	HP DWLG	0.3
5760	24475	HP DRAIN HEADERS	0.8
5760	24480	HP SAFETY VALVES	0.4
5760	24485	HP SAFETY VALVE	2.5
5760	24490	HP START-UP-VENT	1.2
5760	24955	LAPPING TOOLS FO	0.0
5760	24960	LAPPING TOOLS FO	0.0
5760	24989	COMMISSINING SPA	0.0
5760	24992	IMPORTED ELECTRO	0.1
5760	24993	ERECTION MATERIA	0.9
5760	24994	NAME PLATES	0.2
5760	HL101	EVAPORATOR MODUL	16.5
5760	HL102	EVAPORATOR MODUL	16.5
5760	HL103	EVAPORATOR MODUL	20.2
5760	HL104	EVAPORATOR MODUL	20.2
5760	HL105	EVAPORATOR MODUL	22.8
5760	HL106	EVAPORATOR MODUL	22.8
5760	HL131	SH Stage-II Modu	10.0
5760	HL132	SH Stage-II Modu	10.0
5760	HL133	SH Stage-I Modul	20.8
5760	HL134	SH Stage-I Modul	20.8
5760	HL151	Eco Stage-II Mod	16.1
5760	HL152	Eco Stage-II Mod	16.1
5760	HL153	Eco Stage-II Mod	38.6
5760	HL154	Eco Stage-II Mod	38.6
5760	HL155	Eco Stage-II Mod	19.3
5760	HL156	Eco Stage-II Mod	19.3

5760	HL157	Eco Stage-I Modu	19.3
5760	HL158	Eco Stage-I Modu	19.3
5760	HL159	Eco Stage-I Modu	38.6
5760	HL160	Eco Stage-I Modu	38.6
5760	HL161	Eco Stage-I Modu	35.3
5760	HL162	Eco Stage-I Modu	35.3
5760	HL171	WPH MODULE ASSY.	3.2
5760	HL172	WPH MODULE ASSY.	3.2
5760	HL201	LINKS FOR EVAP.	0.9
5760	HL202	LINKS FOR EVAP.	0.9
5760	HL203	LINKS FOR EVAP.	5.8
5760	HL204	LINKS FOR EVAP.	5.8
5760	HL205	LINKS FOR EVAP.	1.5
5760	HL206	LINKS FOR EVAP.	1.5
5760	HL231	SH Stage-II modu	2.8
5760	HL232	SH Stage-II modu	2.8
5760	HL233	SH Stage-I modul	2.8
5760	HL234	SH Stage-I modul	2.8
5760	HL251	Eco Stage-II Mod	0.7
5760	HL252	Eco Stage-II Mod	0.7
5760	HL253	Eco Stage-II Mod	1.0
5760	HL254	Eco Stage-II Mod	1.0
5760	HL255	Eco Stage-II Mod	1.1
5760	HL256	Eco Stage-II Mod	1.1
5760	HL257	Eco Stage-I Modu	1.0
5760	HL258	Eco Stage-I Modu	1.0
5760	HL259	Eco Stage-I Modu	1.0
5760	HL260	Eco Stage-I Modu	1.0
5760	HL261	Eco Stage-I Modu	1.2
5760	HL262	Eco Stage-I Modu	1.2
5760	HL271	LINKS FOR WPH MO	0.2
5760	HL272	LINKS FOR WPH MO	0.2
SUB-TOTAL			788.5

INSULATION			
CUST No.	**PGMA**	**DESCRIPTION**	**DESIGN Wt.(MT)**
5760	28700	CLADDING SHEET F	6.2
5760	32010	CLADDING SHEET I	6.0
5760	32020	CLADDING SHEET B	12.0

5760	32055	EXTERNAL INSULAT	3.5
5760	32110	CLADDING SHEET -	13.0
5760	32810	CLADDING SHEET -	1.3
5760	32993	ERECTION MATERIA	0.8
5760	33021	CERAMIC WOOL	51.0
5760	33621	MINERAL WOOL FOR	15.0
5760	33970	WIRE MESH	0.8
5760	33975	SEALING COMPONEN	0.2
SUB-TOTAL			109.8

PIPING			
CUST No.	**PGMA**	**DESCRIPTION**	**DESIGN Wt.(MT)**
5760	80145	BD TANK EXHAUSTS	3.2
5760	80219	DOSING SYSTEM	4.0
5760	80273	BLOW DOWN SYSTEM	0.5
5760	80274	CBD TANK SAFETY	0.0
5760	80600	DOSING PIPING	0.4
5760	80992	IMP0RTED ELECTRO	0.0
5760	81005	IBD TANK	3.5
5760	81011	CBD TANK	2.0
5760	81411	BLOW DOWN TANK L	0.1
5760	81413	BDT CONTROL VALV	0.2
		PIPING,VALVES,FITTINGS	650.0
SUB-TOTAL			663.9

NON-PRESSURE PARTS			
CUST No.	**PGMA**	**DESCRIPTION**	**DESIGN Wt.(MT)**
5760	37810	OUTER CASING SHE	3.5
5760	41130	Duct Burner Assy	14.0
5760	41450	Pipe type Gas Ig	0.8
5760	41988	Commissioning Sp	0.0
5760	42001	Pneumatic fittin	0.1
5760	42002	Steam Blow mater	0.2
5760	42005	Instrument Fitti	0.2
5760	42076	Skid Assy - Burn	3.5
5760	42155	Operating Floor	3.0
5760	42156	Operating Floor	0.5
5760	42270	SD - FF SKIDS	1.0

5760	42988	Commissioning Sp	0.1
5760	43002	Scanner Cooling	3.0
5760	43202	SD - Scanner and	2.0
5760	48200	INSTRUMENT TAPPI	0.3
5760	48422	HRSG INLET DUCT	18.5
5760	48424	EXP. JOINT - INL	0.5
5760	48452	DUCT BOILER OUTL	5.3
5760	48454	EXP.PIECES - OUT	1.0
5760	48700	BULKED BPS COMPO	0.1
5760	48993	ERECTION MATERIA	0.9
5760	97401	GAUGES	0.1
5760	97402	ELECTRONIC WATER	0.5
~~5760~~	~~97411~~	~~CONTROL INSTRUME~~	~~0.6~~
~~5760~~	~~97414~~	~~TEMPERATURE SENS~~	~~0.2~~
~~5760~~	~~97416~~	~~FLOW ELEMENTS &~~	~~0.4~~
~~5760~~	~~97417~~	~~CONDENSING POT~~	~~0.1~~
~~5760~~	~~97419~~	~~BURNER MANAGEMEN~~	~~0.3~~
~~5760~~	~~97421~~	~~GAS ANALYSERS~~	~~0.3~~
~~5760~~	~~97422~~	~~STEAM AND WATER~~	~~0.4~~
~~5760~~	~~97442~~	~~FIELD INSTRUMENT~~	~~2.7~~
~~5760~~	~~97443~~	~~LT ELECTRICAL PA~~	~~6.5~~
~~5760~~	~~97444~~	~~PB AND JUNCTION~~	~~0.8~~
~~5760~~	~~97451~~	~~POWER & CONTROL~~	~~17.0~~
~~5760~~	~~97453~~	~~CABLE TRAYS~~	~~3.0~~
~~5760~~	~~97454~~	~~INSTRUMENT CABLE~~	~~7.0~~
~~5760~~	~~97455~~	~~TUBING'S AND FIT~~	~~0.2~~
~~5760~~	~~97457~~	~~ANGLES AND CHANN~~	~~3.0~~
~~5760~~	~~97470~~	~~EARTHING MATERIA~~	~~0.2~~
5760	HL098	COLUMN-CASING BR	2.9
5760	HL301	EVAPORATOR BAFFL	2.2
5760	HL302	EVAPORATOR BAFFL	2.2
5760	HL303	EVAPORATOR BAFFL	2.0
5760	HL304	EVAPORATOR BAFFL	2.0
5760	HL305	EVAPORATOR BAFFL	2.0
5760	HL306	EVAPORATOR BAFFL	2.0
5760	HL351	Eco-Stage-II Mod	3.0
5760	HL352	Eco-Stage-II Mod	3.0
5760	HL353	Eco-Stage-II Mod	3.0
5760	HL354	Eco-Stage-II Mod	3.0

5760	HL355	Eco-Stage-I Modu	3.0
5760	HL356	Eco-Stage-I Modu	3.0
5760	HL357	Eco-Stage-I Modu	3.0
5760	HL358	Eco-Stage-I Modu	3.0
5760	HL501	SIDE CASING S1	6.5
5760	HL503	SIDE CASING S3	6.1
5760	HL504	SIDE CASING S4	5.9
5760	HL505	SIDE CASING S5	5.9
5760	HL506	SIDE CASING S6	5.9
5760	HL507	SIDE CASING S7	5.9
5760	HL508	SIDE CASING S8	5.9
5760	HL509	SIDE CASING S9	5.9
5760	HL601	TOP & BOTTOM CAS	3.4
5760	HL603	TOP & BOTTOM CAS	3.4
5760	HL604	TOP & BOTTOM CAS	3.4
5760	HL605	TOP & BOTTOM CAS	3.4
5760	HL606	TOP & BOTTOM CAS	3.4
5760	HL607	TOP & BOTTOM CAS	3.4
5760	HL608	TOP & BOTTOM CAS	3.4
5760	HL609	TOP & BOTTOM CAS	3.4
5760	87010	CHIMNEY FDN MATERIAL	4.5
5760	87100	CHIMNEY SHELL	76.1
5760	87150	CHIMNEY STRAKES	18.1
5760	87200	PAINTER TROLLEY	1.2
5760	87300	PLATFORMS & LADDERS	9.5
5760	87930	AVIATION LAMPS	1.2
5760	87950	CHIMNEY INSULATION	6.5
5760	87960	CHIMN INS FIX COMP	2.7
SUB-TOTAL			336.1

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I A ESTIMATED WEIGHT FOR VARIOUS SYSTEMS IN SCOPE OF WORK of HRSG & Aux

NOTES:

1. 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.

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

3. Rate Schedule Identified for PGMAs of 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.

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

Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc as stated elsewhere will get added

To be issued during execution.

To be issued during execution.

ANNEXURE – I B

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC FOR GTG & AUX

HYDERABAD SUPPLY

FRAME-6FA+e GAS TURBINE & AUXILIARIES

S.No.	ITEM	QTY	DIMENSION METERS (LxWxH)	Tonnage (MT)	REMARKS
1	Assembled Gas Turbine Unit	1	9.82 x 3.62 x 4.6	91.5	Single consignment
2	GT off base Enclosure	1	8 x 3.5 x 3.0	130	Sent in many boxes with above dimensions .Max single consignment weight 25 MT
3	Inlet Filter Unit	1	10.0 x 3.5 x 3.0	90	Sent in many boxes with above dimensions .Max single consignment weight 25 MT
4	Inlet Ducting Including Silencer	2	10.0 x 3.5 x 3.0	80	Sent in many boxes with above dimensions .Max single consignment weight 25 MT
5	Exhaust Diffuser (A042)	1	6.5 x 4.4 x 3.9	16	-
6	Lube oil & Gas Fuel Module (Acce. module)	1	9.2X 3.5 x 4.5	49	Single consignment
7	L.O. Centrifuge	1	2.0 x 2.5 x 2.5	1	-
8	Comp. Water Wash Skid	1	6.1 x 2.6 x 3.1	8	-
9	Foundation Bolts	1 Set	6.0x3.0x3.0	4.7	-
10	Special Tools Tool Kit	1 Set	6.0 x 3.0 x 3.0	2.9 0.4	-

ANNEXURE – I B

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC FOR GTG & AUX

11	CABLES	-	-	30	-
12	AUX CONTROL PANEL	1	1.0 X 0.8 X 2.4	0.5	-
13	415V GTMCC	1	14.0 X 1.25	15	-
14	GT DCDB	2	3.26 X 0.95	1.5	-
15	GT 125V DC,645AH BATTERY (LEAD ACID)	2	11.25 X 0.90	6.5	-
16	GT 125V DC,150A BATTERY CHARGER (DUAL FCBC)	2	2.40 X 0.8 X 2.0	1	-
17	IAF Control panel	1	0.6 x 0.4 x 1.5	0.5	-
18	GT CO2 protection system	1	0.800 x 0.400 x 2.000	0.5	-
19	GT Vent Fans	10	1.9 x 2.0 x 1.1, 1.9 x 2.0 x 1.1, 1.9 x 2.0 x 1.1, 1.9 x 2.0 x 1.1, 3.6 x 2.0 x 1.5, 3.6 x 2.0 x 1.5	9	Sent in many boxes with above dimensions.
20	Miscellaneous	1	6.0 x3.0 x 3.0	15	Sent in many boxes with above dimensions.
21	Exhaust Duct & Bypass Duct	1	10.0 x 4.5 x 4.5	130	Sent in many boxes with above dimensions. Max single consignment weight 25 MT
22	Diverter Damper	1 2	5.5 X 3.5 x 4.0	30	Sent in many boxes with above dimensions.
23	Guillotine Damper	1 2	4.7 x 4.7 x 0.8	14	Sent in many boxes with above dimensions

ANNEXURE – I B

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC FOR GTG & AUX

24	Load Coupling with Hardware	1	1.6 x 0.65 Dia	0.32	-
25	Mist Eliminator	1	1.3 x 1.8X2	2	-
26	GT CO_2 Rack	6	4.0 x 1.0 x 2.0, 2.4x 1.0 x 2.0, 3.2x0.5x2.0	16	Sent in many boxes with above dimensions
			2.0 x 1.0 x 2.0, 2.0 x .5 x 2.0, 4.0x1.0x2.0		
27	Air Processing Unit	1	3.2 x 1.5 x 3.0	1	-
28	Exhaust Frame Blowers	4	3.2 x 3.05 x 3.0	2.1	Sent in many boxes with above dimensions
29	Field Piping	1	6.0 x 3.0 x 3.0	16	Sent in many boxes with above dimensions
30	G.T. Inlet Chilling System	1	10 x 3.5 x 3.5	200	Will be sent in many consignments.
					Max. single consignment weight 25 MT
31	Gas Heater	1	3.7 x .8 x .6	1.25	
32	Lube Oil	-	-	36	
1	Lube oil requirement for first fill will be 23470 liters and 50% extra shall be considered for flow flushing (Lube oil Spec: ISO VG32).				
2	Detergent for each off-line water wash is 160 liters each wash.				

Gas Turbine Generator & AUXILIARIES

Rating: 76 MW 95MVA,11KV,0.8 PF,50 HZ,3000 RPM

S.No.	ITEM	QTY	DIMENSION METERS (LxWxH)	Tonnage (MT)	REMARKS
	Generator Package	1	9.0 x 3.9 x 4.0	150.6	
A	ISOLATED PHASE BUS DUCT & NGE				

ANNEXURE – I B

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC FOR GTG & AUX

1	ISOLATED PHASE BUSDUCT	1	250 M(Single Phase Meters)	20	
2	PT AND SP CUBICLE	1	2.0 x 2.0 x 2.5	2	
3	NGT CUBICLE	1	1.8 x 1.3 x 1.4	1	
B	CONTROL,METERING,RELAY, PROTECTION & SYNCHRONISING PANELS				
1	CONTROL PANEL	1	2.0 x 1.0 x 2.3	1.5	
2	PROTECTION PANEL	1	1.6 x 0.8 x 2.3	1	
3	DATA CONCENTRATOR PANEL	1	0.8 x 0.8 x 2.3	0.5	
C	GENERATOR CIRCUIT BREAKER				
1	GENERATOR CIRCUIT BREAKER	1	5.0 x 2.5 x 2.5	4	
D	STATIC FREQUENCY CONVERTER				
1	SFC CONTAINER	1	10.0 x 2.5 x 3.5	15	
E	CABLES				
1	10T X 0.5 Sq .mm	1	1000 M	10	
2	3C X 4 Sq .mm	1	1000 M	10	
3	3C X 6 Sq. mm	1	800 M	8	
4	5C X 2.5 Sq .mm	1	2000 M	20	
5	10C X 2.5 Sq .mm	1	1500 M	15	
	BOP-MECHANICAL				
S.No.	ITEM	QTY	DIMENSION METERS (LxWxH)	Tonnage (MT)	REMARKS
A	Fuel System				
1	Filter Separator (2*100%) Skid	1	8.5 x 3.5 x 4.0	7	Common for Fr-6FA +E and HRSG
2	Gas Scrubber (1*100%) skid for Fr-6FA+E+HRSG	1	3.5 x 3.5 x 6.0	4	Common for Fr-6FA +E and HRSG
3	Fine Filter skids	1	5.6 x 2.6 x 4.0	8.14	Fine filter skid for FR-6FA+E
4	Natural Gas Electric Heater Skid(950KW) along with Thyristor control panel	1	10.0 x 3.0 x 4.0	72.373	Natural gas Electric skid (950kW) common for Fr-6FA +E and HRSG

ANNEXURE – I B

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC FOR GTG & AUX

5	Natural Gas Steam Heater (1*100) Skid common for FR-6FA+E and HRSGs	1	10.0 x 3.0 x 4.0	26.427	Natural Gas Steam Heater (1*100) Skid common for FR-6FA+E and HRSGs
6	$10m^3$ Gas Condensate drain tank	1	1.5 x6.0 (dia x length)	6.0 (empty weight)	This tank shall be located in a pit.
B	Pumps				
1	Cooling water pumps - For GT AUX's	4	2.5 x 1.00 x 1.5	1.8	
2	Cooling water pumps - For Chiller plant	2	5.0 x 2.0 x 1.5	10	
3	Blow down transfer pumps	2	0.8 x 0.6 x 6.0	0.8	To be located in blow down pit. These are submersible pumps.
C	Plate Heat Exchanger				
	Plate Heat Exchanger (2*100%) for GT accessory base	1	1.76 xx 1.83 x .65	1.57	

NOTE :

1. THE LIST IS TENTATIVE AND HAS BEEN GIVEN TO ENABLE THE CONTRACTOR TO STUDY THE NATURE OF WORK TO BE DONE IN THIS CONTRACT. THERE MAY BE VARIATION IN SIZE, WEIGHT ETC. AND NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED ON ACCOUNT OF THIS BY BHEL.
2. SOME OF THE PACKAGES MAY BE SENT IN PARTS TO SUIT THE SITE CONDITION / TRANSPORTATION, THE SAME IS TO BE ASSEMBLED AT SITE WITHOUT ANY EXTRA COST, LIKEWISE THE PACKAGE MAY BE ASSEMBLED TOGETHER AND SEND AS A SINGLE ASSY. CONTRACTOR MAY HAVE TO DISMANTLE AND ERECT OR, ERECT AS SINGLE ASSEMBLY AS PER THE INSTRUCTION OF BHEL ENGINEERS WITHOUT ANY EXTRA COST.

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC ANNEXURE I C

SUMMARY OF WEIGHT DETAILS

S.N.	EQUIPMENT / PACKAGE	APPROX. WT. (IN MT)
1	GAS TURBINE & AUX	1258
2	GENERATOR & AUX	259
5	BOP-MECH	154
TOTAL		**1671**

NOTE:.

a. THE WEIGHT INDICATED ABOVE IS APPROXIMATE AND THERE MAY BE A VARIATION IN WEIGHT OF EQUIPMENT / PACKAGE. NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED BY BHEL ON ACCOUNT OF VARIATION IN WEIGHT QUANTITIES.

Chapter-XI General

11.1
THE INTENT OF SPECIFICATION IS TO PROVIDE MATERIAL HANDLING AND MATERIALS MANAGEMENT SERVICES ACCORDING TO THE MOST MODERN AND PROVEN TECHNIQUES AND CODES. THE OMISSION OF SPECIFIC REFERENCE TO ANY METHOD, EQUIPMENT OR MATERIALS NECESSARY FOR PROPER AND EFFICIENT UNLOADING, TRANSPORTATION, VERIFICATION, STACKING & PRESERVATION ETC SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING SUCH FACILITIES TO COMPLETE THE WORK WITHOUT ANY EXTRA COMPENSATION.

11.2
THE WORK SHALL BE EXECUTED UNDER USUAL CONDITIONS AFFECTING MAJOR THERMAL POWER PROJECTS IN AN EXISTING POWER PLANT AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH PERSONNEL OF CUSTOMER'S CONTRACTORS, COORDINATING HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK AS A WHOLE.

11.3
ALL THE WORK SHALL BE CARRIED OUT AS PER THE INSTRUCTIONS OF BHEL ENGINEER. BHEL ENGINEER'S DECISION REGARDING CORRECTNESS OF THE WORK AND METHOD OF WORKING SHALL BE FINAL AND BINDING ON THE CONTRACTOR.

11.4
THE CONTRACTOR SHALL PERFORM ALL REQUIRED SERVICES WHICH MAY NOT BE SPECIFIED HEREIN BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

11.5
ALL NECESSARY CERTIFICATES AND LICENSES REQUIRED TO CARRY OUT THIS WORK ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY.

11.6
ALL CRANES, TRANSPORT EQUIPMENTS, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MANPOWER, SUPERVISORS/ENGINEERS, CONSUMABLES ETC REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR.

11.7
ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY THE CONTRACTOR UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES ELSEWHERE IN THESE SPECIFICATIONS. THE CONTRACTOR'S QUOTED RATES SHALL INCLUDE ALL SUCH CONTINGENCIES. IN THIS CONNECTION REFER RELEVANT CLAUSE OF GENERAL CONDITIONS OF CONTRACT.

11.8
THE CONTRACTOR SHALL PERFORM ALL REQUIRED SERVICES WHICH MAY NOT BE SPECIFIED HEREIN BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

11.9
THE DISTANCES INDICATED IN THESE SPECIFICATIONS ARE ONLY APPROXIMATE. HOWEVER, THE TENDERERS SHOULD ASSESS THE VARIOUS DISTANCES AND SITE CONDITIONS BY VISITING SITE BEFORE SUBMITTING THEIR OFFER. NO ADDITIONAL/EXTRA CLAIMS FOR ANY VARIATION IN THIS REGARD WILL BE ENTERTAINED.

11.10
CONTRACTOR SHALL ARRANGE FOR CUTTING AND REMOVAL OF VEGETATION GROWTH/GRASS ETC IN THE STORAGE YARD AS AND WHEN CALLED FOR BY BHEL AS INCIDENTAL TO WORK. BHEL WILL TAKE APPROPRIATE ACTION AT THE RISK & COST OF THE CONTRACTOR IN CASE OF FAILURE IN THIS REGARD.

11.11
IF THE CONTRACTOR OR HIS WORKMEN OR EMPLOYEES BREAK, DEFACE, INJURE OR DESTROY ANY PART OF A BUILDING, ROAD, KERBS, FENCE, ENCLOSURES, WATER PIPES, CABLES, DRAINS, ELECTRIC OR TELEPHONE POSTS OR WIRES, TREES OR ANY OTHER PROPERTY OR TO ANY PART OF ERECTED EQUIPMENTS, STORED COMPONENTS ETC WITHIN THE PROJECT PREMISES OR OUTSIDE THE CONTRACTOR SHALL MAKE THE SAME GOOD AT HIS OWN EXPENSES, ELSE BHEL SHALL LEVY/RECOVER NECESSERY COMPENSATION FROM CONTRACTOR'S BILL PAYMENT.

11.12 Submission of Periodical Reports

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

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

BHEL will provide formats for these reports.

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

TECHNICAL CONDITIONS OF CONTRACT (TCC) **(Section A)**
Chapter-XII MATERIAL HANDLING AND MATERIAL MANAGEMENT
OF MATERIALS RECEIVED BY ROAD

12.1
MAJORITY OF CONSIGNMENTS SHALL REACH SITE DIRECTLY FOR DELIVERY. HOWEVER A GOOD NUMBER OF CONSIGNMENTS SHALL BE BOOKED ON GODOWN DELIVERY BASIS OR DOOR DELIVERY AGAINST CONSIGNEE COPY BASIS, THE PROCEDURE OF MATERIAL COLLECTION SHALL BE ADOPTED AS DETAILED IN RELAVENT CHAPTER

12.2
IT WILL BE RESPONSIBILITY OF THE CONTRACTOR TO KEEP IN TOUCH WITH OFFICIALS OF BHEL REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT LORRY WAY BILLS OR OTHER SUCH DESPATCH DOCUMENTS.

12.3
THE CONTRACTOR SHALL REMAIN IN REGULAR CONTACT WITH THE CONCERNED TRANSPORTERS OR BASED ON THE DESPATCH DETAILS OBTAINED AS STATED ABOVE AND MAKE ALL NECESSARY ARRANGEMENTS FOR COLLECTION / RECEIPT OF THE CONSIGNMENT AS APPLICABLE. CONTRACTOR SHALL TAKE ADVANCE ACTION TO DEPLOY ALL NECESSARY RESOURCES FOR LOCAL TRANSPORTATION, HANDLING AND UNLOADING OF THE ANTICIPATED CONSIGNMENTS SO AS TO ENSURE NO LOSS OF TIME UPON ARRIVAL OF THE CONSIGNMENTS.

12.4
DETENTION CHARGES/DEMURRAGE/WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

12.5
IT WOULD BE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE PACKAGES, CONSIGNMENTS ETC. IMMEDIATELY ON ARRIVAL AND BRING TO THE NOTICE OF BHEL AUTHORITIES REGARDING LOSS/DAMAGE/SHORTAGE/DISCREPANCY, IF ANY, OBSERVED IN THE CONSIGNMENTS BEFORE TAKING DELIVERY OF THE SAME.

12.6
ANY DISCREPANCY/SHORTAGE/DAMAGE FOUND IN THE CONSIGNMENT AFTER TAKING CLEAN DELIVERY FROM THE CARRIERS SHALL BE THE RESPONSIBILITY OF CONTRACTOR AND THE RESULTANT LOSS TO BHEL ON SUCH ACCOUNT SHALL BE RECOVERABLE FROM THE CONTRACTOR.

12.7
CONSIGNMENTS ARE EXPECTED TO ARRIVE DURING ANY TIME OF THE DAY, AND COUNT DOWN FOR DETENTION/DEMMURAGE/WHARFAGE CHARGES IS LIABLE TO START IMMEDIATELY. UNLOADING OF SUCH CONSIGNMENTS MAY BE NECESSITATED EVEN IN THE NIGHT OR ROUND THE CLOCK. CONTRACTOR SHALL ARRANGE TO DEPLOY HIS RESOURCES IMMEDIATELY AND CONTINUE ROUND THE CLOCK ON SUCH OCCASIONS WITHOUT ANY ADDITIONAL COST TO BHEL. CONTRACTOR SHALL ARRANGE ALL NECESSARY RESOURCES INCLUDING SPOT LIGHTING FOR WORKING AT NIGHT. THE CONTRACTOR SHALL SIMILARLY UNLOAD CONSIGNMENTS ARRIVING ON WEEKLY OFF DAYS AND HOLIDAYS.

12.8
UNLOADING AT STORAGE AREA/WORK SITE, STACKING AND RESTACKING IF NECESSITY ARISES, OF ALL MATERIALS INCLUDING HEAVY/SOPHISTICATED EQUIPMENTS LIKE TUBED WALL PANELS OF BOILER, HEAVY MOTORS, HEAVY BEARING PEDESTALS, ELECTRICAL PANELS AND TG EQUIPMENT LIKE HEAVY TURBINE COMPONENTS, PUMPS, PANELS, ETC. SHALL BE DONE AS PER STORAGE AND

PRESERVATION MANUAL OF RELEVANT EQUIPMENT/COMPONENTS OF BHEL AND/OR AS PER DIRECTIONS OF BHEL ENGINEER.

12.9
THE CONTRACTOR SHALL VERIFY THE CONSIGNMENTS IN DETAIL **WITHIN 12 DAYS OF RECEIPT AND REPORT THE DISCREPANCIES IN PRESCRIBED FORMATS NOT LATER THAN 14TH DAY**. ANY LOSS ON ACCOUNT OF DELAYED REPORTING SHALL BE RECOVERABLE FROM CONTRACTORS BILL/ANY PAYMENT DUE. CONTRACTOR SHALL ARRANGE ALL FACILITIES TO OPEN PACKAGES - WHERE REQUIRED IN THE PRESENCE OF BHEL ENGINEER, VERIFY THE CONTENTS, REPACK WHEREVER AND WHENEVER CALLED FOR AND PROPERLY STACK THEM AS PER STORAGE MANUAL OR/AND AS MAY BE DIRECTED BY BHEL.

12.10
THE MATERIAL SHALL BE SO STACKED THAT IT SHOULD FACILITATE EASY IDENTIFICATION, RETRIEVAL AND HANDLING FOR ISSUE AS AND WHEN NEED ARISES.

12.11
PRE-DEFINED IDENTIFICATION SYSTEM OF THE LOCATIONS OF OPEN STORAGE YARD, SEMI-CLOSED SHED, COVERED STORES AS WELL AS STORAGE RACKS HAS TO BE DESIGNED BY THE CONTRACTOR WITH THE APPROVAL OF BHEL. CONTRACTOR SHALL PUT UP PROMINENT IDENTIFICATION BOARDS OF SEGMENTAL LOCATIONS (FOR OPEN AND SEMI-CLOSED STORES) OR INSCRIPTION (ON THE STORAGE RACKS) WITH CLEAR VISIBILITY FROM A DISTANCE. CONTRACTOR SHALL ALSO ARRANGE TO DISPLAY PLOT PLAN AT REGULAR INTERVALS IN THE COVERED/SEMI-CLOSED/OPEN STORAGE. THE CONTRACTOR SHALL ARRANGE PROPER DISPLAYS/SIGNS FOR VARIOUS REQUIREMENTS AS PER INSTRUCTIONS OF BHEL.

12.12
THE CONTRACTOR SHALL EXECUTE THE WORK IN A PROFESSIONAL MANNER. THE STORES SHALL BE HANDLED WITH DUE CARE AND DILIGENCE. THE CONTRACTOR AT HIS RISK AND COST SHALL MAKE GOOD ANY LOSS TO BHEL DUE TO CONTRACTOR'S LAPSE.

12.13
FOR ALL CONSIGNMENTS, OBSERVATIONS REGARDING LOSS/DAMAGE/SHORTAGE/ DISCREPANCY IS TO BE RECORDED IN APPROPRIATE DOCUMENT AND INFORMED TO BHEL. IN CASE IT BECOMES NECESSARY TO TAKE '**OPEN DELIVERY'** FROM THE AUTHORITIES, CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR TAKING OPEN DELIVERIES. ALL EXPENSES CONNECTED THEREWITH SHALL BE TO THE ACCOUNT OF CONTRACTOR. ANY LOSS THAT ACCRUES TO BHEL ON ACCOUNT OF SUCH FAILURES SHALL BE DEBITED TO THE CONTRACTOR AND RECOVERY EFFECTED FROM HIS RUNNING BILLS.

12.14 HANDLING HEAVIER CONSIGNMENTS:

12.14.1 BOILER DRUM

BOILER DRUM WILL BE ARRIVING IN ITS SPECIAL TRAILER INSIDE THE PROJECT PREMISES. CONTRACTOR SHALL ARRANGE JACK & SLEEPER OR SUITABLE CRANES AND UNLOAD THE BOILER DRUM FROM THE SPECIAL VEHICLE AND SHIFT TO THE LOCATION AS DECIDED BY BHEL ENGINEER AT SITE. CONTRACTOR SHALL ALSO CARRY OUT THE NECESSARY LEVELLING & CONSOLIDATION OF THE UNLOADING AREA AND ATTENDANT WORK.

12.14.2

CONTRACTOR SHALL SUBMIT PROCEDURE WITH SKETCHES OF HANDLING OF ALL SUCH HEAVY COMPONENTS TO BHEL WELL IN ADVANCE AND OBTAIN PRIOR APPROVAL BEFORE UNLOADING AND STACKING.

12.15

SINCE THIS CONTRACT IS INTENDED TO BE A COMPLETE PACKAGE FROM MATERIAL RECEIPT THROUGH ISSUE/TRANSACTIONS RIGHT UPTO MATERIAL RECONCILIATION, FULL RESPONSIBILITY W.R.T THE PROPER UPKEEP OF FACILITIES E.G. COMPUTERS, STATIONARY ITEMS; ENSURING BEFITTING DISCIPLINE AMONG THE STORE ASSISTANTS/STAFF UNDER ITS CONTROL AND ACCOUNTING OF MATERIALS ON STOCK SHALL REST WITH THE CONTRACTOR AT ALL TIMES.

IN THE REMOTE POSSIBILITY OF ANY UNTRACEABLE MATERIAL, CUSTOMARILY BHEL HAS TO PROCESS THE INSURANCE CLAIM. TO KICK OFF SUCH CLAIM, THE CONTRACTOR SHALL RENDER ALL NECESSARY ASSISTANCE INCLUDING AUGMENTATION OF DOCUMENTS (FIR ETC) WITHIN THE QUOTED PRICE AS MAY BE REQUIRED FOR REALIZATION OF THE INSURANCE CLAIM.

12.16

THE CONTRACTOR UNDER THIS CONTRACT SHALL COMPLETE INDUCTION OF FOLLOWING CATEGORIES OF RESOURCES WITHIN THE QUOTED ITEM RATES, TO ENSURE ESTABLISHMENT OF PROPER **MATERIALS MANAGEMENT** AT THE PROJECT SITE.

1. **COMPUTERS WITH LATEST UP-GRADATION, MEMORY AND COMPATIBLE WITH BHEL COMPUTERS/LAN EQUIPMENT TO BE INSTALLED/USED WITHIN BHEL SITE OFFICE- 02 SETS**

2. ITEM RATE IN THE RATE SCHEDULE HAS SPECIFIC MENTION OF “MATERIALS MANAGEMENT” WITH SOLE PURPOSE TO EMPHASIZE THE REQUIREMENT OF SUFFICIENT NO. OF ADEQUATELY QUALIFIED MANPOWER TO ENSURE BEST OBTAINABLE QUALITY OF WORK. ACCORDINGLY, SUPERVISORS/MANPOWER (APART FROM WORKMEN ON CRANES AND MATERIAL HANDLING PURPOSE) AS INDICATED AGAINST EACH ACTIVITY IN THE TABLE BELOW, NORMALLY TO WORK AT (BUT NOT LIMITED TO) BHEL SITE OFFICE

RESPONSIBILITIES OF THE CONTRACTOR -

(1) RECEIPT & ISSUE

SCOPE INCLUDES EXECUTION OF VARIOUS ACTIVITIES AS FOLLOWS:

(I) RECEIPT, UNLOADING, CARRYING OUT RECEIPT INSPECTION, DETAILED VERIFICATION, STACKING AND REGULAR STOCK VERIFICATION OF PROJECT MATERIALS AT SITE.

(II) PREPARING VARIOUS REPORTS AT APPROPRIATE STAGES AND REPORTING DAMAGE/LOSS DURING RECEIPT AS WELL AS STORAGE AND ANY OTHER ASSOCIATED RESPONSIBILITY AS ASSIGNED BY BHEL FROM TIME TO TIME. RESPONSIBILITY SHALL INCLUDE THE FOLLOWING ACTIVITIES:

a. EXAMINATION OF INCOMING CONSIGNMENTS TO DETECT ANY LOSS OR SHORTAGE OR OUTWARD DAMAGE AND RECORDING IT ON THE LR/LWB BEFORE MAKING ACKNOWLEDGEMENT OF IT'S RECEIPT FROM THE TRANSPORTER AND SIMULTANEOUSLY OBTAINING ENDORSEMENT OF THE VEHICLE DRIVER ON THE SAME.

b. REPORTING SUCH DISCREPANCY TO BHEL IMMEDIATELY ON RECEIPT OF CONSIGNMENT.

c. ASSISTING BHEL IN LODGING INSURANCE CLAIMS IN RESPECT OF LOSS/DAMAGE AS STATED ABOVE.

(III) ISSUE OF MATERIALS TO BHEL'S ERECTION CONTRACTORS, PRESERVATION OF STACKED MATERIALS, RE-STACKING/RE-HANDLING AS NECESSARY, PROGRESSIVE AND FINAL RECONCILIATION WITH BHEL'S ERECTION AGENCIES AND PREPARATION OF NECESSARY DOCUMENT/ RECORD IN RESPECT OF THESE ACTIVITIES.

(IV) RETURN OF EXCESS/DEFECTIVE MATERIALS BY VARIOUS ERECTION CONTRACTORS OF BHEL.

(V) LOADING AND DISPATCH OF OUTGOING MATERIALS.

EXPECTED MINIMUM QUALITY OF SERVICE

CONTRACTOR SHALL RENDER THE SERVICES BY ENSURING DEPLOYMENT OF REQUISITE PERSONNEL WITH ADEQUATE EDUCATIONAL QUALIFICATION OF ENGINEERING/TECHNICAL BACKGROUND, HAVING THOROUGH EXPERIENCE IN RELATED FIELD TO ENABLE UNDERSTANDING THE INTRICACIES OF AND SPECIAL REQUIREMENTS INVOLVED IN HANDLING OF PROJECT MATERIALS, INCONSISTENCIES AND UNCERTAINTIES ASSOCIATED WITH IN/OUT FLOW OF MATERIALS, PROJECT ACTIVITIES AT ODD HOURS & HOLIDAYS AND IRREGULAR WORKING HOURS. CONTRACTOR SHALL ENSURE PROMPT AND TIMELY AVAILABILITY OF SUCH SERVICES.

(2) RECORD KEEPING –

CONTRACTOR SHALL PREPARE, MAINTAIN AND UPDATE VARIOUS MM RECORDS, ASSOCIATED WITH MATERIALS MANAGEMENT OPERATION OF BHEL AT PROJECT SITE. TWO SYSTEMS OF RECORD KEEPING/CAPTURING INFORMATION & DATA AT VARIOUS STAGES ARE IN VOGUE VIZ.

i. MANUAL LEDGERS & RECORDS.

ii. COMPUTERIZED DATABASE APPLICATION: BHEL HAS DEVELOPED A SOFTWARE APPLICATION NAMED SITE OPERATIONS MANAGEMENT SYSTEM (SOMS) THAT

CAPTURES ALL THE DATA IN THE ENTIRE CHAIN OF TRANSACTIONS STARTING WITH MASTER LIST OF PROJECT MATERIALS, RECORDS OF DISPATCH, RECEIPT, INSPECTION, ISSUE, RETURN, CONSUMPTION ETC.

SOME OF THESE RECORDS ARE MASTER SHIPPING/PACKING LIST, LR/RR REGISTER, DAYBOOK REGISTER, STOCK REGISTER, RECORDS OF ISSUES TO & RETURN OF MATERIALS IN RESPECT OF VARIOUS ERECTION SUBCONTRACTORS, INSURANCE CLAIM RECORDS, PERIODICAL STATUS REPORTS IN VARIOUS FORMATS COVERING DESIRED ASPECTS AND OUTPUT INFORMATION AS PER BHEL/CLIENT'S REQUIREMENT.

BHEL WILL PROVIDE NECESSARY HARDWARE, SOFTWARE & STATIONARY ETC. CONTRACTOR SHALL TAKE UTMOST CARE TO ENSURE THAT THESE PROPERTIES AND RECORDS ARE PROTECTED FROM ANY DAMAGE OR LOSS. **BHEL WILL RECOVER THE COST OF SUCH PROPERTY / EXPENSES OF RESTORATION FROM THE CONTRACTOR WITH 30% OVERHEAD CHARGES IN CASE OF ANY LOSS/DAMAGE ATTRIBUTABLE TO NEGLIGENCE/FAILURE ON CONTRACTOR'S PART**.

SL NO	ACTIVITY/DESCRIPTION	MINIMUM NO. OF PERSONS	REMARKS
1	MATERIAL RECEIPT/UNLOADING, COLLECTION/ BOOKINGS	2	WITH COMMENCEMENT OF WORK
2	DETAILED VERIFICATION	1	WITH COMMENCEMENT OF WORK
3	MATERIAL ISSUE (HRSG)	1	AS PER REUIREMENT
4	MATERIAL ISSUE (GTG, T&P, ELEC, C&I)	1	AS PER REUIREMENT
5	PRESERVATION	1	
6	RECORD KEEPING (HRSG)	1	WITH COMMENCEMENT OF WORK
7	RECORD KEEPING (TG, ELEC, C&I STOCK)	1	WITH COMMENCEMENT OF WORK
8	RECORD KEEPING (T&P STOCK, MRC, ASSISTANCE IN INSURANCE CLAIMS, PURCHASE ETC)	1	WITH COMMENCEMENT OF WORK

NOTE: THE NO. OF PERSONS INDICATED ABOVE IS TENTATIVE AND ACTUAL DEPLOYMENT MAY VARY BASED ON WORK LOAD AND SITE REQUIREMENT, NOR THE DEPLOYMENT ABSOLVES THE CONTRACTOR FROM HIS RESPONSIBILITY TOWARDS THE SATISFACTORY EXECUTION OF THE JOB

IN CASE THE CONTRACTOR DOES NOT DEPLOY OR DELAYS DEPLOYMENT OF ABOVE SAID MANPOWER WITH REFERENCE TO SPECIFIC INSTRUCTIONS FROM BHEL ELSE BHEL WILL DEPLOY MANPOWER AND RECOVER WITH ADDITIONAL 30% OVERHEADS FROM THE RUNNING BILL.

12.17

PAYMENT FOR ALL MATERIALS INCLUDING OD AND HEAVIER COMPONENTS SHALL BE REGULATED ON THE ACCEPTED UNIT **RATE AS PER SL NO A OF RATE SCHEDULE (SECTION A)**

13.1

THERE IS A RAILWAY SIDING IN THE PROJECT PREMISES. ALL THE CONSIGNMENTS REACHING THE PROJECT SITE BY RAIL SHALL BE UNLOADED AT THE RAILWAY SIDING, FOLLOWED BY LOADING ON TRUCK/TRAILER, LOCAL TRANSPORTATION FROM RAILWAY SIDING TO THE STORAGE YARD/STORES, UNLOADING, VERIFICATION AND STACKING AND PRESERVATION AS APPLICABLE TO THE CONSIGNMENTS ARRIVING BY ROAD.

13.2
IT WILL BE RESPONSIBILITY OF THE CONTRACTOR TO KEEP IN TOUCH WITH OFFICIALS OF BHEL AND RAILWAYS REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT RAILWAY RECEIPTS OR OTHER SUCH DESPATCH DOCUMENTS.

13.3
CONTRACTOR SHALL DEPLOY HIS CRANE, TRAILERS/TRUCKS AND ALL OTHER T & P INCLUDING ADDITIONAL T & P AND MANPOWER ETC FOR HANDLING OF MATERIALS AT SUCH UNLOADING BAY/ LOCATION AND TRANSPORT TO STORES/ STORAGE YARD.

13.4
CONTRACTOR SHALL IN HIS OWN INTEREST ARRANGE TO RELEASE THE RAILWAY WAGONS/RACKS WITH UTMOST ALACRITY TO AVOID ANY DEMURRAGE CHARGES. DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

13.5
CONTRACTOR SHALL PROVIDE AREA LIGHTING AT RAILWAY SIDING FOR HANDLING OF MATERIALS DURING EVENING/ NIGHT.

13.6
ALL THE RESPONSIBILITIES SPECIFIED IN THE CONTRACTOR'S SCOPE FOR THE MATERIALS RECEIVED BY ROAD SHALL ALSO BE APPLICABLE MUTATIS-MUTANDIS FOR ALL THE CONSIGNMENTS RECEIVED BY RAIL AT RAILWAY SIDING.

13.7
FOR THE CONSIGNMENTS RECEIVED BY RAIL THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE **ACCEPTED UNIT RATE AS PER SL NO B OF RATE SCHEDULE (SECTION A)**. THE ABOVE ALSO INCLUDES ALL COSTS TOWARDS UNLOADING FROM THE WAGON AT THE UNLOADING SIDING IN THE PLANT AND LOADING ON THE TRANSPROT AND THE COST TOWARDS INTERNAL TRANSPORTATION TO STORAGE YARD/ STORES SHED OF BHEL/ CLIENT

14.1 RESHIFTING AND RE-STACKING

OWING TO SEVERAL PROJECT REQUIREMENTS, MANY COMPONENETS MAY HAVE TO BE SHIFTED FROM ORIGINALLY STACKED LOCATIONS TO ELSEWHERE WITHIN THE PROJECT PREMISES FOR THE LEAD DISTANCE NOT EXCEEDING 2.5 KMS. THIS MAY INVOLVE LOADING OF SUCH MATERIAL ONTO A VEHICLE MOVING TO A NEW LOCATION AND UNLOADING/STACKING INCLUDING PROPER INSCRIPTION OF IDENTIFICATION MARKS IF NEEDED. LIST OF ITEMS DULY CERTIFIED BY BHEL OFFICIAL, SHIFTED, UPDATED STOCK RECORDS ABOUT CHANGE IN LOCATION ETC SHALL BE PREPARED/SUBMITTED ALONG WITH THE MONTHLY BILLS

SEPARATE ITEM RATE SHALL BE QUOTED FOR RESHIFTING AND RE-STACKING OF STACKED MATERIALS AND THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT **RATE AS PER SL NO E OF RATE SCHEDULE(SECTION A)**

14.2 RE-STACKING/RE-ARRANGING

OVER A PERIOD OF TIME, RESTACKING/REARRANGING OF THE MATERIALS STACKED EARLIER MAY ARISES DUE TO VARIOUS REASONS. THE HANDLING OF SUCH ITEMS WILL ALSO BE IN THE SCOPE OF THIS CONTRACT. THE RESTACKING/ RE-HANDLING MAY BE NECESSITATED FOR ANY EQUIPMENT/ MATERIALS COVERED WITHIN THIS WORK SPECIFICATION. CONTRACTOR SHALL DEPLOY NECESSARY RESOURCES LIKE MANPOWER, T&P, EQUIPMENTS ETC TO CARRY OUT THIS EXERCISE INCLUDING PROPER INSCRIPTION OF IDENTIFICATION MARKS IF NEEDED. LIST OF ITEMS DULY CERTIFIED BY BHEL OFFICIAL, RESTACKED, UPDATED STOCK RECORDS ABOUT CHANGE IN LOCATION ETC SHALL BE PREPARED/SUBMITTED ALONG WITH THE MONTHLY BILLS

RESTACKING AND REARRANGING SHALL BE APPLICABLE FOR MATERIALS RETURNED BY BHEL'S ERECTION CONTRACTORS ALSO.

BIDDER SHALL NOT QUOTE ANY SEPARATE RATE FOR RE-STACKING/RE-ARRANGING OF MATERIAL. **THE RATE SHALL BE DERIVED AS 40% OF UNIT RATE QUOTED FOR ITEM NO E OF RATE SCHEDULE (SECTION A)**

TECHNICAL CONDITIONS OF CONTRACT (TCC) **(Section A)**
Chapter-XV MATERIAL HANDLING AND MATERIAL MANAGEMENT OF MATERIAL COLLECTIONS/ DISPATCHES

15.1 INCOMING MATERIALS (SMALLS ETC)

15.1.1
EVEN THOUGH MAJORITY OF CONSIGNMENTS SHALL REACH SITE DIRECTLY FOR DELIVERY. A GOOD NUMBER OF CONSIGNMENTS SHALL BE BOOKED ON GOWDOWNS DELIVERY/ DOOR DELIVERY BASIS AGAINST ORIGINAL CONSIGNEE COPY BASIS, THE PROCEDURE OF MATERIAL COLLECTION SHALL BE ADOPTED AS DETAILED HERE BELOW:

15.1.2
CONTRACTOR SHALL KEEP IN TOUCH WITH OFFICIALS OF BHEL REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT ORIGINAL LRs/RRs/LORRY WAY BILLS OR OTHER SUCH DISPATCH DOCUMENTS

15.1.3
THE CONTRACTOR SHALL REMAIN IN REGULAR CONTACT WITH THE CONCERNED TRANSPORTERS OR RAILWAYS BASED ON THE DISPATCH DOCUMENTS OBTAINED AS STATED ABOVE AND MAKE ALL NECESSARY ARRANGEMENTS FOR COLLECTION / RECEIPT OF THE CONSIGNMENT AS APPLICABLE. CONTRACTOR SHALL TAKE ADVANCE ACTION TO DEPLOY ALL NECESSARY RESOURCES FOR LOCAL TRANSPORTATION, HANDLING AND UNLOADING OF THE ANTICIPATED CONSIGNMENTS SO AS TO ENSURE NO LOSS OF TIME UPON ARRIVAL OF THE CONSIGNMENTS. LOADING AT TRANSPORTERS GODOWN, LOCAL TRANSPORT UP TO BHEL/ CLIENT'S STORES/ SITE AND UNLOADING AT STORES/STORAGE YARD/SITE, VERIFICATION AND STACKING SHALL ALSO BE IN THE SCOPE OF CONTRACT.

15.1.4
DETENTION CHARGES/ DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

15.1.5
SEPARATE ITEM RATE SHALL BE QUOTED FOR MATERIAL HANDLING AND MATERIAL MANAGEMENT OF INCOMING MATERIALS (SMALLS/FULL TRUCK LOADS) FROM TRANSPORTERS GODOWNS AND THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE **ACCEPTED UNIT RATE AS PER SL NO C OF RATE SCHEDULE (SECTION A).** NO OTHER PAYMENT SUCH AS MINIMUM CHARGES FOR CARRIER ETC WILL BE MADE. ALL ARRANGEMENTS INCLUDING TRANSPORT, LABOUR AND OTHER T&P ETC IS IN CONTRACTOR'S SCOPE. THESE GODOWNS ARE EXPECTED TO BE LOCATED WITHIN A RADIUS OF 50 KM APPROX FROM THE PROJECT SITE.

15.1.6
ALL THE RESPONSIBILITIES SPECIFIED IN THE CONTRACTOR'S SCOPE FOR THE MATERIALS RECEIVED BY ROAD SHALL ALSO BE APPLICABLE MUTATIS-MUTANDIS FOR ALL THE CONSIGNMENTS (INCOMING SMALLS) RECEIVED FROM TRANSPORTERS GODOWN/S.

15.2 OUTGOING MATERIALS/DISPATCHES

15.2.1
FOR VARYING REASONS MANY A TIMES, PROJECT MATERIALS / BHEL ASSETS ARE TO BE DISPATCHED TO OTHER SITES/LOCATIONS.

15.2.2
CONTRACTOR SHALL IDENTIFY, TAG, PACK AND PREPARE GATE PASSES FOR THE MATERIALS TO BE DISPATCHED. MATERIALS SHALL BE LOADED ONTO THE OUTGOING VEHICLES WITH DUE CARE AND HANDED OVER TO THE TRANSPORTER WITH CLEAR GOODS RECEIPT WHICH SHALL BE SUBMITTED WITH BHEL PROMPTLY. BHEL SHALL MAKE ARRANGEMENT FOR THE TRANSPORT VEHICLES AT ITS OWN COST.
SEPARATE ITEM RATE SHALL BE QUOTED FOR MATERIAL HANDLING AND MATERIAL MANAGEMENT OF DISPATCH/OUTGOING MATERIALS AND THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON **THE ACCEPTED UNIT RATE AS PER SL NO F OF RATE SCHEDULE (SECTION A).**

15.2.3
SUCH MATERIALS WHICH NEED TO BE BROUGHT TO TRNASPORTER'S/RAILWAY GODOWN FOR BOOKING, ARRANGEMENTS SHALL BE ADOPTED AS MENTIONED BELOW:

CONTRACTOR SHALL ARRANGE SUITABLE VEHICLE FOR TRANSPORTATION OF MATERIALS /SMALLS FROM STORES/STORAGE YARD/SITE TO TRANSPORTERS GODOWNS, IDENTIFY, TAG, PACK AND PREPARE GATE PASSES FOR THE MATERIALS TO BE DISPATCHED. MATERIALS SHALL BE LOADED ONTO THE OUTGOING VEHICLE WITH DUE CARE AND HANDED OVER TO THE TRANSPORTER WITH CLEAR GOODS RECEIPT WHICH SHALL BE SUBMITTED WITH BHEL PROMPTLY WITHIN THE QUOTED RATES AS PER SL NO C OF RATE SCHEDULE

TECHNICAL CONDITIONS OF CONTRACT (TCC) **(Section A)**
Chapter-XVI MATERIAL MANAGEMENT SERVICES

16.1

THE CONTRACTOR UNDER THIS CONTRACT SHALL PROVIDE FOLLOWING CATEGORIES OF SERVICES AT THE PROJECT SITE. THE RESOURCES DEPLOYED FOR MM SERVICES BY THE CONTRACTOR SHALL BE AT THE EXCLUSIVE DISPOSAL OF BHEL ON A FULL TIME BASIS. THESE SHALL NOT BE USED FOR ANY ACTIVITIES ASSOCIATED WITH THE NORMAL RESPONSIBILITIES ENVISAGED UNDER THIS CONTRACT OF MATERIAL HANDLING AND MATERIAL MANAGEMENT:

A. SUPERVISION/SECRETARIAL SERVICES

WORKING LEVEL SUPERVISION OF EACH WORK SPOT SHALL BE IN THE SCOPE OF CONTRACTOR UNDER REGULAR MATERIAL HANDLING WORK. ON THE OTHER HAND, SUPERVISORY SERVICES UNDER MM SERVICES SHALL BE AT ONE LEVEL HIGHER THAN WORKING LEVEL SUPERVISION BEING DONE AS CONTRACTOR'S RESPONSIBILITY TOWARDS MATERIAL HANDLING WORK. BHEL REQUIRES THAT THESE SERVICES SHALL BE TO OVERSEE AND MONITOR THE VARIOUS OPERATIONS/ACTIVITIES OF MATERIAL HANDLING PROCESS. MM SUPERVISORY SERVICES SHALL ENSURE SETTING BROAD GUIDELINES TO THE WORKING LEVEL SUPERVISORS, MONITORING PROGRESS OF OVERALL PLAN VIS-À-VIS IMPLEMENTATION, PROPER AND PROMPT TRACEABILITY OF STOCK IN THE STORES, IDENTIFICATION OF CORRECTIVE & PREVENTIVE ACTIONS IN MATERIAL HANDLING & STORAGE WORK AND IMPLEMENTATION OF A SYSTEMATIC PROCESS TO FINALLY ENSURE ACHIEVEMENT OF THE PROJECT SCHEDULE.
THESE SHALL ALSO INCLUDE SERVICES OF PERSONAL ASSISTANCE IN THE OFFICIAL WORK OF BHEL'S CONSTRUCTION MANAGER, SECRETARIAL SERVICES FOR CORRESPONDENCES AND DOCUMENTATION OF VARIOUS DEPARTMENTS OF BHEL SITE (ERECTION, COMMISSIONING, FINANCE & ACCOUNTS, STORES/MATERIAL MANAGEMENT ETC).

CONTRACTOR SHALL RENDER THE SERVICES BY ENSURING DEPLOYMENT OF REQUISITE PERSONNEL WITH ADEQUATE (MINIMUM DIPLOMA IN ENGINEERING FOR MM SUPERVISION, GRADUATION FOR SECRETARIAL SERVICES) EDUCATIONAL QUALIFICATION, HAVING THOROUGH EXPERIENCE IN RELATED FIELD TO ENABLE UNDERSTANDING THE INTRICACIES OF AND SPECIAL REQUIREMENTS INVOLVED IN HANDLING OF PROJECT MATERIALS, INCONSISTENCIES AND UNCERTAINTIES ASSOCIATED WITH IN/OUT FLOW OF MATERIALS, PROJECT ACTIVITIES AT ODD HOURS & HOLIDAYS AND IRREGULAR WORKING HOURS. CONTRACTOR SHALL ENSURE PROMPT AND TIMELY AVAILABILITY OF SUCH SERVICES.

APPROXIMATELY 36 SERVICE MONTHS, SPREAD ACROSS VARIOUS NATURE OF SERVICES SHALL BE DEPLOYED PROMPTLY AS PER THE INSTRUCTION OF BHEL.

THE UNIT OF MEASUREMENT OF SUCH SERVICES RENDERED SATISFACTORILY BY ONE PERSON DURING ONE MONTH SHALL BE TERMED AS ONE **'SERVICE MANMONTH'.**

PAYMENT FOR THE SAME SHALL BE MADE AS PER THE MAN-MONTH RATE QUOTED BY THE BIDDER IN **ITEM NO H OF RATE SCHEDULE (SECTION A)**

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B. MISCELLANEOUS SERVICES FOR BHEL OFFICE AND STORES ETC

SCOPE SHALL INCLUDE SERVICES OF OFFICE BOY/ MESSENGER/PEON AT BHEL OFFICE AND STORES, FOR HANDLING CORRESPONDENCES (DAK, DOCUMENTS, DRAWINGS ETC), AND OTHER SERVICES E.G. GARDENING, CLEANING ETC. **APPROXIMATELY 60 SERVICE MONTHS**, SPREAD ACROSS VARIOUS NATURE OF SERVICES SHALL BE DEPLOYED PROMPTLY AS PER THE INSTRUCTION OF BHEL.

PAYMENT FOR THE SAME SHALL BE MADE AS PER THE SERVICE-MONTH RATE QUOTED BY THE BIDDER IN **ITEM NO I OF RATE SCHEDULE (SECTION A)**

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IN CASE THE CONTRACTOR FAIL TO DEPLOY OR DELAYS DEPLOYMENT OF ABOVE SAID MANPOWER WITH REFERENCE TO SPECIFIC INSTRUCTIONS FROM BHEL, BHEL WILL RECOVER THE SAME WITH ADDITIONAL 10 % OVERHEADS FROM MONTHLY RUNNING BILL.

TECHNICAL CONDITIONS OF CONTRACT (TCC) **(Section A)**
Chapter-XVII Preservation of Components

PRESERVATION OF COMPONENTS -

CONTRACTOR SHALL ARRANGE FOR PRESERVATION OF COMPONENTS AS PER BHEL'S STORAGE AND PRESERVATION MANUAL AND/OR AS PER INSTRUCTIONS OF BHEL ENGINEERS.

ONE OR MORE OF FOLLOWING METHODS SHALL BE ADOPTED FOR PRESERVATION.

1) COATING WITH PRESERVATIVE PAINTS/LUBRICANT/INHIBITORS

2) CAPPING/WRAPPING/COVERING

3) FILLING/IMMERSION IN OIL/CHEMICALS ETC

4) PERIODIC CHECKS/MAINTAINING REQUIRED NITROGEN PRESSURE IN TANKS OF TRANSFORMERS; BHEL WILL PROVIDE THE NITROGEN GAS FOR THE SAME. HOWEVER CONTRACTOR SHALL HANDLE THE CYLINDERS AT STORES, TRANSPORT TO POINT OF USE, FIT-UP REFILLS AND RETURN EMPTY CYLINDERS TO BHEL STORES.

5) HT MOTORS

   FOR PRESERVATION OF HT MOTORS, SPACE HEATERS HAVE TO BE KEPT ENERGIZED TO AVOID INGRESS OF MOISTURE. INSULATION RESISTANCE HAS TO BE MEASURED AND RECORDED AT SPECIFIED INTERVALS TILL THESE ARE ISSUED FOR ERECTION. BHEL WILL PROVIDE NECESSARY CABLES, SWITCHES ETC. FOR THIS, HOWEVER CONTRACTOR SHALL INSTALL, OPERATE AND MAINTAIN THE SAME.

BHEL WILL PROVIDE FREE OF COST ALL PRESERVATIVES LIKE PRESERVATIVE OIL, LUBRICANTS, CHEMICALS, INHIBITORS, CAPS ETC EXCEPT PRIMERS & PAINTS. CONTRACTOR SHALL PROVIDE RED OXIDE ZINC CHROMATE (ROZC) PRIMER CONFORMING TO IS:2074 OF REPUTED MANUFACTURES (E.G. ASIAN PAINTS, BERGER, JENSON & NICHOLSON, BOMBAY PAINTS, SHALIMAR OR ANY OTHER BHEL APPROVED MANUFACTURER) REQUIRED FOR PRESERVATION SHALL BE PROVIDED BY THE CONTRACTOR AND USED FOR THIS PURPOSE.

IN THE PROCESS THE IDENTIFICATION MARKS, COMPONENT/MATERIAL CODES, MATCH MARKS MAY HAVE TO BE REPAINTED. THIS WORK AFTER PRESERVATION COMPONENTS ARE TO BE STACKED PROPERLY, PERIODICAL REPORTS ON THE PRESERVATION CARRIED OUT SHOULD BE SUBMITTED TO BHEL IN THE PRESCRIBED FORMATS.

SEPARATE RATE (ITEM NO. G OF RATE SCHEDULE (SECTION A)) QUOTED BY BIDDER SHALL ONLY BE PAID FOR ANY SPECIAL PRESERVATION WORK ARISED DURING EXECUTION OF WORK FOR MAJOR COMPONENTS LIKE GAS TURBINE,GENERATOR,PUMPS, MOTORS,TRANSFORMERS,CONTROL PANELS WHICH INCLUDES REHANDLING USING T&Ps & CRANEs. THIS SHALL BE PAID IN 'PER TON' BASIS ON SATISFACTORY COMPLETION OF THE SPECIFIC PRESERVATION WORK. HOWEVER ALL OTHER PRSERVATION ACTIVITIES SHOULD BE CARRIED OUT BY THE CONTRACTOR WITHIN TOTAL QUOTED PRICE.

DETAILS OF SCOPE OF WORK FOR ERECTION TESTING AND COMMISSIONING

18..0 **ERECTION OF HRSG, ITS AUXILIARIES & PIPING**

18..1 **HRSG**

18.1.1 **RECEIPT, UNLOADING, STACKING AND ERECTION OF MODULES**:

18.1.1.a
The heat transfer modules will be sent loose, 2-3 Nos. with intermediate wooden packing, in light crating-cum-arrestor arrangement welded to the trailer bed. The crate-arrestor has to be cut at site for unloading the modules one-by-one. For unloading the modules special unloading frames have to be used as the modules being flexible have propensity to bending. Utmost care is, therefore, essential while unloading & handling the modules and a special frame will have to be used for unloading which shall be fabricated at site .

These modules will be unloaded directly at site and only 2-3 modules, with wooden packing between them at appropriate locations, shall be kept in each stack.

For erection of these modules yet another frame, for making the module vertical, will be required. Frame will have to be fabricated at site by the contractor as per instruction of BHEL Engineer.

Required materials for fabrication of special frames for unloading as-well-as vertical frame shall be issued in random sizes by BHEL on free-returnable basis. No separate payment is envisaged for this fabrication.

In all these handling of modules polyester flat webbing sling shall be used and same shall be provided by contractor.

There are total about 45 modules. The SUPER Heater Modules (released under PGMA HL-131 & HL-132) are of Alloy Steel and other remaining modules are of Carbon Steel. The dimension of each module is about 4M (width) x10M (height) x150mm (Thick). The weight of each module is approx. 3.5 MT.

18.1.1.b
The modules, their links & components have been released under PGMA “HL-XXX” and the supports & other components have been released under PG-07, PG-12 etc. Insulation has been released in relevant PG of insulation group.

18.1.2
Any fixtures, concrete block supports, steel structures, required for supporting for pre-assembly or checking and welding for lifting and handling during pre-assembly and erection shall be arranged by the contractor as scope erection and commissioning work.

18.1.3

It shall be the responsibility of the contractor to provide temporary ladders on columns, chimney etc in a manner prescribed by BHEL using their own material till such time as permanent stairways are completed.

18.1.4
Pressure parts components like headers, modules, loose tubes etc. have to be 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, in random sizes, for this purpose will be provided by BHEL from the packing materials / scraps etc., where as necessary concrete blocks shall be arranged by the contractor. Bed shall be fabricated as per requirement. These shall be dismantled & returned to BHEL at appropriate stage. No separate payment for making / dismantling such bed is envisaged.

18.1.5
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. 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).

18.1.6
Tubes or pipes wherever deemed convenient, will be sent in random lengths. Tubes / pipes sent in standard/ random length shall be cut and edge prepared to suit the site conditions and the layouts. Bends of tubes up to OD 65 mm will have to be formed at site as incidental to the work. This is applicable to piping work also.

18.1.7
Welding of all attachments on casing, non-pressure parts, pressure parts/ piping including those required for insulation work is in the scope of work.

18.1.8
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 bubble/ soap 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 achieved.

18.1.9
If required, the pressure parts, after initial erection and tests, will have to be preserved by either dry or wet preservation procedure. Contractor shall render all assistance for this and erect temporary piping with valves & fittings wherever necessary. Required material will be provided by BHEL.

18.1.10
The drum internals, if already installed, may have to be removed to facilitate tube expansion, inspection by statutory authorities and chemical cleaning. The drum internals are to be preserved properly and refitted afterwards as part of work.

18.1.11
The work on piping systems (air, water, fuel, oil/lube oil, steam, gas etc.) will include cutting to required length, laying, edge preparation, 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.

18.1.12
Fittings like bends tees, elbows, miter bends, reducers, flanges etc., will be supplied as loose items. However, bends of tube size up to OD 65mm will have to be formed as part of work.

18.1.13
All drains / vents / relief/ escape / safety valve piping to various tanks / sewage / drain canal / flash box / sump / atmosphere etc. From the stubs on the piping and equipments erected by the contractor/ battery limit points as specified in drawings/ instructions of BHEL site in charge is completely covered in the scope of work. The matched flanges including at battery limit points will be provided by BHEL.

18.1.14
Connection (flanged, bolted, welded) of piping to the terminal points/equipments etc. Is in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any, is also within the scope of work/specification. Terminal points works of various piping schemes with customer lines and other contractor's lines. The terminal points work is inclusive of cutting of existing lines, edge preparation, welding/blanking and hook up work.

18.1.15
It should be ensured that all the terminal point connections are done without transferring any undue load or strain to the other equipments. Necessary protocols have to be prepared for such fit-up alongwith BHEL /customer representative before connecting. All NDE including radiography of joints so made, post weld heat treatment if any, are also within the scope of work / specification.

18.1.16
The non-IBR piping will be sent as plain pipes. The attachments for tapping points and / or supports will be sent as loose items. Site work will involve fabrication, drilling, fitting, pre-heating, welding, NDE & PWHT as per applicable BHEL documents. Rate quoted shall take account of all these work as no separate payment is envisaged for such work.

18.1.17
For integral piping all attachments etc will be supplied as loose items and are to be welded to the main pipes at site as per instructions. Necessary drilling of holes on main pipe for welding stub shall also be done at site by the contractor.

HRSG Erection Sequence

Usually, the Loose Modules HRSG supplied by BHEL are erected by first completing the Structural Columns and Beams, then the casing with insulations and then the Modules are inserted from Top. The preferred sequence is

1)	The Foundation should be checked as per the Foundation Plan drawing.
2)	The HRSG Structure has to be Erected as detailed in the HRSG Structure Erection Guidelines and as per Technical Circular on Structural Steel Column Stability during Erection
2a	Assembly of columns (PGMA 35-110, 35-120) , bottom bracing beams (PGMA 35-591) and top bracing beams (PGMA 35-592) , assembly of lateral support beams (PGMA 35-595, 35-596), assembly of stiffened beams (Stiffener Beams of PGMA 35-594)).
2b	While the Columns are erected, they have to be held with Guy ropes till structural stability has been achieved. Structural Stability is achieved in Transverse direction when the Bottom Bracing Beams and Top Bracings Beams are welded with columns and in Longitudinal direction when 4 such rows of Column and Beams are erected along with Stiffener Beams and Duct Casing in between them. The columns should be grouted and the Stopper plates should be welded
2c	Duct Casing sheet, with or without insulations are to be completed atleast upto first 4 columns, i.e S1-S2, S2-S3, S3-S4 (L&R)
3)	Assembly of HRSG insulation – where the modules needs to be erected
4)	Erection of Sound Baffle in case of Multi width boiler.
5)	Erection of Temporary support Beams (PGMA 35-593)
6)	Erection of baffles like Baffle on unfinned portion at top and Bottom, Gas Deflector Baffle at the beginning of Modules, Side baffle on the extreme tubes of each Modules, T Baffle between Headers of Modules, (wherever applicable) and which needs to be done before Module Erection.
7)	Uprighting of Modules using Uprighting Frame and erection of Modules from Top of HRSG. The erected Modules has to supported on the Temporary Saddle support to be fabricated from the Module Transport Structure and resting on Beams released in PGMA 35-593. The modules has to be held horizontally with temporary support taken from the Lateral Beams (PGMA 35-595 & 35-596)
8)	Erection of Drum Support Beam and Drum may be erected now. HRSG Drum has to be lifted from outside and placed on the structure. Slide Bearing arrangement to be be erected at Saddle location before placing the drum on the support beam
9)	Erection of Top and Bottom casing, Erection of Links, Erection of Module Top support beams (PGMA 35-597), Erection of Module Tie Rods along with Expansion bellows, etc can be taken parallel

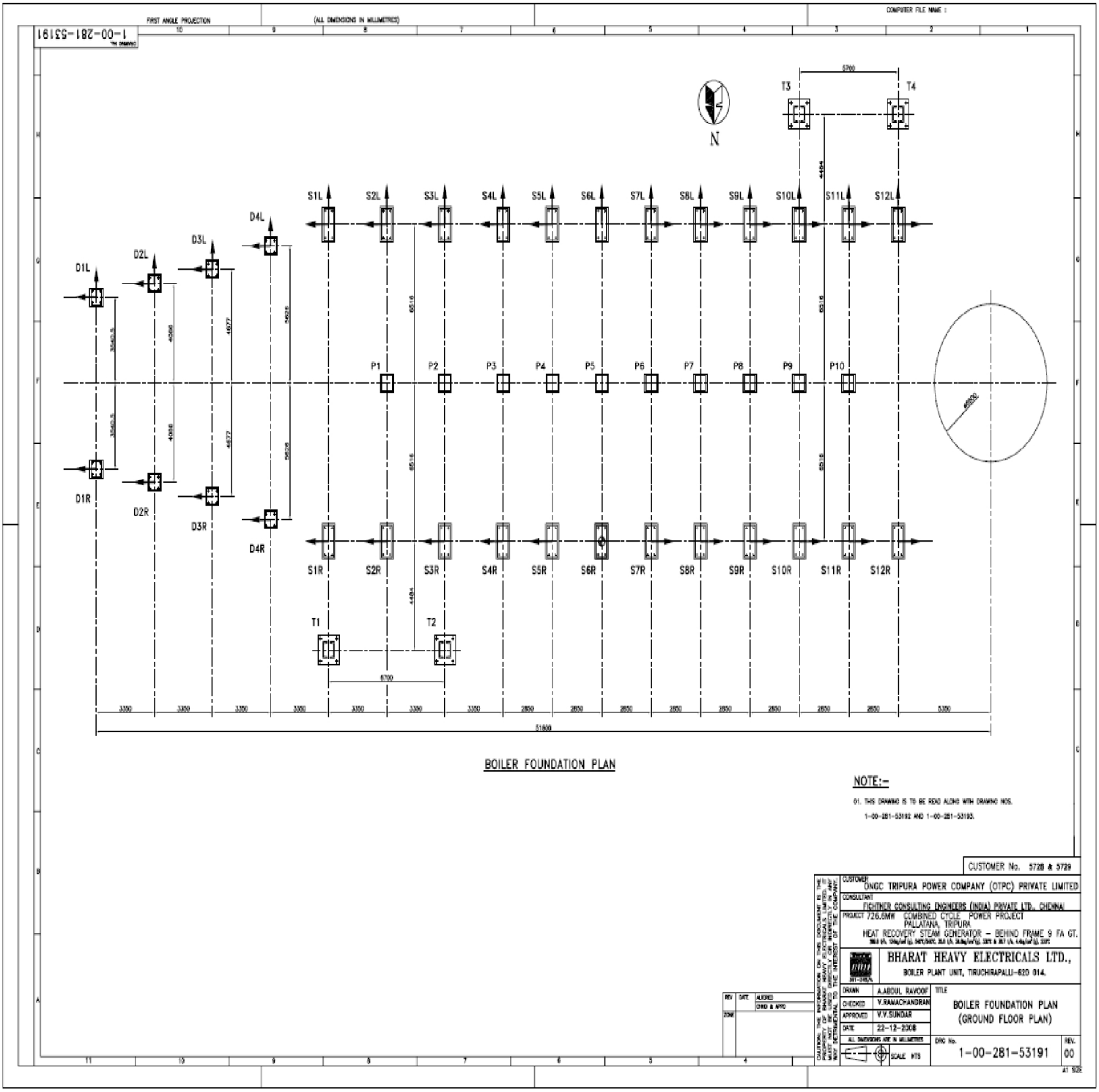
10)	Assembly of HRSG pipelines. (Expansion Bellows to be fixed simultaneously while erecting the Pipe lines or Tie Rods)

HRSG STRUCTURAL ERECTION GUIDELINES

1) The Structural Members of Heat Recovery Steam Generator (HRSG) are connected with the Duct and the stability of the structure is obtained when Ducts are connected integral with the Structure. The Stability of HRSG in Transverse Direction (perpendicular to Gas Flow) is achieved only after full Groove welding of Top and Bottom Bracing Beams and in the Longitudinal Direction (along the Gas Flow) by the erection of Duct casings and Stiffener Beams which act like Shear walls.
2) The HRSG Structure is designed as a Moment resisting frame with the Column base assumed as pinned connection. This means that the Foundation does not resist any moment and the column cannot stand on its own without beams and Ducts.
3) All care shall be taken to provide temporary support to the structure during erection, till structural stability is achieved. The Erection of Structure should be carried out strictly as per the "Technical Circular on General Instruction on Steel Column Stability during Erection", Document No: PWR/TSX/BLR/05/182/00/09. The Structural Stability is achieved, when the following minimum structure are erected.

- Four Adjacent Rows of HRSG Column (S-Row) are erected (Eight Columns) (PGMA 35-110 & 120).
- The Top and Bottom Bracing Beams between the left and right columns are completely welded (Groove Weld) with the above erected Column (PGMA 35-591 & 592).
- The Stiffener Beams with connection plates are erected and welded at all levels between the above erected Columns (PGMA 35-594).
- The side casing ducts are erected and welded between the above Columns (PGMA HL-5xx).
- The Stopper plates at Column base are welded to the Column Bearing Plate (PGMA 35-010).
- The column base grouted.

BOILER FOUNDATION PLAN



A General Erection sequence is provided below for Site Clarity.

a)	The Erection of HRSG Structure ("S" row Columns) should be taken up first before Inlet Duct Support Structure ("D" row Columns).
b)	Column S1L is to be erected on its Foundation using Shim Plates (Packer Plates). The column should be held with four Guy Ropes of Ø 20mm at top, which are perpendicular to each other. The angle between adjacent Guy ropes should be nearing to 90 degrees. The Bottom of the Column should be arrested with the Side of Foundation using the temporary Brackets. This will prevent the movement of Column Base. The Bolts should be tightened during erection. For larger size columns, guy ropes to be provided at two levels as indicated in the drawing. The guy ropes are to be properly anchored and the angle with the horizontal shall not exceed 45°. Site should understand that the column cannot stand on its own without the Guy ropes.
c)	Similarly erect column S1R as detailed in Pt. b and hold it with another set of Guy ropes.
d)	Erect and Weld the Top and Bottom Bracing beams between S1L and S1R Columns.
e)	Erect S2L Column and S2R Column row in the same sequence as detailed in Pt. b, c & d. (Guy ropes to be provided as indicated in Pt. b)
f)	Weld all Stiffener Beams between Columns S1L and S2L and S1R and S2R along with the connection brackets. Weld the Duct side casings between these two Columns.
h)	Repeat Pt. e and f for erecting Column Rows S3L-S3R and S4L-S4R
i)	Weld the Stopper Plates at the Column Bases and Grout the Base.
J)	The Guy ropes used to hold the above erected Columns can be removed now wherever it is causing hindrance.
K)	Erect column row S5, as per the procedure detailed in Pt. b, c, d, f & h. Note that the Guy ropes are required till step h is completed.
l)	Proceed similarly for other rows of columns by erecting one Column row at a time.
m)	Erect the Inlet Duct column row just adjacent to S1 Row. Repeat Pt. b, c, d, f & h except there will be no stiffener beam connecting D-Row columns. The Duct casings between the columns should be erected before removal of Guy Ropes. Similarly erect other row of "D" Columns also.

18..2 **SERVICE & INSTRUMENT AIR PIPES**

18..2.1
Laying of S.S./G.I. Pipes with fittings and supports of instrument air lines/process air shall include air blowing, hacksaw / cutting from running length to the size, threading, welding, installation of isolation valves, headers, root valves, moisture traps, check valves, supports and clamps etc by providing the required consumables shall be carried out by contractor.

18..2.2
Line shall be provided with proper slope as per drawing / standards and shall be supported at recommended pitching.

18.2.3
Hydraulic / pressure testing of pipelines, wherever called for, shall be conducted as part of work till satisfactory results are obtained.

18.3 Other products and systems

18.3.1
Ducts / expansion bellows are normally supplied in loose wall plates / segments and these are to be assembled and welded at site before erection. All joints connecting ducts, expansion pieces and dampers shall be seal welded. These welds have to be tested by LPI and made leak proof as per technical instruction / requirement.

18.3.2
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.

18.3.3
Additional platforms of permanent nature for approaching different equipments like actuators, valves, instruments etc. As per site / BHEL client's requirements, which may not be indicated in drawings, but essential for safe access, shall be made by the contractor from structural steel / materials supplied in random lengths / sizes. The contractor will be paid for this work on accepted erection tonnage rate for structures.

18.4 **CHIMNEY ERECTION**

1. Steel chimney of each HRSG having 40 Meters tall, Self-supported, Straight Cylindrical, Diameter 4 Meters and of varying shell thickness has to be erected.The material of Chimney shells is Carbon Steel (IS 2062)

2. Chimney is being dispatched in 16 full round sections. The length of each shell section is 2.5 meters and thickness of these shell sections vary from 8mm to 24mm.

3. The heaviest shell section as dispatched from works weighs about 7MT and minimum weight shell section weighs about 2.5 MT.

4. The Joints between Chimney shells are Butt Weld joints with flanges for fit up.

5. Providing all platforms, ladders & tapping for sampling, aviation lamps, earthing strip and earth-pit and openings for connection of the duct, access, measurement tap offs etc. shall be within the scope of work.

6. Welding of chimney joints shall be carried out by certified welder. Wherever necessary, radiography have to be taken to meet the BHEL/Statutory requirements/KRIBHCO requirements.

7. Chimney has to be insulated up to full height with outer cladding work of Plain Aluminium sheet of thickness 0.71 mm. The insulation is lightly resin bonded mineral wool to be covered with plain aluminum cladding sheet.

8. Helical strokes as indicated in the erection drawing are to be welded onto the chimney.

9. The Base Ring (Base Plate and Stool Plate) of Chimney will be dispatched in 2 pieces and to be assembled & welded at site.

10. Painter's trolley will be supplied in parts and will have to be assembled.

11. Lighting arrestor and associated Aviation lamps, cabling, Junction boxes etc. the complete erection and commissioning is in the scope of contractor under these specifications.

18.5

Overhauling, cleaning, provisioning, servicing of pumps, governing system, equipments, valves etc. During erection and commissioning stages, are in the scope of work. Gaskets/packing for replacement will be provided by BHEL free of cost. All equipments shall be preserved and protected periodically before and after erection as per the advice of BHEL engineer at no extra cost. All ht motors should be, if necessary, serviced and reassembled before erection as per the advice of BHEL engineer.

18.6

Providing necessary engineer/supervisors/technicians/electricians as required by BHEL engineer for drying out the LT/HT motors is within the scope of the work. Job includes testing the motor

for finding out PI & IR values and making necessary cabling connection for heating for dry out from the nearest source of supply and maintaining and controlling the temperature till the IR and PI values are achieved as per standards. However, BHEL will provide necessary motorized insulation testers for this purpose. The contractor shall provide necessary power cables and other tools and consumables for the above works free of charges. Before undertaking dry out/trial run of HT motors, the end shields and covers shall be opened on both the ends of the motor for inspection, cleaning and greasing of bearings.

13 EQUIPMENTS INSTALLATION – COMMON REQUIREMENTS

13.1
All works such as cleaning, leveling, aligning, hot alignment, trial assembly, dismantling of certain equipments/components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, grinding, straightening, chamfering, filling, machining, chipping, drilling, reaming, scraping, lapping, shaping, fitting-up, drilling of holes, making dowel pins, minor rectification of foundation bolts etc. are incidental to the erection/commissioning and any other work/activity which is necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work.

13.3
Cleaning, servicing, lubrication of actuators, pumps, headers, governing system, ESV & IV, control valves, tanks, vessels etc. during erection and commissioning stages is in the scope of work. However, gaskets/pickings/lubricants for replacement will be provided by BHEL free of cost.

13.4
All equipment shall be preserved and protected periodically before and after erection as per advice of BHEL engineer. The journals of generator rotor, HT motors and other rotating machines shall be thoroughly cleaned, greased/painted with preservative agents periodically as instructed by BHEL engineer.

13.5
Trial run of all motors including checking direction of rotation in uncoupled condition, check alignment and re-couple the motor to driven equipment.

13.6
After initial trial of rotating equipments, control and power cabling for motors and other equipments/instrumentation may have to be disconnected for checking alignment and resetting/realignment/hot alignment. Contractor will have to provide services for disconnection and reconnection of control and power cables.

13.7
All racks or assembled units like Governing Rack, Seal Oil Unit, Gas Unit, Seal Oil Valve Rack, Gas Cylinder Racks etc supplied from manufacturing units will be tested in BHEL/ Customer stores or at site. This may require transportation, filling of oil, water etc in these racks for carrying out testing of these racks. Defects noticed during testing of these racks will have to be rectified by the contractor free of charges. Further, any pipeline / flanges / fittings not found assembled properly, the same have to be rectified / corrected by the contractor free of charges.

19 GAS TURBINE GENERATOR STATOR LIFTING & PLACEMENT

19.1
The Gas Turbine Generator comprising of Generator Stator, Generator Rotor, End Shields, Bearings & Brushgear, HV Busing, Sliprings shaft assembly, Seal Rings, Oil catcher etc. The Generator Stator weight is 125 MT (approx.). Contractor shall carry out all the works of unloading from Road Transport Trailer, Handling, Lifting and placement to designed foundation at designed elevation and further works of leveling, centering, generator rotor insertion, assembly of loose items like end shields, HV bushings and other activities of generator rotor alignment, Electrical tests and other tests on Generator, Generator stator Air Leak tests, Leak test of complete generator system with seal oil system etc. in service as per Field Quality plan and requirements at site.

Contractor shall carry out the removal of Generator Hydrogen Coolers which have come as assembled to carry out necessary hydraulic tests and necessary inspection as part of scope of work as per instruction of BHEL Engineer at site.

BHEL will provide 250 T Capacity crawler crane for unloading and placement of Gas Turbine Generator to nearest location of designed foundation subject to its capacity, reach, accessibility and approachability. All other works of shifting, leveling, centering and alignment etc. will be carried out by contractor as scope of work. There is restricted space for movement of this BHEL crane. Contractor shall have to provide his own for boom extension, reduction, insertion, plates etc. for above 250 T Capacity BHEL crane including the required suitable capacity of crane, arrangements, trailers & assist crane for above as required during handling, transportation of all desired items / components of this crane from stores to site for lifting and placement of Gas Turbine Generator as scope of work.

Contractor shall provide the fuel, lubricants and all other consumables for above BHEL 250 T capacity Crane and all other cranes deployed by contractor. BHEL will provide Operator for above 250 T Capacity BHEL Crane and contractor has to provide crew for BHEL crane during operation. Contractor shall provide the operators and other crew for all his cranes.

19.2 GAS TURBINE LIFTING & PLACEMENT

19.2.1
The Gas Turbine (FRAME-6 FA) weighing about 90 MT is supplied in assembled condition. However its field piping and inter connecting piping shall be supplied loose and erection, testing, welding and NDE/NDT along with radiography etc. shall be carried out by contractor at site.

BHEL will provide 250/150 T Capacity crawler crane for unloading and placement of Gas Turbine to nearest location of designed foundation subject to its capacity, reach, accessibility and approachability. All other works of shifting, leveling, centering and alignment etc. will be carried out by contractor as scope of work. There is restricted space for movement of this BHEL

crane. Contractor shall have to provide his own for boom extension, reduction, insertion, plates etc. for above 250 T/150 T Capacity BHEL crane including the required suitable capacity of crane, arrangements, trailers & assist crane for above as required during handling, transportation of all desired items / components of this crane from stores to site for lifting and placement of Gas Turbine Generator as scope of work.

Contractor shall provide the fuel, lubricants and all other consumables for above BHEL 250 T capacity Crane and all other cranes deployed by contractor. BHEL will provide Operator for above 250 T/150 T Capacity BHEL Crane and contractor has to provide crew for BHEL crane during operation. Contractor shall provide the operators and other crew for all his cranes.

19.3 HANDLING OF HEAVIER EQUIPMENTS

All other Heavy and voluminous Equipments/consignments like Gas Turbine Generator Rotor, ~~Deaerator Feed Storage Tank~~, Gas Turbine Accessory Base, Water Wash Skid and other equipments / skids etc. along with other Equipments shall be handled carefully by providing contractor's his own lifting Crane and T&P with manpower arrangements. BHEL shall not provide any T&P other specifically indicated in relevant appendix. However contractor will be permitted to use the special erection devices / special erection tools which have been supplied along with main equipments from works and contractor shall return these erection devises / tools in perfectly working condition after completion of work.

BHEL shall not provide any T&P other than those specified for the specific work as per relevant Appendix and other relevant clauses of tender specification.

19.4 DEAERATOR INSTALLATION

~~19.4.1~~
~~BHEL will arrange suitable crane for lifting and placement of De-aerator and FST from area/place near to TG building. Contractor shall place them at suitable location / elevation of equipment foundation depending accessibility and approachability of crane. Contractor shall arrange all other T&P as required for all other works as part of scope of work. The fuel and operator for this crane shall be provided by contractor as part of scope of work. For effective utilization of crane, contractor shall plan his activities so as to carry out the work in minimum possible duration. In case of any accessibility and approachability limitations of crane to place the FST and deaerator on required foundation, the contractor shall make necessary temporary platform / approach including providing the materials as per requirement as part of scope of work.~~

~~19.4.2~~
~~Erection of permanent approach platform and ladders etc for de-aerator and FST, GSC, flash tanks, lubes oil / control oil tanks, ESVS/ IVS, local platforms for various inaccessible valves and equipment etc are in the scope of work. The structural steel and other members will be supplied in random length/size & will have to be cut to required size and profile as incidental to work~~.

19.5 PIPING INSTALLATION

19.5.1
The scope of work in piping system (air, Gas, Water, Oil, Steam, Governing oil/Control oil etc.) will include cutting to required length, edge preparation, laying, fixing and welding of the elbows/fittings/valves etc, fixing supports/hangers/shock absorbers/ guides and restraints etc and carrying out all other activities/works to complete the erection and also carrying out all pre-commissioning/ commissioning operations mentioned in these specifications as per engineer's instructions and/or as per approved drawings. Weld joints and NDT requirement for all TG Integral piping, and other piping's as applicable under tender specification shall be as per drawings/schemes and suiting to site requirement. The necessary drawings/documents for these weld joints will be provided at site during execution of work.

19.5.2
Carrying out of piping as per the specifications between equipments constituting terminal points, whether the terminal equipments fall within the scope of the work/specification or not, is within the scope of the work/ specification. The contractor shall complete terminal joints at either ends, with due NDE & PWHT if applicable, for all the piping schemes covered in the scope of work.

19.5.3
Fit up and welding/bolting/fastening of piping to the terminal points (such as stubs, valves, flanges on terminal points/equipments, stubs on headers, battery limits etc) forming part of the scope of work/specification and stress relieving and radiography of joints so made are also within the scope of work. Permanent fasteners and gaskets will be supplied by BHEL.

19.5.4
Interconnection/ Hook-up, if any, with the existing system shall form part of work. Such interconnections, hook-ups may require shut down of running plant and the relevant work has 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.

19.5.5
All drains / vents / relief / escapes / safety valve piping to various tanks/ sewage / drain canal / flash box / condenser / sump / atmosphere etc. from the stubs on the piping and equipments erected by contractor is completely covered in the scope of this tender specification.

19.5.6
The following items of work shall be incidental and forming part of piping fabrication and erection:

(1) To locate cause of vibrations in equipments/auxiliaries/pipelines and carrying out necessary corrections in case the same is attributed to the contractor.

(2) Fabrication and erection & welding of racks, steel supports, guides, restraints for all the piping. Steel for this purpose will be supplied by BHEL free of charge in random and running lengths.
(3) Pre-assembly of spring suspension/hangers and shock absorber as per requirement.
(4) Erection of steam traps, filters, flow nozzles/ flow indicators/ flow orifices other measuring elements in the piping. These may have been supplied either by BHEL or their customer. This may involve cutting of pipe lines, fresh edge preparation and welding with stress relieving wherever applicable.
(5) Fabrication / making of bends for pipes and tubes of diameter up to 65mm.
(6) Matching of all fittings like tees, bends, flanges, reducers valves, socket fittings, etc with pipes for welding.
(7) Servicing of valves, Power Cylinders and actuators etc.
(8) Cleaning of all pipes by wire brushing / blowing by compressed air.
(9) Welding of root valves with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles/orifices/metering/ measuring elements fixed on piping.
(10) Welding of blanks with stress relieving if required on a temporary basis.

19.5.7
Pipelines will be field routed as per schemes/ suggestive layout or as per the instructions of BHEL engineer. Pipes & tubes will be supplied in random lengths and running lengths. The contractor shall have to lay the piping after carrying out the necessary fabrication, edge preparation, routing etc to suit site requirement in best professional manner.

19.5.8
As far as possible, pre-assembly shall be done. The pipe laying shall be carried out from the available terminal point/points or any other area between the terminal points. The erection can be carried out on temporary supports to obtain proper alignment and welding. After fixing the permanent supports, all the temporary supports shall be removed. The alignment, distances and loading of the supports shall be checked and the required settings to be ensured as per requirement.

TECHNICAL CONDITIONS OF CONTRACT COMMON FOR E T & C OF HRSG & AUXL AND GTG, BOP AND AUXL.

20. GENERAL

20.1.1
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.

20.1.2
The terminal points decided by BHEL should be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.

20.1.3
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.

20.1.4
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.

20.1.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL/KRIBHCO 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.

20.1.6
All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory authorities are to be arranged by the contractor at his cost in time to ensure smooth progress of work.

20.1.7
The HRSG pressure parts and piping will be erected as per relevant provisions of Indian Boiler Regulations & latest amendments/revisions thereof.

20.1.8

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.

20.1.9
The contractor shall perform any services; tests etc. which may not be specified but nevertheless required for the completion of work within quoted rates.

20.1.10
All necessary certificates and licenses, permits etc required for carrying out this work are to be arranged by the contractor expeditiously.

20.1.11
The contractor shall execute the work in the most substantial and workmanlike manner.

20.1.12
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.

20.1.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, materials, manpower, supervisors/ engineers, consumables etc.(except the T&P indicated in relevant Appendix as free by BHEL) 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 him unless otherwise specified in the relevant clauses. The contractor's quoted rates should be inclusive of all such contingencies.

20.1.14
During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc., may become necessary on account of feedback / revision of drawing. 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.

20.1.15
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 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.

20.1.16
The contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work as scope of work.

20.1.17
The contractor shall take delivery of the components, equipments, chemicals, lubricants, H2 & Co2 Cylinders (for Turbo-generator gas filling etc.) 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.

20.1.18
Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by contractor most expeditiously. No claim for extra payment for such work will be entertained.

20.1.19
Plant materials should not be used for any temporary supports / scaffolding / preparing pre-assembly bed etc.

20.1.20
The details of equipments to be erected under this contract are generally as per the details of quantity given in relevant Annexures. 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 erection drawings & documents which will be furnished in the course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

20.1.21
All welded joints should be painted with anticorrosive paint immediately after completion of radiography and stress relieving works. Necessary paints and other consumables for the above work are in the scope of the contractor.

20.1.22

Hangers & suspensions, supports and supporting structures 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.

20.1.23
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. This exercise may have to be repeated till satisfactory results are achieved.

20.1.24
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. Such changes will be incidental to work hence no separate/ additional payment will be made.

20.1.25
Welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow metering & measurement devices, and control valves to be provided on HRSG, GTG & their respective auxiliaries, integral & external pipe/off base/system / co-gen piping covered within the scope of this specification, will also be the responsibility of the contractor and shall be done as per the instructions of BHEL site engineer. 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 any agency other than BHEL.
NDE/NDT and post weld heat treatment for above shall be done as per the specifications and drawing requirement as part of scope of work.

20.1.26
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, where instructed so, such instruments for calibration and storage/re-erection. Calibration will be done by C&I erection agency.

20.1.27
Fixing and seal welding of thermo wells & plugs before hydro test/ steam blowing/gas tightness test 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.

20.1.28
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.

20.1.29
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.

20.1.30
Contractor will have to collect the materials from BHEL /customer stores/ storage yard, verify the materials, loading of materials including heavy equipments at stores/storage yard by arranging the cranes and all other T&P etc, arrange transpiration to transport to site of work/erection site and unload/handle and preserve them as scope of work.

20..1.31
Any discrepancy/shortage/damage found in the consignment after taking clean delivery of materials from the stores/storage yard shall be the responsibility of contractor.

20..1.32
Unloading at work site, stacking and restacking if necessity arises including of heavy/sophisticated equipments like heavy motors, heavy bearing pedestals, Dampers, Gas Turbine, Gas Turbine Generator, Pumps, ~~Deaerator with FST~~, H.T. Motors, DG set, Duct items and other GT equipments & associated Auxiliaries and Balance of Plant Equipments etc. as covered under these tender specifications shall be done as per storage and preservation manual of BHEL and/or as per directions of BHEL engineer.

20.1.32
If the contractor or his workmen or employees break, deface, injure or destroy any part of a building, road, Krebs, fence, enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property or to any part of erected equipments, stored components etc. Within the project premises or outside the contractor shall make the same good at his own expenses.

20.1.33
All the materials during pre-assembly, storing shall be stored well above ground level as necessary to avoid water ingress etc, by use of wooden/concrete sleepers/ blocks as per instruction of BHEL Engineer at site. No material shall be stored directly on the ground at any time. Concrete blocks/ Sleepers have to be provided by the contractor

20.1.34
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.

20.1.35
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.

20.1.36
It may so happen that certain components like manhole doors, hanger etc may be supplied in loose items. They need to be assembled as per relevent drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

20.1.37
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.

20.1.38

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.

20.1.39
Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost. For T-91 material site weld joints argon as per grade-3 of is 5760: 1998 with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the Contractor. The supply

should accompany test certificate for the batch indicating individual element 'ppm' level and overall purity level.

20.1.40
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.

20.1.41
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

21 PREPARATION OF FOUNDATION

21.1
Buildings, foundations and other necessary civil works for supporting structures, equipments etc, will be provided by the BHEL/customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits and also adjustments of foundation level, dressing and chipping of foundation surfaces of all equipments contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations up to 25mm for achieving proper levels will be within the scope of work/specification.

21.2
All minor foundations and anchor points required for installing erection equipments like winches, anchors etc. are to be cast by the contractor.

21.3
The complete work of secondary grouting of equipments is included in the scope of work/specification. Contractor shall arrange all manpower, T&P, form work and shuttering materials including all grouting materials such as ordinary Portland cement, sand, stone chips etc & quick-setting-non-shrink-free-flow special grout mix of required specification (like conbextra-gp-2 or equivalent).

21.4
The quick-setting-non-shrink-free-flow special grout mix shall be purchased only from the following BHEL approved vendors:

1. M/S FOSROC CHEMICALS (INDIA) PVT LTD;
2. M/S SIKA INDIA PVT LTD;
3. M/S PAGEL CONCRETE TECHNOLOGIES PVT LTD;
4. M/S PIDILITE INDUSTRIES LTD.

In order to ensure the quality, the major grouting of equipments using any of above grout mixes shall essentially be done as per the recommendations of supplier with regard to grout preparation and use of machinery etc under the supervision of the respective supplier. BHEL has arrangement with above suppliers for supervision services and the supervision charges for the same will be borne by BHEL. However, the contractor shall ensure readiness of equipment for grouting in all respect before such a service is requisitioned and the duration is not prolonged unduly. Any overstay required due to contractor's delay shall be charged to the contractor with BHEL's departmental charges. Contract shall consult BHEL engineer before deciding upon the vendor for the above.

21.5
Cleaning of the foundation surfaces, pocket holes, 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 will be within the scope of this work.

21.6

BHEL will provide only shims and packer plates (either machined or plain), which are received from BHEL's manufacturing plants and go as permanent part of the equipment. Additional packer plates and shims if required will have to be prepared by the contractor out of steel plates, steel sheets to meet site requirements. Necessary steel plates for this purpose will be provided by BHEL free of cost.

21.7
The contractor shall carry out scrapping and matching of embedded plates, permanent spacers and all the matching parts of turbine, generator, pumps and other rotating machines & stationary equipments wherever required. The support and sole plates matching and concrete surface bedding is also covered in the scope of work. The fine dressing of concrete shall be with Prussian blue-match checks.

21.8
Packer plates shall not only be blue matched with foundations but also inter-packer contact surfaces, contact surfaces between packer and pedestals, contact surface between packer and foundation frame etc. Shall also be blue matched and required percentage contact shall be achieved by chipping and scrapping as per engineer's instructions.

21.9
Further, the surface preparation, cleaning, curing, procedure and mixing of grout mix etc. for secondary grouting shall be carried out as per the instruction of BHEL site Engineer.

22 HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

22.1
Contractor shall carry out the following tests required to complete the erection and commissioning t:
(1) Ultrasonic test
(2) Dye Penetrate test
(3) Magnetic Particle Test.
All above facilities (men, materials, equipments, consumables etc) with operating engineer/experienced person and proper approach wherever required shall be provided by the contractor for satisfactory completion of the above tests.

22.2
Contractor shall lay all necessary temporary piping, welding, supports, install pumps, valves, pressure gauges, electric cables and switches etc, required for the Hydro test, Air leak test, Chemical cleaning, Steam blowing etc.. After the test is over, all the temporary piping, pumps, etc will be removed. It may also specifically be noted that servicing, erection and dismantling of piping and equipments for conducting above tests will be done by the contractor. No separate payment shall be made for this purpose.

22.3
All the above tests shall be repeated till all the equipments, piping and systems satisfy the technical and statutory requirements. All related works form part of the scope.

22.4
Suitable welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable de-aeration/ venting /drain points with valves as per BHEL engineer's instruction, for performing hydro test of piping is within the scope of work**.** Required valves, fasteners, blank flanges, blanks or steel for blank flanges shall be provided by contractor. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL engineers' instruction.

22.5
Hydro test of piping may have to be repeated several times to meet technical and statutory requirements before application of insulation.

22.6
While conducting hydraulic test of steam lines, water lines, oil lines either individually or grouping a few lines or in portions. Blanks/spools may have to be put up at terminal points, strainers, walls, flanges etc. After conducting the tests, the blanks shall be removed and the lines restored. Also interconnecting piping between boiler and turbine, the hydraulic test may have to be done section wise and some–times piping of other agencies may have to be combined. Contractor shall carry out all such incidental work to satisfactorily conduct the hydro

test. Wherever work is involved in the terminal points, Contractor shall carryout the same as per instruction of BHEL engineer. The decision of BHEL engineer is final and the same is binding on the contractor.

The contractor shall carry out any other tests as desired by BHEL engineers on erected equipment covered in the scope of this contract during testing and commissioning to demonstrate the satisfactory completion of any part or whole of work performed by the contractor.

23.0 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING

23.1

Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing, trial runs of various equipments erected and systems installed; flushing of the lines by air, water, oil/lube oil, gas, steam as the case may be; chemical cleaning of various systems & piping; steam blowing of the pipe lines; floating of safety valves, cranking of GT, FSNL run of GT, synchronization of GT set, open cycle operation, combined trial operation and reliability run 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.

23.2

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

23.3

Contractor shall lay / install necessary temporary piping, tanks, 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. 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.

23.4 (a)

For the installation of temporary system as above BHEL will provide only the piping, structural items for supports and access platforms, tanks/ plates for fabrication of tank, valves, gauges and their fittings, Thermal insulation and Chemical Circulation Pumps for Alkali Boil out / Chemical cleaning of Major / Bigger size of piping. These will be supplied in random sizes / lengths. However, fabrication, erection, installation, alignment, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the contractor. All above works shall be carried out by contractor. All other pumps like Hydraulic Test Pumps, Water fill pumps and Chemical cleaning pumps etc. which have o be used in temporary installation for the respective purpose will be arranged by the contractor along with starters, foundation / frames cables, switches, etc.. BHEL will not provide any pumps / arrangements other than specified above.

23.4 (b)

For payment of temporary system for chemical cleaning and steam blowing of boiler and piping the measurement for the piping, fitting, valves etc and equipments like tanks, structures provided by BHEL & not figuring in shipping list will be based on jointly

measured quantity and corresponding standard weights. Payment will be made at the rate applicable for **non-pressure parts** for items. No payment will be made for the equipments brought by the contractor such as pumps etc and foundations made by the contractor for temporary systems. Similarly, no payment will be made for temporary system installed for conducting hydraulic test of various piping systems and HRSG.

23.5
Fabrication, fit-up, pre-heating, welding, 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.

23.6
Cleaning, servicing of tanks, valves, pumps, equipments, turning gear, governing system during various stages of erection and commissioning are in the scope of work. Gaskets, packing & spares for replacement will be provided free of charges by BHEL.

23.7
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.

23.8
During trials/ 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.

23.9
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. If any readjustment and realignment are necessary, the same shall be done as per BHEL engineer's instructions. Claim, if any, for these works from the contractor shall be governed by relevant clauses of GCC.

23.10
Contractor shall cut / open / dismantle work, if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.

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

23.11
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 unit is taken over.

23.12
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 as part of work.

23.13
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.

23.14
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.

23.15
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 GTG set, rotating machinery and other system as per scope of tender specification before and after oil flushing is in the scope of work.

23.16
Transportation of oil drums from customer's/BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during commissioning and post

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 and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of the contractor.

23.17
BHEL's crane will not be available under this tender specification. Contractor shall take specific note of this aspect and shall arrange all necessary T&P and lifting/handling/transportation arrangements for placement on required foundation/elevation, erection of equipment including the heavier consignments/equipment like Gas Turbine, Gas Turbine - Generator, GT inlet ducts, GT off base enclosure, filter unit of GT, ~~Deaerator~~, unloading/handling of electrical items like transformers etc.

23.18
Piping weight indicated in relevant Annexures (pipings, valves, fittings & supports for all piping schemes like fuel, oil/lube oil-GT integral piping, gas, HP & MP steam/aux. steam, HSD, HP & LP feed water, Chemical Dosing, Service water, Instrument & Service air, Process air / N2, DM water, Cooling water, Condensate etc. for GT system, and other balance of plant equipment) includes the all type piping for all equipments, auxiliaries, packages/systems of HRSG, GT and balance of plant equipments with auxiliaries etc. Including the equipments integral piping like lube oil/control oil, fuel / gas / water / air etc. Contractor shall carry out the erection and complete the piping works of respective system as per sequence, schedule and programme decided by BHEL engineer/customer at site in order to achieve the commissioning schedule of respective equipments/ systems and over all commissioning schedule of project as whole.

23.19
Apart from some portion of lube oil piping, the piping of DM water system, fuel, gas and instrument/process air system are of stainless steel materials. Where as piping of steam system is of alloy steel material

23.20
For the purpose of payment, the weight of Field inter connection / integral piping (such as Lube oil / Control oil piping, individual Equipments drains & Vents etc.) of GT, GTG and BOP with Aux. shall be considered as scope of work under lumpsum rate of GT, GTG & Balance of Plant equipments with Aux. system Erection, Testing & Commissioning work.

23.21

For HRSG with Aux & integral piping and Power Cycle piping like HP & MP steam/aux. steam, HSD, HP & LP feed water, Chemical Dosing, Service water, Instrument & Service air, Process air / N2, DM water, Cooling water, Condensate, Gas piping etc. for GT system & Balance of Plant Equipments with Aux, the payment will be made as per accepted rate of rate schedule for piping erection, testing, NDT/NDE test and commissioning works.

24.1 WELDING, HEAT-TREATMENT, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING

24.1.1
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.

24.1.2
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.

24.1.3
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.

24.1.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

24.1.5
All the welders (structural and high pressure) shall be tested and approved by BHEL engineer before they are actually engaged on work though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.

24.1.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

24.1.7
The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. For this consumables like paint etc will be in the contractor's scope.

24.1.8
Hp joint fit-ups, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The contractor shall supply consumables like protective paints/tapes etc.

24.1.9
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. Normally the electric resistance heating method will be adopted. Contractor shall arrange to supply heating equipment with automatic recording devices. Also the contractor shall have to arrange for labor, 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.

24.1.10

All the recorded graphs for heat treatment works shall be the property of BHEL and shall be handed over to BHEL engineer when demanded.

24.1.11
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.

24.1.12
Heat treatment may be required to be carried out at any time (day and night) to ensure the continuity of the process. The contractor shall make all arrangements including labour required for the work as per direction of BHEL.

24.1.13
Radiography work of welds connected with this contract shall be arranged by the contractor including provision of services of technician and necessary equipment and consumables like isotope camera, x-ray/gamma ray films, chemicals etc., and necessary labour required such as riggers, helpers, etc., to assist the technician for carrying out the radiography work and making other arrangements such as providing scaffolding, approaches, platform lighting arrangements, etc., at their cost and the work has to be arranged as per the instruction of BHEL. It may please be noted that invariably the radiography work will be carried out after the normal working hours and close of other site activities only.

24.1.14
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL engineer. The 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.

24.1.15
All x-ray / gamma ray films of joints shall be preserved properly and be handed over to BHEL. These shall become the property of BHEL.

24.1.16
The field welded joints shall be subject to dye-penetrant / other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

24.1.17
Where required, surface preparation, like smooth grinding of welded area, prior to radiography shall be done as specified. 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.

24.1.18 **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 at a later date. 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.

24.1.19
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

24.1.20
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.

24.2 HEAT TREATMENT:

24.2.1
For the purpose of temperature recording of stress relieving process wherever applicable, 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.

24.2.2
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.

24.2.3
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.

24.2.4
In certain cases only the pre-heating of weld joints may be called for.

24.2.5
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

24.2.6
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.

24.2.7
All the recorded graphs for heat treatment shall be handed over to BHEL/ IBR authorities and due clearances obtained.

24.2.8
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

24.3 NON DESTRUCTIVE EXAMINATION:

24.3.1
Contractor shall provide all resources and make all arrangements for the radiographic examination of welds for this work for reasons of safety; invariably the radiography work will be carried out after the normal working hours and close of other site activities only. In this regard, the Contractor has to adhere to the safety rules / regulations laid by barc authorities from time to time.

24.3.2
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL Engineer. The minimum quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer/Boiler inspecting authority. Bidder shall also arreage the UT equipment with recording facility at his own cost. Usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

24.3.3
All X-Ray / Gamma Ray films of weld joints shall be preserved properly and be handed over to BHEL and requisite clearances shall be obtained by the Contractor.

24.3.4
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.

24.3.5
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.

24.3.6
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.

24.3.7
100% radiograph of certain sizes in piping have to be taken as per BHEL standards/ drawings.

24.3.8
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.

24.3.9
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.

24.3.10
No separate payment for any NDE activities (including radiography) will be made.

25 ACID CLEANING/ ALKALI FLUSHING/ STEAM BLOWING/ OIL FLUSHING ETC

25.1
Contractor shall lay and erect temporary pipelines with fittings and accessories and also erect/commission the chemical cleaning/ circulating pumps after servicing as per requirements, tanks and other installations, as a system as instructed by BHEL for the purpose of chemical cleaning, steam blowing, steam washing, steam flushing, water flushing, water washing, oil flushing of piping and shall provide all other arrangements as per requirement as part of scope of work.

It shall be specifically noted by the contractor that all pipes for above works shall be supplied in random length and in loose condition. Contractor has to assemble and erect them as per schemes / drawings provided by BHEL. Further, flanges bend etc for completing the scheme shall be machined/ fabricated by the contractor at his own cost. However, plates/ steel etc for the same will be provided by BHEL free of charges.

25.2
After the chemical cleaning/ flushing have been successfully completed, dismantling of all temporary installations as instructed by BHEL is within the scope of work under this specification. The dismantled materials shall be dressed and returned to BHEL as stated elsewhere in this tender spec.

25.3
Preservation of the cleaned surfaces will be the responsibility of contractor under the guidance of BHEL engineer.

25.4
Hydraulic test of temporary piping is to be carried out as per the instructions of BHEL Engineer. Carrying out repairs, if any, is in the scope of work/specification.

25.5
For chemical cleaning of the piping system, contractor will have to lay temporary piping to connect the entire system irrespective of whether the equipment/system connected is in the scope of contractor or not. Decision of BHEL Engineer in this regard will be final and binding on the contractor.

25.6
During the initial stages of work, trenches for draining water may not be available after alkali flushing or mass flushing for discharging and emptying. Necessary low point drains and temporary piping for this will have to be provided by contractor from materials provided by BHEL.

25.7

Laying effluent discharge line from mixing tank (for acid cleaning or any other chemical cleaning process) as per the instructions of BHEL engineer and dismantling, servicing for preservation and handing over the same to BHEL stores after completion of the job is within the scope of work/specification.

25.8
Radiographic examination of weld joints on temporary pipes as required by the Engineer In-charge should be carried out.

25.9
Contractor shall also carry out the repairs or attend leaks etc., in the temporary piping and equipments for the above operations / activities while carrying out the above activities / operations.

25.10
For chemical cleaning of system which consist of equipment/piping erected by the contractor and also equipment/piping erected by other contractors of BHEL/customer's contractor has to arrange for workers and supervisory staff as required supplementing/complimenting the labour and supervisory staff mobilized by other agencies for chemical cleaning of the portion of equipment erected by them in the system. Decision on the strength of gangs and supervisory staff for deployment of labour and allocation of work for them at site by BHEL engineer is final and binding on the contractor.

25.12
After acid cleaning/pickling of lubricating system (including oil piping of lube oil system, HP Oil supply system, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems, LP Bypass systems etc as per instructions of BHEL Engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machineries, cooler etc before and after oil flushing is the responsibility of the contractor.

25.13
For full welding of structures, tanks and piping etc, only welding generators shall be used. The use of welding transformers will be subject to the approval of BHEL Engineer.

25.14
Erection and commissioning of connecting piping – permanent and temporary for oil purification equipments and all operations for cleaning, oil flushing, dismantling of temporary piping during pre and post-commissioning of equipment up to full load shall be the responsibility of contractor as part of scope of work

26 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

26.1
The contractor shall provide all (except those indicated in BHEL scope) required tools and plants, monitoring and measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. Contractor has to provide suitable cranes for material handling at BHEL/client's stores/storage yard. BHEL's crane will not be available for this purpose. Please refer relevant appendix for the list of T&P being provided by BHEL free of charges on sharing basis.

26.2
All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification. Indicative list of major T&P to be arranged by contractor has been furnished in relevant appendix. Contractor shall also mobilize all other T&P necessary for timely and satisfactory completion of the work in scope.

26.4
Contractor shall provide all required suitable cranes and trailers for materials handling during collection from BHEL/ client's stores/ storage yard, transportation to site of work and at work site for all equipments and consignments including heavy and voluminous equipments/ components/ consignments

26.5
Contractor shall provide the complete operating crew like operator, helpers for handling trailing cable for EOT & portal gantry cranes. It may be specifically noted that the EOT crane/ gantry crane shall be shared by many other agencies working within the TG hall. The contractor shall have to extend the services of the EOT crane operation to all such other agencies as instructed by BHEL; the operation cost (for crew) will be shared proportionately amongst the beneficiary agencies on mutually agreed terms and rate.

26.6
Contractor has to provide spanners of all sizes for carrying out the complete erection / commissioning works. No spanners will be provided by BHEL to the contractor.

26.7
Contractor has to arrange slings of all sizes for completing the works covered under these specifications except the special slings for generator stator lifting/handling, which will be provided by BHEL free of charges on returnable basis.

26.9
Timely deployment of adequate quantity of T&P is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned program and to achieve the milestones.

26.11
Complete set of hydraulic jacks of 50 tonnes and 100 tonnes capacity shall be arranged by the contractor for use during erection and commissioning of turbine. Also, the contractor shall arrange hydraulic jacks of 100 tonnes and 63 tonnes capacity along with long high pressure hoses of suitable length for generator erection and alignment. These jacks shall be of internationally reputed make, highly reliable and maintained in excellent working condition. They shall be tested for safe working before deploying in actual work. These jacks shall not be permitted for use anywhere other than steam turbine/ generator area.

26.12
All jack bolts that are required during erection for carrying out roll-check etc will have to be arranged by the contractor. No jack bolts will be provided by BHEL.

26.13
Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.

26.14
In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make the alternative arrangement at the risk and cost of the contractor.

26.15
The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. Contractor shall obtain prior approval of BHEL for all the T&P before deploying in actual work. The movement of cranes and other equipment should be such that no damage / breakage occur to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility.

26.16
Normally, use of welding generators only is permitted for welding. The use of welding transformers will be subject to prior approval of BHEL.

26.17
The contractor at his cost shall carry out periodical testing of his construction equipments and calibration of measuring & monitoring devices (MMD). Test / calibration certificates shall be furnished to BHEL. MMD shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL. All calibration shall be traceable to national or international standards.

27 WELD FIT-UP AND WELD JOINT PROTECTIVE PAINT, COMPONENT PRESERVATIVE PAINTING ETC.

1) All protective paints for the protection of weld joint fit-ups, application of primers on finished weld joints are in the scope of contractor.

2) The water boxes shall be sandblasted to remove all traces of primer applied at the works. Thereafter apply two coats of primer paint followed by two/three coats of alloyed resin machinery enamel paints as approved by BHEL. Contractor shall submit manufacturer's batch test certificate / test certificate from BHEL approved laboratory for the primers and paints. Prior approval of BHEL for each and every batch of the primer & paints shall be mandatory. In order to achieve a desired minimum paint dry film thickness (DFT) as specified in BHEL drawing, number of coats may be applied and method of application shall be as recommended by the paint manufacturer. Required paints & primers and other consumables shall be arranged by contractor.

4) After the successful completion of hydraulic testing, the interior surfaces of the water boxes, main tube plates shall be painted with suitable anticorrosive paints as per special procedures laid down by BHEL. Required necessary paints along with primers and other consumables shall be arranged by Contractor.

6) After completion of tubing and tube side hydro test, all water side surfaces of water chambers including tube plate shall be painted.

7) Preservation of all components/equipments during various stages of erection, commissioning till handing over is in the contractor's scope. All prescribed methods of surface cleaning prior to application of preservative paint shall be followed by the contractor. **Contractor has to arrange all primer and paints, and other consumables like wire brush, painting brush required for this work.**

28 LINING AND INSULATION

28.1

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

1 TG integral piping and tanks & vessels
2. ~~Deaerator, feed water storage tank~~
3. Other equipments including BOI's, though not listed above but required for completion
4. TG auxiliaries including, but not limited, to heat exchangers, pumps, tanks and vessels and other equipments

28.2

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 dedicated from contractor's bills towards expenditure incurred including 30% departmental charges.

28.4

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.

28.5

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

28.6

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

28.7

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

28.7

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

28.8

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

28.9

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

28.10

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

28.11

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

28.12

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

28.13

The contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL engineer to facilitate inspection 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.

28.14

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

28.15

Wastage allowances for the material issued are envisaged as follows:

A	Pourable & castable insulation	-	2%
B	Insulation bricks and motor	-	2%
C	Wool mattresses	-	2%
D	Cladding sheets	-	2%

The wastage allowance will be applicable on the net issued quantity i.e. Total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall

reconcile the material issues periodically as prescribed by BHEL site. Payment for the done will be regulated as per relevant section.

28.16

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

- Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint shall be arranged by contractor.

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

28.17

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

28.18

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

28.19

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

28.20

Inlet and outlet ducts have to be fully insulated with ceramic wool and SS cladding from inside i.e. on gas flow path side, at site. HRSG casing(Ducts) will be fabricated at site from Stainless Steel Sheets & Carbon sheet, Stainless Steel Hooks/Retainers and outer cladding sheet including packing/fixing of insulation in HRSG casing (Ducts).

The Stainless Steel Sheets will be used for cladding the insulation on HRSG casing (Ducts) inside surface at high temperature region upto Evaporator Section.

The Carbon Steel Sheets will be used for cladding the insulation on HRSG casing (Ducts) inside surface at low temperature region after Evaporator Section.

The GI / Aluminium Sheet work is involved to clad (outer sheeting) the external insulation of Steam Generator Drum, Piping with valves & fittings, Chimney, Tanks, Vessels, Ducts and all other associated Aux./systems/components as per drawings/documents.

28.21

Chapter-XXVIII LINING AND INSULATION

Application of wool insulation, sheet metal cladding, welding of hooks/supports to hold insulation covered under this contract, shall include, but are not limited to, the following :-

A) Insulation material would be ceramic wool/ mineral wool mattress of density as per design requirement. HRSG to be insulated from inside. Steam drums and all external piping to be insulated externally with mineral wool with outer pain GI/aluminium cladding. All insulation including HRSG internal insulation shall be carried out at site. Insulation material supplied to site will be loose.

B) Where indicated, removable type of insulation to be provided for valves, expansion joints, etc. as per the drawings or as directed by BHEL engineer.

C) Wool insulations are received at site as bonded and unbounded mattresses in standard sizes. These are to be dressed/cut to suit work by the contractor.

D) Application of insulation and refractory works and sheet metal covering as given in various drawings/ specifications of BHEL, supplied to the contractor.

E) Outer sheet cladding by fabrication of aluminum / GI sheets to the sizes and shapes specified in drawings, beading, swaging, beveling of sheets, crowning the sheets, if necessary, fixing the same to supports, over wool insulation with screws/retainers as specified in BHEL drawings or as instructed by BHEL engineer.

F) Welding of hooks/supports on equipment including on pr. Parts and piping to support wool insulation, as per the drawings or as instructed by BHEL engineers.

G) Painting the inner side of aluminum/GI/steel cladding, with anti-corrosive paint as specified. The required paint and thinner is in the contractor's scope. Also all other accessories for painting, cleaning the surfaces etc. shall be arranged by the contractor.

H) 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 cut open during commissioning to fix gauges, fittings and instruments etc. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.

I) The skin casing plates scalloped bars and other materials that are to be matched with the erected components have to be cut and re-welded from the fabricated pieces as incidental to work.

J) Wastage allowance for the materials issued shall be as under :-

- Refractory 2%
- Wool Insulation 2%
- Cladding sheets 2%

29 FINAL PAINTING

29.1

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

29.2 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 has to be applied by brush immediately after the surface preparation.
Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer.
Painting scheme is enclosed for information at relevant annexure. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

29.3

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.

29.4

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

29.5

All exposed metal parts of the equipment including piping, structures, hand railing, grating etc shall be thoroughly cleaned off dust, rust, scales and other foreign materials by

manual or mechanised wire brushing, scrapping, sand blasting etc and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

29.6 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.

29.7

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.

29.8

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.

29.9

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

29.10

This work requires working at higher altitudes from ground level to as high as 30 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.

29.11

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.

29.12

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.

29.13

In general, painting of structural parts and colour bands, lettering, marking of direction of flow/rotation etc will be carried out by brush painting. However, areas/equipment inaccessible for manual painting has 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.

29.14

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

29.15

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

29.16 PRIMER AND PAINTS FOR FINAL PAINTING

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

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