T E N D E R S P E C I F I C A T I O N NO:

TS : BHE/PW/PUR/VIOCI-MECH/1103

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 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, APPLICATION OF THERMAL INSULATION, FINAL PAINTING AND HANDING OVER OF 1X125 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1X30 MW(Fr6B) GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / EXTERNAL / PIPING ETC. FOR 1X30 MW GTG + 1X125 TPH HRSG, BASED CO-GEN, IOCL (IRUP), GUJARAT REFINERY, IOCL VADODARA PROJECT (GT#6).

AT

INDIAN OIL CORPORATION LIMITED

GUJARAT REFINERY, JAWAHAR NAGAR
VADODARA (GUJARAT)

TECHNICAL BID - VOLUME- I A

TENDER SPECIFICATIONS CONSISTS OF:

- **Notice Inviting Tender**
- **Volume 1 A - Technical Conditions of Contract,**
- **Volume 1 B - Special conditions of Contract,**
- **Volume 1 C - General conditions of Contract**
- **Volume 1 D - Forms & Procedures**
- **Volume 1 E- Safety Manual & Painting Scheme**

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

CONTENTS			
Volume No	Description	Hosted in website bhel.com as files titled	No. of pages
NIL	Tender Specification Issue Details	(Part of **Vol-IA-1103**)	1
NIL	Notice Inviting Tender	(Part of **Vol-IA-1103**)	18
I-A	Technical Conditions of Contract	Vol-IA-1103	117
I-B	Special Conditions of Contract	Vol-IBCD-1103	47
I-C	General Conditions of Contract	(Part of **Vol-IBCD-1103**)	29
I-D	Forms & Procedures	(Part of **Vol-IBCD-1103**)	54
I-E	SAFTEY MANUAL & PAINTING PROCEDURE	(Part of **Vol-IE-1103**)	
II	Price Bid Specification	Vol-II-1103	6

Note : 1) Present Document is a Volume- I A (Technical Bid)

2) Special & General Conditions of Contracts are as per Volume- I BCD (issued as a Separate booklet)

3) Safety Manual & Painting Scheme are as per Volume-IE (issued as a Separate booklet)

4) All above documents (ie Volume – I ABCDE) are a part of Technical Bid.

5) “Volume-II- Price Bid- 1103” issued as a separate book as a Price Bid of this tender.

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

TS No : BHE/PW/PUR/VIOCI-MECH/1103

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 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, APPLICATION OF THERMAL INSULATION, FINAL PAINTING AND HANDING OVER OF 1X125 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1X30 MW(Fr6B) GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / EXTERNAL / PIPING ETC. FOR 1X30 MW GTG + 1X125 TPH HRSG, BASED CO-GEN, IOCL (IRUP), GUJARAT REFINERY, IOCL VADODARA PROJECT (GT#6).

AT

INDIAN OIL CORPORATION LIMITED

GUJARAT REFINERY, JAWAHAR NAGAR
VADODARA (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

DEPUTY GENERAL MANAGER (Purchase)
Place: Nagpur
Date :

1103

NOTICE INVITING TENDER

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

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/VIOCI-MECH/1103 Date: 31.01.2013

NOTICE INVITING TENDER (NIT)

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

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHE/PW/PUR/VIOCI-MECH/1103**	
ii	**Broad Scope of job**	**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 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, APPLICATION OF THERMAL INSULATION, FINAL PAINTING AND HANDING OVER OF 1X125 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1X30 MW(Fr6B) GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / EXTERNAL / PIPING ETC. FOR 1X30 MW GTG + 1X125 TPH HRSG, BASED CO-GEN, IOCL (IRUP), GUJARAT REFINERY, IOCL VADODARA PROJECT (GT#6).**	
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 : 31/01/2013:*** ***Closes: 07/02/2013 , Time : 16:00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 08/02/2013, Time : 15.00 Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be handed over to PSWR HQ-Nagpur Dispatch Section. For any assistance bidder may contact the following BHEL officials: RK Ranade/ Sr. Manager (Purchase) Pratish Gee Varghese/Engineer(Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***Date : 08/02/2013, 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/- (Rupees Two Thousand Only)***	*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.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	----------	*Not Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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	○ Envelopes I ○ Envelopes II ○ 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'$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating '$\mathbf{R_{BEHL}}$' 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	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix)

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

ii) Weightage "B" assigned to bidders based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions, for the respective Package:

a) If R_{BHEL} is ≥ 80%, "B" will be equal to '6'
b) If R_{BHEL} is ≥ 75% < 80%, "B" will be equal to '5'
c) If R_{BHEL} is ≥ 70% < 75%, "B" will be equal to '4'
d) If R_{BHEL} is ≥ 65% < 70%, "B" will be equal to '3'
e) If R_{BHEL} is ≥ 60% < 65%, "B" will be equal to '2'
f) If 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 INCLUDING ELECTRICAL, CONTROL & INSTRUMENTATION EQUIPMENTS / ITEMS AND OTHER MATERIALS IN BHEL/CUSTOMER'S STORES/STORAGE YARD AS RECEIVED BY ROAD 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, APPLICATION OF THERMAL INSULATION, FINAL PAINTING AND HANDING OVER OF 1X125 TPH HEAT RECOVERY STEAM GENERATOR WITH AUXILIARIES, STACK/ STEEL CHIMNEY WITH ASSOCIATED AUX, 1X30 MW(Fr6B) GAS TURBINE-GENERATOR SET WITH THEIR AUXILIARIES, BALANCE OF PLANT EQUIPMENTS / SYSTEMS WITH RELATED AUXILIARIES, INTEGRAL PIPING, FIELD / EXTERNAL / PIPING ETC. FOR 1X30 MW GTG + 1X125 TPH HRSG, BASED CO-GEN, IOCL (IRUP), GUJARAT REFINERY, IOCL VADODARA PROJECT (GT#6).
TENDER NO	**BHE/PW/PUR/VIOCI-MECH/1103**

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** Bidder must have, **achieved (either B.1 or B.2)** in last seven years as on the latest date of offer Submission, **B.1.** **B.1.1)** Executed Erection Testing & Commissioning (E T & C) of Atleast one Boiler (Consisting of Pressure parts, Structures/ESP and IBR/Power Cycle Piping of the same unit as a stand-alone bidder) of rating 300 TPH or above OR **B.1.2)** Executed Erection Testing & Commissioning (E T & C) of ESP and Power Cycle Piping of a unit of 190 MW or above OR **B.1.3**) Executed Erection Testing & Commissioning (E T & C) of ESP **OR** Power Cycle Piping of a unit of rating 190 MW or above subject to:- a) Entering into a consortium with another agency who has experience of Boiler (Consisting of Pressure parts, Structures/ESP and IBR/Power Cycle Piping of the same unit	APPLICABLE	

	as a stand alone bidder) & power Cycle Piping **OR** Boiler (Consisting of Pressure parts, Structures/ESP and IBR/Power Cycle Piping of the same unit as a stand alone bidder) & ESP respectively of a unit of rating 190 MW or above OR **B.1.4)** Executed Erection Testing & Commissioning (E T & C) of atleast one STG of above 400 MW under direct order of BHEL subject to:- a) Experience of Boiler (Consisting of Pressure parts, Structures/ESP and IBR/Power Cycle Piping of the same unit as a stand alone bidder) of atleast 200 TPH OR b) Entering into a Consortium arrangement with an agency who has experience of Boiler Structures and Pressue parts or IBR/Power Cycle Piping of 190 MW or above with his own T&Ps and consumables. **OR** **B.2)** **B.2.1)** Executed Erection Testing & Commissioning (E T & C) of One STG job of one unit of 100 MW or higher OR **B.2.2)** Executed Erection Testing & Commissioning (E T & C) of One GTG job of one unit of 190 MW or higher OR **B.2.3)** Executed Erection Testing & Commissioning (E T & C) of One BOILER (with Rotating machinery) of one unit of above 400 MW under direct order of BHEL subject to:- a) Experience of STG of atleast 60 MW OR b) Consortium arrangement with an agency who has experience of STG of 60 MW or above Prime Bidder (who is submitting the offer), shall also submit relevant documents of the consortium Partner in support of the experience of the consortium partner satisfying PQR (i.e. work order, work completion certificate & profile of organization). Prime bidder has to submit the copy of consortium agreements executed between both agencies on Rs 50/- non judicial stamp paper duly certified by Notary as per Format No- F-22 of Vol-I BCD of tender. In case of consortium, the bidder shall comply all terms and conditions as given in GCC of this tender.		

C-1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of **Rs 240 Lakhs** or more over last three Financial Years i.e. 2009-2010, 2010-2011, 2011-12	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	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.

Note:

Customer Approval is required for the subject work.

Customer may prefer the bidders who have similar work experience in Hydrocarbon Industry.

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**	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 4: **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.**IOCVL VOADODA**- is a Refinery Project as such Safety Requirements of this project are stringent and hence bidders has to comply all the safety requirement during execution of contract as per IOCL Safety Specifications given in this tender in (Vol- IE) SPECIAL CONDITIONS OF CONTRACT – SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM- APPENDIX-7. BHEL will levy penalty in case of Non-compliance of safety requirements as specified in this tender.

1103

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

Registered Office : BHEL House, Siri Fort, New Delhi – 110 049, India
Website : www.bhel.com

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

Introduction

Bharat Heavy Electricals Ltd. has received a turnkey contract to set up a 1X30 MW GTG + 1X125 TPH HRSG Based Co-generation Plant from Customer (M/s. Indian Oil Corporation Limited) at their existing IOCL, Gujarat Refinery, Jawahar Nagar, Vadodara premise. Indian Oil Corporation Ltd. (IOCL), is currently setting up GT+HRSG Unit known to be the 6th GT + HRSG Unit. Two units of the same capacity GT + HRSG (Unit#4&5) is already in operation at site in adjacent to proposed Unit#6 machine.

Approach to site

The proposed project site is located at a distance 15 KM from Vadodara City and 400 KM from Mumbai. The nearest railway station is Vadodara (Gujarat). The nearest airport is Vadodara.

Climate

1. Barometric Pressure:

(i)Normal :1008.2 mbar
(ii)Minimum :1000.7mbar
(iii)Maximum:1013.2mbar

2. Site elevation: 37.7meters above the sea level

3. Ambient Temperature:

(i) Minimum Temperature (winter dry bulb):4.4Degree Centigrade
(ii) Maximum Temperature (Summer dry bulb):46.7DegreeCentigrade
(iii) Relative humidity:21%
(iv) Relative humidity:89%

4. Rain Fall:

Maximumrainfall:77mm (rainy season is from July to September)

5. Wind Speed experienced during a cyclone in November 1982:

125Km/Hr. for 2 Hours, 90 Km/Hr.; average N-W (320 degree N)

Wind Velocity (gust wind): Max.61 Km/Hr.

(i) 20-61 Km/Hr.-4 days annually

(ii) 1-19 Km/Hr.-289 days annually
(iii) Under 1 Km/Hr.-72 days annually

Above information furnished are for general guidance of Contractor. However 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 under these specification for Material Handling & Materials Management services and Erection, Welding, Alignment, Testing, Commissioning, Chemical Cleaning/Flushing, Final Painting and Handing over of 1x30 MW GTG + 1X125 TPH HRSG along with respective auxiliaries & accessories, BOP/BOI packages and integral & field / external piping, Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project (GT#6) shall broadly be as under:

2.1 MATERIAL HANDLING & MATERIALS MANAGEMENT SERVICES

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 1x125 TPH Heat Recovery Steam Generator and their auxiliaries, Insulation, Chimney and Integral / Field / External / Power Cycle Piping, 1x30MW Fr-6 Gas Turbines, Gas Turbine-Generators with their Auxiliaries including Bypass Stack, Gas Turbine Filter, Deaerators with FST, LP Dosing system, Naphta Filter Skids, HSD Filter Skids, Hitech Additive Skids, Naphta Tanks, HSD Tanks, HSD Fuel forwarding Skids, Drain Tanks, Gas Conditioning Skids, Gas Filter Skids, SWAS system, Naphta Colesecnt Skids, Water Injection Skids, IBD & CBD Tanks, Heat Exchangers, DM Water Circulating Pump Skids, HSD Centrifuge, Compressor water wash Skids, Diverter Dampers, Electrical and Control & Instrumentation Equipments & items likes, Station Transformers, Generator Transformers, Aux. Transformers, Switchgear Systems/Panels and other related system Panels/cubicles/control panels, other related items like Cable, Cable Trays, Electrical Fittings etc. and Reinforcement & Structural Steel materials supplied by BHEL Units / PSWR, their sub-vendors, bought-out items, any other material like BHEL's T&P, furniture etc.

2.1.1 Broad Scope of work for Material Handling and Material Management Services:

The scope of work under Material Handling and Materials Management services for 1x30 MW GTG + 1X125 TPH HRSG along with respective auxiliaries & accessories, BOP/BOI packages and integral & field / external piping , Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project (GT#6) shall broadly be as under:

- Receipt and unloading of various components of the power plant **including heavy and over-dimensional consignments** (e.g. boiler drum, ceiling girders, GT & GTG etc) directly from trailers / wagon by suitable crane or by jack and sleeper method including levelling of the unloading area and attendant work.

- BHEL will despatch the plant materials by **road transport** on door delivery basis upto the project site. Contractor shall receive all such consignments at the respective location, unload, and carry out local transportation upto the stacking yard / storage sheds inside the project premises.

- Collection of materials (dispatched by road transport on go-down delivery basis) from transporters' go-downs, loading at transporters go-down, local transport up to BHEL stores / storage yard at project premises and unloading thereof.
- **Preliminary verification** of all materials at the time of unloading from transport vehicle or while receiving consignments from transporters' go-down - as the case may be, reporting immediately the discrepancies like damages and shortages noticed.
- **Detailed verification** of materials with reference to packing list and loading advice slip after unpacking of boxes & crates; repacking, where called for, after detailed verification; preparation of receipt inspection reports.
- **Stacking and storing** at BHEL open storage yard / covered stores / closed & semi-closed sheds in project premises, submission of stacking / storing records.
- **Preservation** of the materials in accordance with BHEL's preservation manual or BHEL vendors' manual as applicable else as per BHEL's instructions.
- **General cleaning, grass cutting and upkeep of storage yard, covered and semi-closed stores sheds** within the quoted rates for unloading, verification and stacking.
- **Providing Materials Management Services**.
- **Re-handling and restacking** of materials as and when called for by BHEL. This also includes excess / redundant / scrap materials returned to stores by BHEL's erection contractors.
- **Handling and loading of outgoing materials** those are to be sent to other destinations.

2.1.2 Major Packages to be Handled are as under:

The scope of work of this tender specification of material handling and materials management of entire 1x30 MW GTG + 1X125 TPH HRSG , Based Co-gen, IOCL (IRUP), Gujarat Refinery, Vadodara Project (GTG & HRSG with related Auxiliaries & accessories, integral / field / external piping, Tanks, Vessels, Skids, Electrical and C&I equipments/items/Panels, Reinforcement & Structural Steel Materials etc.), shall broadly be as under:

1. HRSG 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. HRSG's Electrical and Controls & instrumentation and accessories.

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

6. Balance of Plants (Mechanical equipments & Skids, such as Naphtha Filter Skids, HSD Filter Skids, Hi-tech 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, BFPs, Motors, Accessory bases, Gas Valve Modules) Equipments, Skids and Packages etc..

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

8. Switchgear System 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. Integral / Field / External Piping 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.)
16. BHEL Owned cranes.

2.1.3 <u>SOME OF THE MAJOR HEAVY CONSIGNMENTS ARE:</u>

SN	Description of the equipment	Approx. Equipment dimension LXBXH (in Meter)	Approx. Weight (MT) per item
1	HRSG Drum	L- 9.7 X H - 2.5	29
2	Chimney Sections (24 Nos. shell and each of 2.5 Mtr Height)	Dia.3.5x H - 2.5	10 MT - weight of heaviest shell
3	Gas Turbine Skids	7.38x3.5x4.2	64
4	Accessory Base	6.3x3.5x4.5	38
5	GT Generators assembled with	7.5x3.6x3.5	93

	rotor etc.		
6	GT Gas valve Module	3X2X4	9
7	Boiler Feed Pumps (3 Nos.)	7X2	4
8	Diverter Dampers	4.5x4x6	20
9	Guillotine Dampers	6x0.5x4	12
10	Silencer Duct SL1	4.7x5.1x3.2	10
11	Silencer Duct SL2	4.3x4.7x1.6	5
12	Horizontal Duct D-1	4.5x4.1x3.8.5	9
13	Horizontal Duct H-1	4.1x2.5x2.8	4
14	Transit Duct D-2	4.7x4.3x2.6	5
15	Transit Duct D-3	4.5x4.3x2.1	4
16	Vertical Duct VD8 (4 Nos.)	4.3X4.3X3.35	5
17	Vertical Duct VD9	4.5X4.5X3.4	5
18	FST Headers	4.8x2.2x2.5	10
19	Feed Storage Tanks	14x3.75x4	21
20	Generator Cooler Duct	5X1.5X2.5	10
21	Load Gearboxes	2X1.5X2	12
22	Generator Transfor - 55 MVA	11X6.2X6.7	87
23	Station Transformers - 10 MVA (2 Nos.)	7.2X5.4X5.6	35
24	Distribution transformer - 2MVA (2 Nos.)	4.0 X 3.0X 3.0	4

 # As an additional information:

1. Chimney Shells will be supplied as single items. Chimney base plate will be supplied in two halves. Chimney ID is 3.5m. Total height of chimney is 60m and there will be 24 shells each of 2.5m height with thickness varying between 40mm (bottom) to 10mm (top) and chimney base plate will be 40mm.

Tentative weight of bottom most shell = 10.0 MT
Tentative weight of top most shell = 3.0 MT

2. Total Approx. Weight of Main Plant Equipment (1X125 TPH HRSG, 1X30 MW GTG, their Auxiliaries and BOP etc.) including Structural steel and Reinforcement Steel :4231.00 MT

2.1.4. Unit Wise Tentative Weight Details -

Unit	Materials	Tentative Weight (In MT)
Trichy	HRSG & Auxiliaries	850
Ranipet	Chimney	191
EDN	C&I Items	25
Hyderabad	GT, GTG & Auxiliaries	1000
PE&SD	Piping & BOI (Mechanical, Electrical and C&I Items)	600
Bhopal	Switchgears	40
Jhansi	Transformers	125
PSWR	Steel & Other Miscellanies Items	845
Total		**3676 MT**

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 this specifications and drawings.

2.1.4 (A)
In above mentioned weight details around 300 MT erection materials supplied from mfg. units and 230 MT structural steel arranged by PSWR are already unloaded at site by temporary arrangement. The remaining works of these materials like - Stacking, Verification updation of receipt details & issue details, etc. shall be carried by contractor under these tender specification and the payment for this work will be paid as per terms of payment *(refer clause Serial number of 1.2 to 1.6 of Clause 7.1).*

2.1.5
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.

2.1.6

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.

2.1.7
The contractor shall perform all required services which may not be specified herein but nevertheless required for the completion of work within quoted rates.

2.1.8
All necessary certificates and licenses required to carry out this work are to be arranged by the contractor expeditiously.

2.1.9
All cranes, transport equipments, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables (excluding those indicated as BHEL scope), etc required for this scope of work shall be provided by the contractor.

2.1.10
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 here. The contractor's quoted rates shall include of all such contingencies. In this connection refer relevant clause of general conditions of contract.

2.2 ERECTION, TESTING & ASSISTANCE IN COMMISSIONING OF MAIN PLANT EQUIPMENT & BOP (HRSG, GTG & AUXILIARIES ALONGWITH ASSOCIATE PIPING)

2.2.1

The scope of work for receipt / collection / loading / unloading/ transportation of materials from BHEL / client's stores / storage yards to site of work, erection, testing, commissioning, Insulation, final painting and handing over of 1x125 TPH Heat Recovery Steam Generator with Auxiliaries, Stack/ Steel Chimney with Associated Aux, 1x30 MW (Fr6B) Gas Turbine-Generator set with their auxiliaries, balance of plant equipments / systems with related auxiliaries, integral piping, field / external / power cycle piping and application of thermal insulation of equipments / piping/vessels & tanks, supply of Paints/Primer and application of paints for final painting etc. for 1X125 TPH HRSG with all its auxiliaries at 1X30 MW GTG + 1X125 TPH HRSG, Gujarat Refinery, IOCL Vadodara Project (GT#6), Vadodara, Gujarat.

The work is mainly categorized as follows:

- 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 drum, modules, steel chimney / stack sections, Gas Turbine, Gas Turbine Generator, GT accessory base, Deaerator, bypass stack and dampers and all other related erection materials etc. by making his own transport and handling arrangements. The tentative distance of storage yard from erection site is about 3 km.

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

- Lifting, placement, erection, fit-up, alignment etc. Of equipments of HRSG, steel chimney / stack, Gas Turbine, Gas Turbine Generator, Bypass stack, Deaerator, pumps, balance of plant equipments with respective aux., systems, piping including integral piping of HRSG, GTG / balance of plant equipments etc. as the scope of these specifications.

- Erection, alignment, fit-up and welding/bolting/fastening, pre-heat treatment/post heat treatment etc. Of equipments with aux., systems, field piping including integral piping of HRSG, integral piping of GTG / balance of plant equipments, field / external / power cycle piping with supports etc. Including primer painting of site weld joints with chlorinated based zinc phosphate primer.

- 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.

- Non destructive examination, radiography etc.

- Chipping, preparation of equipments & structures foundations.

- 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.

- Erection, laying, welding, NDE/radiography of Piping (external / field / power cycle piping, integral piping, regenerative piping including instrument air & service air piping etc.) / Tanks / Valves etc.

- Preservative coating/ rapping of Buried / under ground piping.

- Testing, pre-commissioning, commissioning, hydraulic testing, chemical cleaning/ air blowing/ flushing, alkali boil out, steam blowing, safety valve etc.

- Assembly of chimney shells, fit-up, welding with NDE/radiography etc. Of chimney.

- Application of refractory/lining & thermal insulation with retainers, fixing components, cladding sheet etc. Of HRSG with aux., equipments, ducts, piping, tanks, vessels, chimney, integral Piping of HRSG & GTG, GTG system equipments, Deaerator, and other related balance of plant equipments with associated aux./ equipments as per scope under these specifications.

- Handling, lifting, erection and placement of heavy equipments like HRSG modules, HRSG drums, steel chimney sections/shells, Gas turbine, Gas turbine generator, Deaerator with heater, bypass stack etc.

- 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.

- 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.

- Pre-commissioning checks, trial runs, testing and commissioning.

- supply of Paints/Primer and application of paints for final painting including surface preparation, cleaning, marking of identification marks, colour bands, direction of rotation / flow marks, legends etc. as per IOCL/ BHEL site requirement.

- Safety valve floating, trial operation.

- Completion of facility points (as applicable)

2.2.2

TENTATIVE SCOPE OF EQUIPMENTS/SYSTEMS COVERED UNDER THIS SCOPE OF WORK

- ✓ Heat Recovery Steam Generator with associated Equipments & Aux. including Steel Stack / Chimney, Integral / field / external Piping.
- ✓ Integral /Field / External system / Power Cycle Piping Schemes related with GTG system, Balance of Plant Equipments with valves, fittings, hangers & supports etc.
- ✓ Gas Turbine with Generator (including exciter)& Aux., Bypass Stack, Heat Exchangers, Pumps, Deaerator with heater & approach platform, and Balance of Plant Equipments with integral piping, Field / External/Power Cycle Piping, LP Dosing / Chemical dosing system etc.
- ✓ Various Pumps with Motors and associated Aux., Accessories:
- ✓ Deaerator with Accessories (FST, Heater, platform and loose items):
- ✓ Oil / Air Coolers, Heat exchangers with associated Auxiliaries.
- ✓ Insulation & cladding of Equipments / Chimney / Piping / Tanks etc. (wherever applicable)

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 Due to Space constraints at erection site, contractors are advised to deploy Porta cabin for their offices.
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner.
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Fire fighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
a	Open space for labour colony (as per availability)		Yes	Contractor has to make his own arrangements for space, shelter and transportation of labours as per their requirement at his own cost.

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Labour 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)**			
a	Single point source	Yes		Shall be provided by BHEL on Free basis. However, bidder shall be required to pay duty, taxes, penalty or any other charges, if levied by the Govt/IOCL.
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		Same as "3.2.1.a"
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 at his own cost.
a	Single point source		Yes	

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	**WATER SUPPLY**			
3.3.1	**For construction purposes: (to be specified whether chargeable or free)**			
a	Making the water available at single point	Yes		Shall be provided by BHEL on Free basis. However, bidder shall be required to pay duty, taxes, penalty or any other charges, if levied by the Govt/IOCL.
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		Same as "3.3.1.a"
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 at his own cost.

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

Sl.No	Description **PART I**	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
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
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

Sl.No	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
h	Daily erection / work plan based on 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	Yes	Only leveled plot shall be provided by BHEL, Other arrangements in bidders scope.
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself			NOT APPLICABLE
L	Arranging the materials required for preassembly		Yes	

A: TOOLS AND PLANTS TO BE DEPLOYED AT SITE BY CONTRACTOR

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	DEPLOYMENT PERIOD	*REMARKS*
1	TYRE MOUNT / CRAWLER CRANE	75 MT	01	FROM START OF HRSG ERECTION TO TILL THE COMMISSIONING OF PROJECT	FOR ERECTION WORK
2	MOBILE CRANE	40 MT	01	FROM START OF MM WORKS TO TILL THE END OF PROJECT	FOR MM WORK
3	MOBILE CRANE	10/12 MT	03	**1ST** - FROM START OF MM WORKS TO TILL END OF PROJECT **2ND & 3RD –** FROM START OF ERECTION WORK TO TILL COMMISSIONING OF PROJECT	**1ST –** FOR MM WORK **2ND & 3RD –** FOR ERECTION WORK
4	TRAILER WITH PRIME HORSE	15/20 MT	01	FROM START OF HRSG ERECTION TO TILL COMMISSIONING OF PROJECT	FOR ERECTION WORK
5	AIR COMPRESSOR (ELECTRIC/DIESEL OPERATED)	140 CFM, 7 KG/CM2	1		
6	TIG WELDING SET	AS REQUIRED	3 NOS. AND FURTHER AS PER REQUIREMENT		
7	PLASMA CUTTING M/C	FOR CUTTING UP TO 10 MM THICK STAINLESS STEEL	AS REQUIRED		
8	3-PHASE DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWL OF	600 AMP	AS PER REQUIREMET		

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	DEPLOYMENT PERIOD	*REMARKS*
	CONSTRUCTION POWER & FITTED WITH ENERGY METER				
9	POWER CABLE FOR DRAWL OF CONSTRUCTION POWER	AS REQUIRED	AS REQUIRED		
10	PRE HEATING / STRESS RELIEVING SET (HEATING CONTROL PANEL, CABLES, HEATING ELEMENTS, THERMOMETERS ETC.)	AS REQUIRED	AS REQUIRED		
11	RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE	IRIDIUM-192	AS PER REQUIREMENT		
12	THEODOLITE OF REQUIRED ACCURACY	TO ENSURE VERICALITY OF STRUCTURAL COLUMNS	AS REQUIRED		
13	SELF DRILLING CUM TAPPING MACHINE FOR FIXING OF SHEETING WORK SCREWS	AS REQUIRED	AS REQUIRED		
14	RADIOGRAPHY ARRANGEMENT WITH RADIOACTIVE ISOTOPE SOURCE	AS REQUIRED	1 SET		
15	CHEMICAL CIRCULATION PUMPS TO HANDLE ACID SOLUTION FOR CHEMICAL CLEANING, WITH DRIVE MOTORS, STARTER PANEL, CABLE, SWITCH FUSE UNIT ETC.	CONTRACTOR SHALL DEPLOY THE RQUIRED CAPACITY PUMP WITH ACCESSORIES AFTER OBTAINING WRITTEN APPROVAL OF BHEL.	AS REQUIRED (02 Set)		
16	WELDING GENERATOR (ELECTRICAL)	300 AMPERE RATING	AS REQUIRED		
17	WELDING GENERATOR (DIESEL OPERATED)	300 AMPERE RATING	AS REQUIRED		
18	RADIOGRAPHY FILM VIEWER	AS REQUIRED	AS REQUIRED		

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	DEPLOYMENT PERIOD	*REMARKS*
19	ELECTRIC WINCH WITH WIRE ROPE	03 TON	AS REQUIRED (MINIMUM 2 NOS.)	FROM START OF HRSG ERECTION TO TILL THE COMMISSIONING OF PROJECT	
20	PIPE BENDING MACHINE-HAND OPERATED	UP TO 2" NB PIPES	AS REQUIRED		
21	HAND WINCH WITH WIRE ROPE	01 TON	AS REQUIRED (MINIMUM 3 NOS.)	FROM START OF HRSG ERECTION TO TILL THE COMMISSIONING OF PROJECT	
22	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR WELDING ELECTRODES	AS PER REQUIREMENT	AS REQUIRED		
23	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS PER REQUIREMENT	AS REQUIRED		
24	ELECTRIC MOTOR DRIVEN HYDRAULIC TEST PUMP WITH DRIVE AND STARTER ETC.	400 KG/CM2 250 KG/CM2	1 Set 1 Set		FURTHER AS REQUIRED
25	SCAFFOLDING MATERIALS (SCAFFOLDING PIPES WITH CLAMPS ETC.)	ADEQUATE TO SUIT THE REQUIREMENT	800 SETS AND FURTHER AS PER REQUIREMENT		
26	ALU. SHEET CLAD PROFILE MAKING MACHINE	AS PER REQUIREMENT	AS REQUIRED		
27	HAND TOOLS, CUTTING TOOLS GRINDING MACHINES ETC	AS PER REQUIREMENT	AS REQUIRED		
28	NIBBLING MACHINE	AS PER REQUIREMENT	AS REQUIRED		
29	SHEARING MACHINE	AS PER REQUIREMENT	AS REQUIRED		
30	WATER PUMP TO LIFT WATER TO TOP OF HRSG	AS PER REQUIREMENT	AS REQUIRED		

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	DEPLOYMENT PERIOD	*REMARKS*
31	PORTABLE GRINDING M/C	AS PER REQUIREMENT	AS REQUIRED		
32	PORTABLE DRILLING M/C	AS PER REQUIREMENT	AS REQUIRED		
33	CHAIN PULLEY BLOCKS	ASSORTED CAPACITIES	AS REQUIRED		
34	GANG OPERATED AND HAND OPERATED HYDRAULIC JACKS WITH SUFFICIENT LONG HOSES OF VARIOUS CAPACITIES FOR GT AND GTG.	AS PER REQUIREMENT (50 MT & 100 MT)	AS REQUIRED		
35	SLINGS OF VAROIUS CAPACITY AND QUANTITIES FOR HANDLING OF EQUIPMENTS	AS PER REQUIREMENT	AS REQUIRED		
36	CONCRETE SLEEPERS FOR MATERIAL HANDLING	ASSORTED SIZES 6 FT LENGTH, 6 INCH WIDTH AND 6 INCH HEIGHT	AS REQUIRED (MINIMUM 300 NOS.)	150 NOS. WITHIN 1ST MONTH AND BALANCE BY 4TH MONTH FROM DATE OF REPORTING AT SITE TO TILL THE END OF THE PROJECT.	FOR MM WORKS
37	WOODEN SLEEPERS FOR MATERIAL HANDLING	ASSORTED SIZES 6 FT LENGTH, 6 INCH WIDTH AND 6 INCH HEIGHT	AS REQUIRED (MINIMUM 50 NOS.)	BY 3RD MONTH FROM DATE OF REPORTING AT SITE TO TILL THE END OF THE PROJECT.	FOR MM WORKS
38	VACUUM CLEANER (INDUSTRIAL)	AS PER REQUIREMENT	AS REQUIRED		
39	AIR COMPRESSOR (ELECTRIC/DIESEL OPERATED)	140 CFM, 7 KG/CM2	01		
40	FIRE RETARDANT TARPAULINS	AS PER REQUIREMENT	AS REQUIRED		
41	FIRE EXTINGUISHER	AS PER REQUIREMENT	AS REQUIRED		

SN	DESCRIPTION	CAPACITY (MINIMUM)	MINIMUM QUANTITY	DEPLOYMENT PERIOD	*REMARKS*
42	ANY OTHER T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS.	AS PER REQUIREMENT	AS REQUIRED		

A: MEASURING AND MONITORING DEVISES (MMD) TO BE DEPLOYED BY CONTRACTOR

AS PER REQUIREMENT TO BE FINALIZED AT SITE.

NOTE:

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

2) FOR MM WORKS, SINGLE ITEMS WHICH WILL BE MORE THAN THE CAPACITY OF 40 MT CRANE, CONTRACTOR HAS TO MAKE HIS OWN SUITABLE ARRANGEMENTS AS A PART OF WORK WITHIN COATED RATES.

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

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

5) THE MANUFACTURING YEAR OF ALL MAJOR T&PS DEPLOYED BY THE CONTRACTOR (75 MT, CRAWLER CRANE, 40 MT MOBILE CRANE AND 12/10 MT PICK & CARRY CRANE) SHOULD 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 DEPLOY ANOTHER CRANE IN GOOD WORKING CONDITION WITH MINIMUM DESIRED CAPACITY. IF CONTRACTOR FAILS TO DEPLOY THE SAME WITH IN 10 DAYS, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER DAY OF DELAY IN THE FOLLOWING MANNER -

1. IN RESPECT OF 75 MT CRANE: @ RS. 5,000 / -
2. IN RESPECT OF 40 MT CRANE: @ RS. 3,000 / -
3. IN RESPECT OF 10/12 MT CRANE: @ RS. 1,000 / -
4. IN RESPECT OF PER CONCRETE SLEEPERS: @ RS. 5 / -

5. IN RESPECT OF PER WOODEN SLEEPERS: @ RS. 10 / -

BES = BOILER ERECTION START, CF = COAL FIRING, BLU = BOILER LIGHT UP, FL = FULL LOAD,

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

SN	DESCRIPTION	QUANTITY	DEPLOYMENT PERIOD	REMARKS
1	150 MT Crane	01 (One) Number	From 3rd Month of Civil Structure erection start to GAS In (Milestone)	This crane will be on sharing basis.

Note:

1) CRANES DEPLOYED BY BHEL SHALL BE OWNED OR HIRED BY BHEL.

2) OPERATOR AND O&M FOR BHEL OWNED CRANE WILL BE ARRANGED BY BHEL (FREE OF CHARGES).

3) OPERATORS AND O&M FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY (FREE OF CHARGES).

4) CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES (HIRED/OWNED) FOR THEIR USE.

5) CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS LIKE LAYING 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.

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 TIME SCHEDULE & MOBILIZATION

6.1 INITIAL MOBILIZATION

After receipt of fax **Letter of Intent (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.

6.2 FOR MATERIAL HANDLING & MATERIALS MANAGEMENT SERVICES

6.2.1 MOBILIZATION

The activities for Material Handling & Materials Management etc. shall be started as per directions of Construction Manager / Project 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 and progressively augment the resources to match schedule of the project.

6.2.2 COMMENCEMENT OF CONTRACT PERIOD

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.

6.2.3 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be **13 (Thirteen) months** from start of contract period as specified earlier.

6.3 FOR ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING ETC.

6.3.1 MOBILIZATION

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

6.3.2 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

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

The Contractor has to subsequently augment his resources in such a manner that 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:

Major Milestone:

SN	Milestones	Completion Schedule
1	HRSG Erection Start	15-Dec-12
2	Drum Lifting	11-May-13
3	Hydro Test	02-Aug-13
4	Steam Blowing Completion / SVF	15-Dec-13
5	GT Erection Start	04-Mar-13
6	Oil Flushing	22-May-13
7	Cranking & Rachting	28-Jun-13
8	FSNL	26-Jul-13
9	Open Cycle Commissioning	10-Sep-13
10	Co Gen Commissioning	17-Dec-13
11	Completion of all Facilities and Handing Over	15-Jan-14

It is to mention that the HRSG Erection start may get delayed by 15 days from above indicated schedule. However to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary & additional resources from time to time on the instructions of BHEL to complete all mechanical works well in advance to meet the scheduled/revised completion schedules.

6.3.3 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be **13 (Thirteen)** months from the "start of contract period" as specified earlier.

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

Note:

- Agency should note that the construction works for both the stream viz HRSG and GT along with its auxiliaries shall have to go parallely to match with the

commissioning schedule of the plant. For this it will necessary to deploy "Dedicated Resources" like Manpower, Machineries and Materials Area wise to execute the woks simultaneously.

- Bidders are requested to submit Resource deployment plan Area wise with detail program in line with above schedule in the form of Bar Chart / MS project planer along with their offer.

6.4

In order to meet above schedule and other intermediate targets/activities as set **by BHEL Engineer in charge** at site & to meet customer requirements/project schedule, contractor shall arrange all necessary resources and work force in consultation with BHEL Engineer at site to undertake works concurrently in all possible fronts as made available to contractor.

Contractor shall note that individual milestones as above shall be achieved as per schedule furnished above.

6.5

Commencement of Contract period and total contract period shall be considered separately for MM Works (6.2) and E&C works (6.3) as mentioned in above clauses of respective works.

7.1 The progressive payment **"Material Handling & Materials Management Services"** on accepted price of contract value will be released as per the break up given hereinafter:

TERMS OF PAYMENT FOR MATERIAL HANDLING & MATERIALS MANAGEMENT SERVICES		
SL NO	Description of Activity	% of payment
1	**UNLOADING FROM TRUCKS/TRAILERS** **(For item nos A, B & C of Rate Schedule. Serial number – 1.1 is not applicable for Item nos A.1 & C.1 of Rate Schedule)**	
1.1	UNLOADING, SHIFTING TO OPEN/ COVERED STORES	30%
1.2	UPDATION OF RECEIPT DETAILS, IN STORE MATERIAL REGISTERS/BHEL MM PACKAGE SYSTEM	15%
1.3	STACKING AND VERIFICATION	15%
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%
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%
1.6	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
2	**MATERIAL RE-SHIFTING/RE STACKING WITHIN THE PROJECT PREMISE** **(For item D of Rate Schedule)**	
2.1	MATERIAL RE-SHIFTING/RE STACKING	85%

2.2	UPDATION OF STORE MATERIAL REGISTERS/BHEL MM PACKAGE SYSTEM	12%
2.3	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
3	**OUTGOING MATERIALS (For item E of rate Schedule)**	
3.1	IDENTIFICATION OF MATERIALS, TAGGING, PACKING IF REQUIRED, PREPARATION OF GATE PASSES ETC	40%
3.2	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%
3.3	UPDATION OF STORE DOCUMENTS/BHEL MM PACKAGE SYSTEM	12%
3.4	COMPLETION OF CONTRACTUAL OBLIGATIONS	3%
	Total	100%
4	**OTHERS**	
	% from every RA Bill to be paid only after satisfactory completion 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%

7.2 The progressive payment for **"Erection, Testing and Commissioning of HRSG & Piping Package"** on accepted price of contract value will be released as per the break up given hereinafter:

TERMS OF PAYMENT FOR ERECTION, TESTING AND COMMISSIONING OF HRSG, PIPING & AUXILIARIES PACKAGE							
SN	**Activity / Milestone**	**Structures**	**Pressure Parts & Heat transfer Module**	**Non-pressure parts**	**Chimney**	**Piping**	**Insulation***
1	**PRO RATA PAYMENTS (85%)**						
1.1	TRANSPORT & PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION)	20.00%	20.00%	20.00%	15.00%	20.00%	--
1.2	ERECTION / PLACEMENT	25.00%	10.00%	15.00%	20.00%	20.00%	50.00%
1.3	ALIGNMENT	15.00%	15.00%	15.00%	10.00%	10.00%	15.00%
1.4	WELDING / BOLTING WITH PERMANENT SUPPORTS	15.00%	20.00%	15.00%	20.00%	15.00%	20.00%
1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)	10.00%	10.00%	--	5.00%	5.00%	--
1.6	COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS ETC.	--	5.00%	--	--	5.00%	--
1.7	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG	--	5.00%	20.00%	15.00%	10.00%	--
	TOTAL FOR PRO RATA PAYMENTS (85%)	**85.00%**	**85.00%**	**85.00%**	**85.00%**	**85.00%**	**85.00%**
2	**STAGE/MILESTONE PAYMENTS (15%)**						
2.1	Drum Lifting	2.00%					

2.2	AIR & GAS TIGHTNESS TEST	--	--	3.00%	5.00%	--	--
2.3	BOILER HYDRAULIC TEST (DRAINABLE)	--	2.00%	--	--	--	--
2.4	ABO	--	2.00%	1.00%	1.00%	1.00%	1.00%
2.5	Steam Blowing	--	2.00%	2.00%		2.00%	2.00%
2.6	SVF	--	2.00%			2.00%	1.00%
2.7	Co Gen Commissioning	1.00%	1.00%	1.00%	2.00%	2.00%	2.00%
2.8	Completion of sheet covering for Boiler roof, burner roof, lift shaft cladding, completion of gutters	2.00%	--	--	--	--	--
2.9	Painting	5.00%	2.00%	3.00%	2.00%	3.00%	--
2.10	Area cleaning, temporary structures cutting/removal and return of scrap	1.00%	1.00%	1.00%	1.00%	1.00%	3.00%
2.11	Punch List points/pending points liquidation	2.00%	1.00%	2.00%	2.00%	2.00%	3.00%
2.12	Material Reconciliation	1.00%	1.00%	1.00%	1.00%	1.00%	2.00%
2.13	Completion of of all Facilities and Handing Over / Contractual Obligation	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)	**15.00%**	**15.00%**	**15.00%**	**15.00%**	**15.00%**	**15.00%**
	TOTAL (I+II)	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

* Payment for Insulation of all areas like - HRSG, GT, Piping, Tanks & vessels, Deaerator, BOI with their respective accessories and auxiliaries is covered under this item / payment term.

7.3 The progressive payment for **"Erection, Testing and Commissioning of GT, GTG & Auxiliaries Package"** on accepted price of contract value will be released as per the break up given hereinafter:

TERMS OF PAYMENT FOR ERECTION, TESTING AND COMMISSIONING OF GT, GTG & AUXILIARIES PACKAGE		
SN	Activity / Milestone	Payment Percentage
1	**GAS TURBINE, DUCTING, AUXILIARIES AND INTEGRAL PIPING (48 %)**	
1.1	Preparation and chipping of Fdn., leveling and centering of Gas Turbine	2.00%
1.2	Placement, leveling & centering of Gas Turbine with accessories on foundation	7.00%
1.3	Erection of load gear box	1.00%
1.4	Alignment of GT with Load Gear Box	1.00%
1.5	Grouting of foundation	2.00%
1.6	Erection of GT off base enclosure	3.00%
1.7	Erection of lube oil & gas fuel modules/Skids, Air Processing Skid, L.O. centrifuge, lube oil drain pump, water injection skid	3.00%
1.8	Erection of GT vent Fans with enclosure & exhaust blowers with frame, Lube oil mist eliminator etc.	3.00%
1.9	Erection of GT CO_2 fire protection systems	2.00%
1.1	Erection of Main Filter House with inlet filter, GT air filter system	3.00%
1.1	Erection of GT inlet ducting with silencers, expansion joints, Supports structure etc.	3.00%
1.1	Erection of Exhaust ducting with silences, Bypass Stack with Support structure, Aviation lamp & Lightening arrestors etc.	7.00%
1.1	Erection of dampers/diverter dampers with seal air fans with accessories & Aux.	4.00%
1.1	Erection of Integral Piping	5.00%
1.2	Erection of miscellaneous works on GT	2.00%
	SUB TOTAL OF 1.0	**48.00%**
2	**GAS TURBINE GENERATOR & AUX (17%)**	
2.1	Preparation of foundation and levelling of base plates & packers etc.	1.00%
2.2	Placement of generator on foundation, centering & levelling	6.00%

2.3	Alignment of Generator with load gear box	2.00%
2.4	Erection of exciter and alignment	1.00%
2.5	Grouting of foundation	2.00%
2.6	Erection of air filter, Air cooler duct with air cooling elements etc.	2.00%
2.7	Erection of staircase, walkway & enclosure	2.00%
2.8	Miscellaneous items	1.00%
	Sub total of 2.0	**17.00%**
3	**BALANCE OF PLANT (MECHANICAL) AND OTHER RELATED EQUIPMENTS & AUX. (20%)**	
3.1	Erection of BFPs with auxiliaries	5.00%
3.1	Erection of Naphtha Filter Skids with aux	1.00%
3.2	Erection of HSD Filter Skid with Aux. and HSD Centrifuge	1.00%
3.3	Erection of Hitech Additive Skid and Naphtha Fuel forwarding Skid, Naphtha Calescent Skid with Aux.	2.00%
3.4	Erection HSD Fuel forwarding Skid and Drain tank	1.50%
3.5	Erection of Water to Water Heat Exchanger	0.50%
3.6	Erection of DM water circulating Pumps skids and DM water Pump GT Atomising Cooler	2.00%
3.7	Erection of Deaerator with Heater, fittings and Platform structure	4.00%
3.8	Erection of LP Dosing Skids	2.00%
3.9	Erection of Miscellaneous items	1.00%
	Sub total of 3.0	**20.00%**
4	**FINAL PAINTING (5%)**	
4.1	Progressive final painting of equipments under scope	5.00%
5	**Commissioning 15%**	
5.1	Oil flushing completion of GT system	2.00%
5.2	Cranking of GT	2.00%
5.3	Full speed no load sum of GT	1.00%
5.4	Synchronisation of GT set	2.00%
5.5	Commissioning of feed water system	2.00%

5.6	Commissioning of BFPs	2.00%
5.7	Combined Trial operation of GT in Co-Gen operation	1.00%
5.8	Completion of all facilities of GT systems	2.00%
5.9	Completion of of all Facilities and Handing Over / Contractual Obligation	1.00%
	SUB TOTAL OF 5.0	**15.00%**
	GRAND TOTAL OF 1.0,2.0,3.0,4.0, AND 5.0	**100.00%**

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 02 dated 20/09/2012)

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

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

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

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

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

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

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

~~**8.2 'Enabling Works'**~~

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

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

8.3 New Taxes/Levies

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

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

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

make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

8.4 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.

9.0 SPECIFIC INCLUSIONS

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

- Supply of primer and paints for preservation & final painting.
- Erection of all motors are in the scope.
- Erection of Aviation lamp / lights are in the scope.

10.0 EXCLUSIONS

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

- 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.
- Electrical & C&I items of handling system.
- All electrical and control & instrumentation items except those specified elsewhere in these specifications.
- Civil works except to the extent specifically indicated elsewhere in this tender.
- Pneumatic copper tubing and fittings thereof.
- Testing and commissioning of heating elements, thermostats, HV rectifier transformers.
- Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications.

ESTIMATED WEIGHT OF VARIOUS SYSTEM IN SCOPE OF WORK

HRSG, Chimney, Piping & Insulation Etc.

Trichy Supplied Items (HRSG):

Sl No	PGMA	Description	Weight (In MT)	TYPE
Structural items				
1	35010	FOUNDATION MATER	8.0	STR
2	35110	MAIN COLUMNS LEF	34.5	STR
3	35120	MAIN COLUMNS RIG	34.5	STR
4	35131	INLET DUCT SUPPO	34.0	STR
5	35140	AUXILIARY COLUMN	4.0	STR
6	35220	PIPING SUPPORT -	3.0	STR
7	35540	AUXILIARYCOLUMN	6.5	STR
8	35591	BOTTOM BRACING B	5.5	STR
9	35592	TOP BRACING BEAM	7.5	STR
10	35593	BASE BEAMS OR MO	3.0	STR
11	35594	DUCT STIFFENER B	12.5	STR
12	35595	LATERAL SUPPORT	6.0	STR
13	35596	LATERAL SUPPORT	5.5	STR
14	35597	MODULE AND DRUM	5.5	STR
15	35610	BOILER ROOF STRU	22.0	STR
16	35611	BOILER ROOF SHEE	3.0	STR
17	36210	MAIN FLOOR 1ST L	7.0	STR
18	36220	MAIN FLOOR 2ND L	5.0	STR
19	36230	MAIN FLOOR 3RD L	4.0	STR
20	36240	MAIN FLOOR 4TH L	8.0	STR
21	36250	MAIN FLOOR 5TH L	5.0	STR
22	36390	MISCELLANEOUS PL	3.0	STR
23	36810	FLOOR GRILLS AND	25.0	STR
24	36820	STAIRS AND LADDE	6.5	STR
25	36850	HANDRAILS AND HA	12.0	STR
		Sub Total (STR)	**271 MT**	
Pressure Parts & Heat Transfer Module items				
1	4116	BOILER DRUM WITH	29.0	PP

2	4148	DRUM SLIDE BEARI	0.2	PP
3	4158	FASTENERS FOR DR	0.2	PP
4	7201	RISER PIPES (FRO	0.8	PP
5	7206	RISER PIPES (MID	2.5	PP
6	7207	RISER PIPES (REA	1.5	PP
7	7210	RISER HEADERS &	0.7	PP
8	7211	RISER HEADERS &	2.0	PP
9	7212	RISER HEADERS &	2.0	PP
10	7411	DOWNCOMER SUSPEN	0.5	PP
11	7504	DISC SPRING FOR	0.2	PP
12	7505	EVAP. MODULE SUP	0.1	PP
13	7506	EVAP. MODULE SUP	0.1	PP
14	7507	EVAP. MODULE SUP	0.6	PP
15	7508	EVAP. MODULE SUP	0.4	PP
16	7992	WELDING CONSUMAB	0.4	PP
17	10100	SH-I INLET HEADE	0.5	PP
18	10121	SH-II INLET HEAD	0.5	PP
19	10135	DESH INLET HEADE	1.2	PP
20	10221	SH-II OUTLET HEA	0.8	PP
21	10235	DESH OUTLET HEAD	1.2	PP
22	12850	SAT. STEAM CONNE	1.1	PP
23	12851	MAIN STEAM LINE	2.0	PP
24	12852	DESH INLET AND O	1.5	PP
25	12900	DESUPERHEATER	0.5	PP
26	12901	SUPPORTS FOR SAT	0.3	PP
27	12902	SUPPORTS FOR MS	0.3	PP
28	12905	SUPPORTS FOR DES	0.3	PP
29	12912	SH-II MODULES SU	1.2	PP
30	12913	SH-I MODULES SUP	1.1	PP
31	12992	WELDING CONSUMAB	0.1	PP
32	19101	WPH INLET LINE	0.3	PP
33	19102	WPH OUTLET LINE	0.3	PP
34	19702	ECO. OUTLET HEAD	0.2	PP
35	19850	ECONOMISER FEED	0.5	PP
36	19851	ECONOMISER LINK	1.0	PP
37	19852	ECO INTERCONNECT	0.3	PP
38	19902	ECO TO DRUM LINK	0.2	PP

39	19908	SUPPORTS FOR CPH	0.2	PP
40	19911	WPH MODULE SUPPO	0.3	PP
41	19912	Eco. FRONT MODUL	0.5	PP
42	19913	Eco. REAR MODULE	0.7	PP
43	19992	WELDING CONSUMAB	0.1	PP
44	20304	Wall box Assy.	0.3	PP
45	20331	RBIE Main Assy.	1.2	PP
46	20621	Blowing element	0.1	PP
47	20721	Blowing element	0.3	PP
48	21600	SOOT BLOWER PIPI	2.6	PP
49	21601	SOOT BLOWER PIPI	1.5	PP
50	21800	SOOT BLOWER VALV	0.3	PP
51	21825	SB PRESSURE REDU	0.2	PP
52	21850	SOOT BLOWER SAFE	0.1	PP
53	21992	WELDING CONSUMAB	0.2	PP
54	24400	TRIM PIPING AND	10.0	PP
55	24401	BOILER TRIM PIPI	2.4	PP
56	24420	SV ESCAPE PIPING	4.5	PP
57	24460	BHEL VALVES	7.0	PP
58	24465	VALVES & FITTING	2.5	PP
59	24473	DIRECT WATER LEV	0.3	PP
60	24475	DRAIN HEADERS	0.8	PP
61	24480	SAFETY VALVES	0.7	PP
62	24485	SAFETY VALVE SIL	3.5	PP
63	24490	START UP VENT SI	1.0	PP
64	24992	WELDING CONSUMAB	0.2	PP
65	42152	Operating Floor	0.5	PP
66	42155	Operating Floor	0.3	PP
67	42156	Operating Floor	1.0	PP
68	42157	Operating Floor	0.8	PP
69	42270	SD - FF SKIDS	3.0	PP
70	80145	EXHAUST AND VEN	3.4	PP
71	80219	HP DOSING SYSTEM	4.0	PP
72	80273	BD TANK VALVES	0.3	PP
73	80274	BLOW DOWN TANK S	0.0	PP
74	80600	DOSING PIPING	0.6	PP
75	80992	WELDING CONSUMAB	0.4	PP

76	81005	IBD TANK	2.5	PP
77	81011	CBD TANK	1.5	PP
78	81411	B D TANK TUBULA	0.1	PP
79	81413	BD TANK CONTROL	0.2	PP
80	HL098	COLUMN-CASING BR	14.0	HL
81	HL101	EVAPORATOR MODUL	3.9	HL
82	HL102	EVAPORATOR MODUL	5.9	HL
83	HL103	EVAPORATOR MODUL	45.0	HL
84	HL104	EVAPORATOR MODUL	22.5	HL
85	HL131	SUPERHEATER-II M	12.0	HL
86	HL132	SUPERHEATER-I MO	20.0	HL
87	HL151	ECONOMISER-FRONT	23.0	HL
88	HL152	ECONOMISER-REAR	31.0	HL
89	HL171	WPH MODULE ASSY.	17.2	HL
90	HL201	LINKS FOR EVAP.	1.0	HL
91	HL202	LINKS FOR EVAP.	0.2	HL
92	HL203	LINKS FOR EVAP.	18.0	HL
93	HL204	LINKS FOR EVAP.	2.0	HL
94	HL231	SH-II MODULE CRO	2.0	HL
95	HL232	SH-I MODULE CROS	2.0	HL
96	HL251	LINKS FOR Eco-FR	0.5	HL
97	HL252	LINKS FOR Eco-RE	0.8	HL
98	HL271	LINKS FOR WPH MO	0.4	HL
99	HL301	EVAPORATOR BAFFL	2.0	HL
100	HL302	EVAPORATOR BAFFL	2.0	HL
101	HL303	EVAPORATOR BAFFL	2.0	HL
102	HL331	SUPERHEATER BAFF	1.5	HL
103	HL351	ECO BAFFLES & SP	1.0	HL
104	HL371	WPH BAFFLES & SP	1.5	HL
105	HL501	SIDE CASING S1 -	3.6	HL
106	HL502	SIDE CASING S2 -	4.1	HL
107	HL503	SIDE CASING S3 -	4.1	HL
108	HL504	SIDE CASING S4 -	4.1	HL
109	HL505	SIDE CASING S5 -	3.7	HL
110	HL601	TOP & BOTTOM CAS	3.0	HL
111	HL602	TOP & BOTTOM CAS	2.0	HL
112	HL603	TOP & BOTTOM CAS	2.0	HL

113	HL604	TOP & BOTTOM CAS	2.0	HL
114	HL605	TOP & BOTTOM CAS	3.0	HL
		Sub Total (PP+HL)	**380 MT**	
Non Pressure Parts items				
1	19901	SUPPORTS FOR ECO	0.2	NPP
2	21725	SOOT BLOWER SUPP	1.0	NPP
3	24425	SILERNCER SUPPOR	3.0	NPP
4	24994	NAME PLATES	0.1	NPP
5	41130	Duct Burner Assay	12.0	NPP
6	41390	Oil gun vice & r	0.2	NPP
7	41450	Pipe type Gas Ig	0.6	NPP
8	43002	Scanner Cooling	1.2	NPP
9	43003	Augmenting air p	6.5	NPP
10	43008	Seal Air Piping	3.0	NPP
11	43202	SD - Scanner Air	1.5	NPP
12	43203	SD – Augmenting	2.0	NPP
13	43208	SD - Seal Air sy	0.8	NPP
14	48200	INSTRUMENT TAPPI	1.5	NPP
15	48422	HRSG INLET DUCT	40.0	NPP
16	48424	EXP. JOINT – INL	0.5	NPP
17	48452	DUCT BOILER OUTL	6.0	NPP
18	48454	EXP.PIECES – OUT	1.0	NPP
19	48482	DISTRIBUTION GRI	1.5	NPP
20	48700	BULKED BPS COMPO	0.1	NPP
21	48993	ERECTION MATERIA	1.5	NPP
		Sub Total (NPP)	**85 MT**	
Insulation items				
1	28700	CLADDING SHEET F	5.5	INS
2	32010	CLADDING SHEET I	6.6	INS
3	32020	CLADDING SHEET B	6.6	INS
4	32055	EXTERNAL INSULAT	2.5	INS
5	32110	CLADDING SHEET -	2.5	INS
6	32810	CLADDING SHEET -	0.8	INS
7	33021	CERAMIC WOOL	40.6	INS
8	33621	MINERAL WOOL FOR	16.0	INS
9	33970	WIRE MESH	0.4	INS
10	33975	SEALING COMPONEN	0.2	INS

11	37810	OUTER CASING SHE	2.0	INS
		Sub Total (INS)	**84 MT**	
	Total (Trichy Supplied Items - HRSG)		**820 MT**	

Ranipet Supplied Items (Chimney):

SN	PGMA	DESCRIPTION	Weight (In MT)
1	87010	Chimney Foundation material	8.85
2	87100	Chimney Shell	147.3
3	87150	Chimney strakes	13.4
4	87200	Painter's Trolley	1.1
5	87300	Platforms and ladders	8.05
6	87930	Aviation lamps	1.1
		Sub Total (Chimney)	**180 MT**
7	87960	Chimney insulation fixing components	3
8	87950	Chimney insulation	8
		Sub Total (Chimney Insulation)	**11 MT**
	Total (Ranipet Supplied Items – Chimney)		**191 MT**

PE&SD Supplied items (Piping):

OFF BASE PIPINGS WITH VALVES, FITTINGS, SUPPORTS AND ALL OTHER EXTERNAL PIPING/ CO-GEN PIPING SCHEMES LIKE FUEL, GAS, NAPHTHA, HSD, HP FEED WATER, FEED WATER, LP & HP STEAM, INSTRUMENT AIR & SERVICE AIR, COOLING WATER, SERVICE WATER PIPING, PORTABLE WATER PIPING, DM WATER PIPING, CONDENSATE PIPING, UNDERGROUND / BURIED PIPING, PROCESS AIR/N2 PIPING ETC. (EXCLUDING GTG SETS INTEGRAL PIPING) FOR GTGs, HRSGs, COMMON SYSTEM EQUIPMENTS AND BALANCE OF PLANT EQUIPMENTS / SYSTEMS & RELATED AUXILIARIES:

SN	DESCRIPTION OF MATERIALS	APPROX. WEIGHT (MT)
(a)	CARBON STEEL	245
(b)	ALLOY STEEL	100

(c)	STAINLESS STEEL	15
	TOTAL (Piping)	**360 MT**

PE&SD Supplied insulation Items:

INSULATION MATERIALS INCLUDING WOOL MATTRESS, GI / ALUM. SHEETING, ANCHOR HOOKS ETC. FOR PIPINGS / VALVES/ FITTINGS, EQUIPMENTS, TANKS & VESSELS OF GTG SETS, BOP AND MECHANICAL EQUIPMENTS WITH RELATED AUX.

SN	DESCRIPTION OF MATERIALS	APPROX. WEIGHT (MT)
1	INSULATION WITH SHEETING MATERIALS AND ANCILLARY ITEMS	35
Total (Insulation)		**35 MT**

Summary of HRSG, Chimney, Piping and Insulation Weight Details:

Units	Category wise Weight Summary (In Metric Ton)						
	Structure	Pressure Parts	Non Pressure Parts	Chimney	Piping	Insulation	Total
Trichy	271	380	85	0	0	84	**820**
Ranipet	0	0	0	180	0	11	**191**
PE&SD	0	0	0	0	360	35	**395**
Total	**271**	**380**	**85**	**180**	**360**	**130**	**1406**

Total weight for HRSG, Chimney, Piping and Insulation etc. (Tentative) – 1406 MT

GT, GTG & Auxiliaries BOQ

Hyderabad Supplied Items (GT & Aux, Bypass Stack, Inlet & Exhaust Duct etc.):

SN	Item Descriptions	Length (M)	Width (M)	Height (M)	Total Weight (MT)
I	**Gas Turbine & Auxiliaries**				
1	Gas Turbine Package (Flange to Flange)	7.38	3.5	4.2	64
2	Load Coupling	2.1	0.6	0.75	0.3
3	Accessory Base	6.3	3.5	4.5	38
4	Load Coupling Guard	2.2	1.5	1	0.22
5	Accessory Coupling	1.5	0.5	0.5	0.15
6	Accessory Coupling Guard	1.5	0.6	0.6	0.05
7	CO_2 bottle Racks-1	4.5	1	2.5	5
8	CO_2 bottle Racks-2	2	1	2.5	2
9	Main Filter House with chiller module(will be shipped loose)	9	10	9	80
10	VAM system for GT IAC (will be shipped loose)	14	8	9	60
11	Tools & Tackles				4
12	Turbine Vent Fans (8 Nos)	2.5	2.5	2	4.5
13	Air Processing Skid	3	1	2.5	1
14	Air processing skid panel	3	0.5	2	0.2
15	APU cooler	3	0.5	2	0.5
16	Compressor Water Washing skid	6.5	3	3.2	5
17	Lube oil Centrifuge	3	1.5	1.8	1.5
18	Field Inter connection piping	6	3.5	3	15
19	Foundation Bolts and Misc. Hardware	-	-	-	5
20	GT off-base Enclosures	7.5	4.5	4	90
21	Gas valve module	3	2	4	8.5
22	Exhaust frame blowers (2 nos)	3	3	1.5	3

23	Vent Ducting	6	2	1.5	5
24	Load Gear Box	2	1.5	2	12
Sub Total (GT & Aux)					**405 MT**
II	**Inlet Ducting**				
01	--Inlet Duct Transition Pieces	4	4	3	**35**
02	--Inlet Duct Extension Pieces	4	0.5	4	
03	--Inlet Duct Elbow No.1	4	4	4	
04	-- Inlet Duct Elbow No.2	4	4	4	
05	--Silencer	4	3	3	
06	--Straight Duct No.1	4	3	3	
07	--Straight Duct No.2	4	3	3	
08	--Support Structure	6	3	3	
Sub Total (Inlet Ducting)					**35 MT**
III	**Exhaust Ducting**				
01	--Expansion Joints (Total 4)	4.4	4	0.5	5
02	--Silencer Duct SL1	4.7	5.1	3.2	10.173
03	--Silencer Duct SL2	4.3	4.7	1.6	5.118
04	--Diverter Damper	4.5	4	6	20
05	--Guillotine Damper	6	0.5	4	12
06	--Horizontal Duct D1	4.5	4.1	3.85	9.732
07	--Horizontal Duct H1	4.1	2.5	2.8	4.653
08	--Horizontal Duct D5	3.9	3.9	0.6	1.827
09	--Horizontal Duct D6	4.1	4.1	1.1	2.918
10	-- Transit Duct D2	4.7	4.3	2.6	5.139
11	-- Transit Duct D3	4.5	4.3	2.1	4.102
12	--Vertical Duct VD8 (4 NOS.)	4.3	4.3	3.35	18.64
13	-- Vertical Duct VD9	4.5	4.5	3.4	5.009
14	GT Battery Charger Dual FCBC	1.7	0.75	2	1.2
15	GT MCC, 415V,3PH, 50Hz	13	1.4	2.43	12

16	GT DCDB, 125 VDC	3.26	0.9	2.43	5
17	125 VDC CELL BOOSTER	1.05	0.6	0.8	0.15
18	Diverter Damper Local JB's (2 No)	2	1	1	0.5
19	Guillotine Damper Local JB's (2 No)	2	1	1	0.5
20	Stack support Structure (columns beams, angles)	-	-	-	30
21	GT Battery 125 VDC	5	0.586	1.55	3.7
22	GT Auxiliary Panel	1	0.8	2.4	0.25
23	GT CO2 Panel	0.8	0.4	2	0.15
24	Inlet air filter panel	0.66	0.255	1.015	0.5
25	GD & GFD Seal Air Fan Assy	3	2	2	1
26	Miscellaneous Item (Ladders ,Platform ,Bolts)	-	-	-	4
27	Lube Oil Mist Eliminator	3	1.5	3	1
Sub Total (Exhaust Ducting)					**165 MT**
	Total (I+II+III)				**605 MT**

The following items are removed after testing of gas turbine and accessory skids due to constraints resulting from transportation. These shall be assembled back on to the turbine and accessory skids as per applicable drawings, as part of scope of work.

Material Number	Material Description	PGMA WBS Element	Qty	Base UOM	5th Level WBS Elemen	Total weight (In KG)
13590761002-02	GUARD CPLG ACCESS GEAR AFT	P-1088509600-35907	1	EA	36172	27
13590761003-01	GUARD CLGP ACCESS GEAR FWD	P-1088509600-35907	1	EA	36172	7.72
13590761004-02	COVER BOTTOM SCREENED CPLG GUA	P-1088509600-35907	1	EA	36172	12.06
33552761001-01	PIPING, EXHAUST PLENUM DRAIN	P-1088509600-35527	1	EA	36172	69
33554361008-01	SUPPORT PIPE	P-1088509600-35504	1	EA	36172	11.32
33558561001-01	PPG TURBINE CASE COOLING DISCH	P-1088509600-35585	2	EA	36172	97
33558561002-01	PPG TURBINE CASE COOLING DISCHARGE	P-1088509600-35585	1	EA	36172	39
33558561003-01	PPG TURBINE CASE COOLING DISCH	P-1088509600-35585	1	EA	36172	39
43510861003-03	GASKET	P-1088509600-35585	2	EA	36172	0.4
43550051006-14	BAR MOUNTING, CS	P-1088509600-35507	4	EA	36172	0.6
43550051008-02	STRIP LOCKING, CS	P-1088509600-35552	2	EA	36172	0.02
43550051037-10	PIPE THREAD ONE END 1" SS	P-1088509600-35552	2	EA	36172	2.2
43550051054-15	PLATE,PATCH	P-1088509600-35566	2	EA	36134	0.6
43550051086-02	PIPE THREADED ENDS 1" SS	P-1088509600-35552	2	EA	36172	0.32
43550051088-27	NIPPLE BOTH SIDES 1/2IN NPT	P-1088509600-35533	2	EA	36172	0.24
43550051144-01	TUBE-6 IN-OD=152.3-L=77.7	P-1088509600-35524	2	EA	36134	4.42
43550761023-03	PIPING COOLING AND SEALING AIR	P-1088509600-35507	2	EA	36172	86.6
43550761023-29	PIPING, COOLING AND SEALING AIR	P-1088509600-35507	1	EA	36172	35.4
43550761023-30	PIPING,COOLING AND SEALING AIR	P-1088509600-35507	1	EA	36172	32.7
43551751001-01	PIPING, FALSE START DRAIN	P-1088509600-35517	1	EA	36172	24.7
43551861020-	PIPE VENT SS	P-1088509600-35566	1	EA	36134	2.2

02						
43552451007-01	PLATE PATCH	P-1088509600-35524	2	EA	36134	4
43552451008-01	SUPPORT MUFFLER	P-1088509600-35524	2	EA	36134	7.6
43552451012-00	SUPPORT MUFFLER	P-1088509600-35524	2	EA	36134	10
43553361002-27	PIPING ARRGT COMPR WASHING	P-1088509600-35533	2	EA	36172	6.4
43554361001-10	PIPING LUBO FEED & DRAIN	P-1088509600-35504	1	EA	36172	14.33
43554361001-11	PIPING LUBO FEED & DRAIN	P-1088509600-35504	1	EA	36172	30
43554361001-12	PIPING LUBO FEED & DRAIN	P-1088509600-35504	1	EA	36172	33.7
43554361005-01	SUPPORT PIPE	P-1088509600-35504	1	EA	36172	0.9
AA1011808030	PLATE 6 IS2062 GRE250(FE410W)QLTY-A	P-1088509600-35504	0.084	KG	36172	0.084
AA1012508137	ANGLE CS 75X75X8,1*300.00MM	P-1088509600-35524	2.67	KG	36134	2.67
AA1049355512	PIPE(SMLS)168.3X 7.11 CS SA106 GR B	P-1088509600-35524	2	M	36134	56.528
AA1049355580	PIPE(SMLS) 219.1X 8.18 CS SA106 GR B	P-1088509600-35524	1	M	36134	42.549
AA7111122216	BOLT HEX M12X65-8.8	P-1088509600-35533	8	EA	36172	0.576
AA7111122313	BOLT HEX M16X90-8.8	P-1088509600-35504	8	EA	36172	1.368
AA7111122313	BOLT HEX M16X90-8.8	P-1088509600-35507	4	EA	36172	0.684
AA7111122313	BOLT HEX M16X90-8.8	P-1088509600-35507	32	EA	36172	5.472
AA7121123525	SCRU HEX M16X45-8.8	P-1088509600-35585	16	EA	36172	1.616
AA7123123174	SCRU CAP SOC P M10X40-12.9	P-1088509600-35504	8	EA	36172	0.28
AA7169001055	WASHER LOCK MTA10.5	P-1088509600-35504	8	EA	36172	0.008
AA7242502276	ELBOW LR 90DEG CS 6" SCH 40 BW ENDS	P-1088509600-35524	1	EA	36134	10.5
AA7242530423	RDCR CONC CS 8"X6" SCH 20X40 BW ENDS	P-1088509600-35524	1	EA	36134	5
AA7246101128	FLANGE SOW CS 6" CL 150 RF (SA105)	P-1088509600-35524	2	EA	36134	15.6
AA7246101136	FLANGE SOW CS 8" CL 150 RAISED FACE	P-1088509600-35524	2	EA	36134	25
GT9751036178	UNION-BALL TO ANGLE-SS-1 IN NPT	P-1088509600-35552	2	EA	36172	0.8
GT9751060222	O-RING 33.32X39.67X3.18 VITON	P-1088509600-35504	2	EA	36172	0.1
GT9751155010	BOLT HEX HD.DIA 5/8" X2"	P-1088509600-35907	6	EA	36172	1.2
GT9751262020	COUPLING, ACCY FR-6 (MULTIMEMBRANE TYP	P-1088509600-36362	1	EA	36172	150
GT9751263069	SELF LOCKING NUT M10 PROPERTY CLASS 8	P-1088509600-35507	4	EA	36172	0.4
GT9751263069	SELF LOCKING NUT M10	P-1088509600-35517	2	EA	36172	0.2

	PROPERTY CLASS 8					
GT9751263077	SELF LOCKING NUT M12 PROPERTY CLASS 8	P-1088509600-35517	8	EA	36172	0.24
GT9751263085	SELF LOCKING NUT M16 PROPERTY CLASS 8	P-1088509600-35524	8	EA	36134	0.08
GT9751263085	SELF LOCKING NUT M16 PROPERTY CLASS 8	P-1088509600-35504	9	EA	36172	0.09
GT9751263093	SELF LOCKING NUT M20 PROPERTY CLASS 8	P-1088509600-35524	24	EA	36134	1.2
GT9751263093	SELF LOCKING NUT M20 PROPERTY CLASS 8	P-1088509600-35517	24	EA	36172	1.2
GT9751263093	SELF LOCKING NUT M20 PROPERTY CLASS 8	P-1088509600-35585	16	EA	36172	0.8
GT9751317576	HOSE FLEXIBLE SS, .(SIZE-6"-PR.CLASS1	P-1088509600-35507	2	EA	36172	39
GT9751317584	HOSE FLEXIBLE SS, .(SIZE-6"-PR.CLASS1	P-1088509600-35507	1	EA	36172	18.75
GT9751317592	HOSE FLEXIBLE SS, .(SIZE-6"-PR.CLASS150	P-1088509600-35507	1	EA	36172	19
GT9751394023	HEX SOCKET HEAD CAP SCREWS(SET)=16 NOS	P-1088509600-36362	1	SET	36172	3.5
GT9751619335	ACC. CPLNG HRDWR BOLT KIT(1KIT = 20NOS)	P-1088509600-36362	1	EA	36172	5
GT9751619343	ACC. CPLNG HRDWR NUT KIT (1KIT = 20NOS)	P-1088509600-36362	1	EA	36172	5
GT9754024057	PORT SIGHT 2"	P-1088509600-35504	2	EA	36172	0.5
GT9754035059	VALVE BALL ELEC OPR 1.5"SW 115V FIRES	P-1088509600-35533	2	EA	36172	20
GT9754039070	COUPLING PIPE SLIP JOINT 4" B 178	P-1088509600-35504	1	EA	36172	9.5
GT9754085048	Y STRAINER 2" 150 SS	P-1088509600-36328	1	EA	36134	5
GT9754192014	UNION TUBE 1/2"	P-1088509600-35507	4	EA	36172	0.4
GT9754192162	CONNECTOR TUBE MALE 3/8"X3/8"	P-1088509600-35549	3	EA	36172	0.9
GT9754192499	UNION TUBE 3/8"	P-1088509600-35517	2	EA	36172	0.62
GT9754192685	ELBOW TUBE UNION - 3/8"	P-1088509600-35507	2	EA	36172	0.36
GT9754264104	NON ASBESTOS MSW GASKET SIZE 4"-CL 150	P-1088509600-35504	1	EA	36172	0.08
GT9754264120	NON ASBESTOS MSW GASKET SIZE 6" -CL 150	P-1088509600-35524	1	EA	36134	0.15
GT9754264120	NON ASBESTOS MSW GASKET SIZE 6" -CL 150	P-1088509600-35517	3	EA	36172	0.45
GT9754264120	NON ASBESTOS MSW GASKET SIZE 6" -CL 150	P-1088509600-35585	2	EA	36172	0.3
GT9754264139	NON ASBESTOS MSW GASKET SIZE 8" - CL 1	P-1088509600-35524	2	EA	36134	0.4
GT9754264457	NON ASBESTOS MSW GASKET 1 1/2" CL-600"	P-1088509600-35533	2	EA	36172	0.07

GT9754274916	HEAD COOLER LUBE OIL	P-1088509600-36321	2	EA	36134	60
GT9754274924	GASKET COOLER LUBE OIL	P-1088509600-36321	2	EA	36134	1
GT9754274940	HEAD COOLER ATMG AIR	P-1088509600-36322	1	EA	36172	20
GT9755002545	VALVE NEEDLE, SS, 1/2" NPT	P-1088509600-35533	2	EA	36172	1.5
GT9755005048	CLAMP LOOP 9.65	P-1088509600-35549	4	EA	36172	0.8
GT9755016430	UNISTRUT CHANNEL A=1000	P-1088509600-35549	4	EA	36172	4
GT9755018018	CAP END-UNI STRUT CHANNEL	P-1088509600-35549	8	EA	36172	1.6
GT9755054030	NUT SPRING UNISTRUT	P-1088509600-35549	4	EA	36172	0.04
GT9755134018	VALVE FLSE DRN SS 1" NPT	P-1088509600-36337	2	EA	36172	10
GT9755191070	4-10 EXTRACTION BLEED VLV	P-1088509600-36335	2	EA	36172	100
HY1071093088	PIPE SS 9.53 X 0.9 S/L	P-1088509600-35517	11.6	M	36172	2.262
HY1071093134	TUBE SS 9.5 X 1.24	P-1088509600-35549	7.7	M	36172	1.979
HY5981798106	,1*100.00*150.00MM	P-1088509600-35907	0.015	M2	36172	0.018
HY7111122860	BOLT HEX M16X40-8.8	P-1088509600-35524	8	EA	36134	0.728
HY7111124707	BOLT HEX M20X90-8.8	P-1088509600-35524	24	EA	36134	6.696
HY7111124707	BOLT HEX M20X90-8.8	P-1088509600-35517	24	EA	36172	6.696
HY7111124707	BOLT HEX M20X90-8.8	P-1088509600-35585	16	EA	36172	4.464
HY7121124971	SCRU HEX M20X50-8.8	P-1088509600-35504	12	EA	36172	2.196
HY7121198037	SCRU HEX M 6X16P8.8 GAL	P-1088509600-35549	6	EA	36172	0.03
HY7242566568	ELBOW LR 45DEG CS 6" SCH 40 BW	P-1088509600-35524	2	EA	36134	21
HY7242574048	PLUG SQ HEAD CS 1/2" NPT ENDS	P-1088509600-35507	2	EA	36172	0.1
HY7242574048	PLUG SQ HEAD CS 1/2" NPT ENDS	P-1088509600-35517	1	EA	36172	0.05
HY7242574064	PLUG SQ HEAD CS 1" NPT ENDS	P-1088509600-35507	1	EA	36172	0.15
HY7242574072	PLUG SQ HEAD CS 1 1/4" NPT ENDS	P-1088509600-35507	2	EA	36172	0.54
HY7242574447	PLUG SQ HEAD SS 1/2" NPT ENDS	P-1088509600-35533	2	EA	36172	0.1
HY7242584035	PLUG HEX HD CS 3/8" NPT	P-1088509600-35549	1	EA	36172	0.1
HY7242591066	BUSHING HEX HD CS 1"X 3/4" NPT MALE&FEM	P-1088509600-35552	2	EA	36172	0.2
HY7242597226	ELBOW 90DEG SS 1/2" CL 3000 NPT FEM ENDS	P-1088509600-35533	2	EA	36172	0.78
HY7246166122	FLANGE BLIND CS 6" CL 150 RF(SA105)	P-1088509600-35517	1	EA	36172	12
HY9603148024	U-BOLT GALVZD 1"	P-1088509600-35517	1	EA	36172	0.225
HY9603148075	U-BOLT GALVZD 6"	P-1088509600-35524	1	EA	36134	1

Hyderabad Supplied Items (Integral piping & loose supply):

SN	PGMA	PGMA Description	Weight (In MT)
1	P-1088509600-35423	TRANSDUCER,ARRGT - UNIT	0.2
2	P-1088509600-35543	PPG ARRGT,BASE INTER-CON	2.0
3	P-1088509600-35683	CONDUIT ARRGT, LIGHTING	0.3
4	P-1088509600-35807	LOCAL MEAS INSTRM-SHIP T	0.1
5	P-1088509600-35816	PPG ARRGT,LO FEED & DRAI	0.7
6	P-1088509600-35817	PPG ARRGT,OIL VENT	1.3
7	P-1088509600-35822	GUARD COUPLING, OUTPUT	0.2
8	P-1088509600-35823	STRAINER ASSY,FUEL GAS	0.2
9	P-1088509600-35824	COUPLING,LOAD (INCL HARD	0.3
10	P-1088509600-35828	PANELS ARRGT,ENCLOSURE	60.0
11	P-1088509600-35835	PPG ARRGT,FIRE PROTECTIO	1.1
12	P-1088509600-35857	PPG ARR, GAS FUEL MOD-IN	0.8
13	P-1088509600-36328	FILTER,FUEL OIL,MAIN(STR	1.8
14	P-1088509600-36338	VALVE,TEMP ACTD-CW, AA P	0.1
15	P-1088509600-36343	VALVE,TEMP ACTD CLG WATE	0.1
16	P-1088509600-36402	FOUNDATION BOLTING ARRGT	2.8
17	P-1088509600-36411	COND ARRGT,FIELD WIRING	0.1
18	P-1088509600-36412	PPG ARRGT,COOLING WATER-	19.0
19	P-1088509600-36413	PPG ARRGT,INTER CON - FI	19.0
20	P-1088509600-36414	CABLE ARRGT,GT STN(MARK-	10.0
21	P-1088509600-36416	SENSOR ARRGT,INLET/EXH(P	0.1
22	P-1088509600-36417	PIPING-LUBE OIL,FLUSH FI	0.3
23	P-1088509600-36419	SENSOR ARRGT,HUMIDITY	0.1
24	P-1088509600-36438	FUEL GAS FLOW MEAS SYSTE	0.1
25	P-1088509600-36447	ERECTION MATL, GT (PRODU	1.3
		Total	**122 MT**

Hyderabad Supplied Items (Gas Turbine Generator & Auxiliaries):

SL. NO.	DESCRIPTION OF EQUIPMENT	OVERALL DIMENSIONS IN MM			WEIGHT (IN MT)
		LENGTH	WIDTH	HEIGHT	
1.	GENERATOR PACKAGE	7500	3600	3500	92.6
2.	FOUNDATION ITEMS	3500	1000	500	7.0
3.	AIR COOLER ELEMENTS (8 NOS.)	3000	670	630	8x1.5 = 12
4.	COOLER DUCT	5000	1500	2500	10.0
5.	ENCLOSURE	AS PANELS			10.0
	TOTAL				**132 MT**

Hyderabad Supplied Items (Deaerator and Heat Exchangers):

Sl.No	Equipment	Overall Dimensions (in mm)	Qty	Weight (IN MT)
1.	**Spray cum Tray Deaerator**			
a.	Header	L 4.8 x W 2.2 x H 2.5	1 no.	10
b.	Feed Storage Tank (Sec-I)	L 14 x W 3.75 x H 4.0	1 no.	21
c.	Loose items (for Stand pipes, Platform etc)		1 set	4
2.	**GTG Air Cooler**			
a.	Per Element	L 3000 x W 700 x H 520	6 nos.	1.5
3.	**Water to Water Heat Exchanger**			
a.	Per Cooler	L 5400 x W 700 x H 1100	1 nos.	3.4
Total				**40 MT**

PE&SD Supplied Items (BOI Items):

SN	Item Description	Dimensions(Mtrs) LXBXH	Weight(MT)
1	Fuel Gas Filter Separator Skid (Fine Filter)	5.6 X 2.6 X 4.0	8.2

2	Fuel Oil-1 Centrifuge System	3.5 X 1.8 X 1.7	3
3	Fuel Oil-1 Forwarding Skid	4.1 X 3.0 X 2.0	5
4	Fuel Oil-1 25 Micron & 6 Micron Filter Skid	2.0 X 1.5 X 2.0	1.1
5	Fuel Oil-1 (HSD) 6 Micron Filter Skid	2.0 X 1.5 X 2.5	1.1
6	Fuel Oil-1 (HSD) Accumulator	2.0 X 0.2D	1
7	Hydrazine Dosing System	2.0 X 4.0	5
8	Morpholine Dosing System	2.0 X 4.0	5
9	HP Boiler Feed Pumps – 3 Nos.	7.0 X 2.5	10
10	DM Water circulating Pump Skids	2.5X2.0X1.0	2
Total			**42 MT**

Summery of GT, GTG, Deaerator and BOI Items Weight Details:

Unit	Category	Weight (In MT)
Hyderabad	GT & Aux, Ducts etc.	605
	Integral piping & Loose Items	122
	GTG & Aux	132
	Deaerator and Heat Exchangers	40
PE&SD	BOI Items	42
Total		**941 MT**

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

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

5. Besides the above, weight of all temporary piping, valves, pumps, tanks and other miscellaneous equipments etc for carrying out hydraulic test, chemical cleaning, steam blowing and other tests, as stated elsewhere will get added.

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

Shall be issued during Execution

PAINTING SCHEME:

PAINTING SCHEME AS PER BHEL/IOCL SPECIFICATION FOR FINAL / TOUCH UP PAINTING.

(IOCL Painting Scheme – issue as a separate booklet as Volume- I E)

GENERAL REQUIREMENTS

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, curbs, 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 necessary compensation from contractor's bill payment.

11.12
Submission of periodical reports

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

Consumption of construction power
Manpower reports
Daily and monthly progress reports
Field calibration reports

BHEL will provide formats for these reports.

11.13
The Contractor shall make his own arrangements of Gate Pass with photo for his employees as prescribed and instructed by the Security deptt. i.e. CISF, Gujarat Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used by any employee. In case of termination of the service of any of his employee during the contractual period, the contractor shall have to surrender the Gate Pass issued to the employees to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's employees shall have to be returned.

11.14
The Contractor shall make his own arrangements of Gate Pass for his Vehicle, T&P etc. as prescribed and instructed by the Security deptt. i.e. CISF, Gujarat Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used. In case of termination of the service of any of T&P or Vehicle during the contractual period, the contractor shall have to surrender the Gate Pass to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's Vehicle, T&P shall have to be returned.

11.15
Where permitted, by Customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

11.16
Contractor to note that in addition to BHEL requirements of safety, occupational health and environmental management, contractor shall strictly follow & abide the safety laws/rules & regulation requirements of IOCL at site and in the event of any deviation/ dispute, the

requirements of IOCL in this regard shall supersede the BHEL requirements. Contractor shall arrange the required safety facilities as mentioned in the document number **Safety Document – isuued as a separate Booklet- Volume- IE**

For non-compliances/violation of safety rules and fine/penalty imposed by IOCL as their rules & regulations shall be to the account of contractor & same shall be paid by contractor. In even of any recovery from BHEL bills by customer on account of contractor against such fine/penalty, BHEL shall recover such amount/payment in addition to 30% departmental overheads from any available bills/payments of contractor which is due for payment from BHEL.

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 CONSIGNMEN+TS 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, GAS TURBINE, GAS TURBINE GENERATOR, TRANSFORMERS, DEAERATOR, ETC. 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- 04 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) 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.

(3) 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.

CONTRACTOR WILL PROVIDE NECESSARY HARDWARE, SOFTWARE & STATIONARY ETC. AND 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		REMARKS
1	MATERIAL RECEIPT/UNLOADING, COLLECTION/ BOOKINGS	2	TO BE DEPLOYED FROM BEGINNING
2	DETAILED VERIFICATION	1	TO BE DEPLOYED FROM BEGINNING
3	MATERIAL ISSUE (BOILER & STEEL)	1	FROM BEGINNING
4	MATERIAL ISSUE (TG, T&P, ELEC, C&I)	1	FROM ONE MONTH BEFORE THE START OF TG ERECTION
5	PRESERVATION	2	GANG OF 2 QUALIFIED PERSON FROM 2ND MONTH ONWARDS
6	RECORD KEEPING (BOILER & STEEL STOCK)	1	FROM BEGINNING
7	RECORD KEEPING (TG, ELEC, C&I STOCK)	1	FROM BEGINNING
8	RECORD KEEPING (T&P STOCK, MRC, ASSISTANCE IN INSURANCE CLAIMS, PURCHASE ETC)	1	FROM BEGINNING

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. DEPLOYMENT OF ABOVE MENTIONED MANPOWER IS THE PART OF SCOPE OF WORKS UNDER MATERIALS HANDLING & MATERIALS MANAGEMENT. NO ANY SEPARATE PAYMENT IS PAYABLE ON ABOVE ACCOUNT.

IN CASE THE CONTRACTOR DOES NOT DEPLOY OR DELAYS DEPLOYMENT OF ABOVE SAID MANPOWER WITH REFERENCE TO SPECIFIC INSTRUCTIONS FROM BHEL, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER MAN- DAY @ Rs 500

12.17

PAYMENT FOR ALL MATERIALS INCLUDING ODC AND HEAVIER COMPONENTS SHALL BE REGULATED ON THE ACCEPTED UNIT **RATE AS PER SL NO. A, A.1,C & C.1 OF RATE SCHEDULE**

13.1 RE-SHIFTING 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, MAXIMUM DISTANCE AROUND 3 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. D OF RATE SCHEDULE**

13.2 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 ACCEPTED FOR ITEM NO D OF RATE SCHEDULE**.

14.1 INCOMING MATERIALS (SMALLS ETC)

14.1.1
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:

14.1.2
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

14.1.3
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.

14.1.4
DETENTION CHARGES/ DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

14.1.5
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 B OF RATE SCHEDULE.** 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.

14.1.6
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.

14.2 OUTGOING MATERIALS/DISPATCHES

14.2.1
FOR VARYING REASONS MANY A TIMES, PROJECT MATERIALS / BHEL ASSETS ARE TO BE DISPATCHED TO OTHER SITES/LOCATIONS.

14.2.2
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 E OF RATE SCHEDULE.**

14.2.3
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 B OF RATE SCHEDULE**

15.1

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 AND ALSO IN NOWAY THESE ARE CONNECTED WITH MATERIAL MANAGEMENT SERVICES AS SOUGHT FOR MATERIALS HANDLING AND MATERIALS MANAGEMNET SERVICES UNDER Chapter-XII

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, PLANNING, 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 SERVICE – 54 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 MONTH'.**

PAYMENT FOR THE SAME SHALL BE MADE AS PER THE MAN-MONTH RATE IN **ITEM NO G OF RATE SCHEDULE (Section A).**

B. MENIAL 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 SERVICE – 126 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 IN **ITEM NO H OF RATE SCHEDULE (section A).**

IN CASE THE CONTRACTOR DOES NOT DEPLOY OR DELAYS DEPLOYMENT OF ABOVE SAID MANPOWER WITH REFERENCE TO SPECIFIC INSTRUCTIONS FROM BHEL, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER DAY OF DELAY IN THE FOLLOWING MANNER:

A. SUPERVISION/SECRETARIAL SERVICES @ Rs 500 PER MAN-DAY

B. MENIAL SERVICES FOR BHEL OFFICE AND STORES ETC @ Rs 300 PER MAN-DAY

15.2
Payment against Manpower services mentioned herein and Section A item G and H of Price bid shall be calculated & paid in the following Manner;

Monthly salary for a single service month= 1.41 X 30 X Minimum Wages per day (Rounded of to next higher Fifty value)

Monthly Salary is inclusive of PF, Bonus & Profit.

The minimum per day wage shall be paid as per the rate for Gujarat given in the website http://www.paycheck.in/main/salary/minimumwages/gujarat Sr.No.15: Engineering Establishments (other than) Auto Repair. Workshop & Garage employing less than 50 Employee in Industrial Engg. Establishments, Zone –I for Unskilled & Skilled –A category.

15.3

Overrun Compensation and Price Variation Compensation as per the provisions of General Conditions of Contract shall not be payable for item no. item G and H of Section A (Supervision and Secretarial Services) & (Menial services for BHEL office and stores, site offices) of Price bid.

GENERAL REQUIREMENTS

16.1
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.

16.2
The terminal points decided by BHEL shall be final and binding on the Contractor for deciding the scope of work and effecting payment for the work done.

16.3
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.

16.4
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.

16.5
Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

16.6
All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory/ local authorities are to be arranged by the Contractor at his cost in time to ensure smooth progress of work.

16.7
The boiler shall be erected as per relevant provisions of latest Indian Boiler Regulations (IBR) and amendments/addendums thereof, if any.

16.8
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.

16.9
The Contractor shall perform any services, tests etc, which may not be specified but nevertheless, required for the completion of work within quoted rates.

16.10
All necessary certificates and licenses required for carrying out this work are to be arranged by the Contractor expeditiously.

16.11
The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

16.12
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.

16.13
All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.

16.14
During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc may become necessary on account of feed back / revision of drawing etc. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the Contractor for such reworks. Claim of Contractor if any, for such works will be governed by relevant clauses of 'General Conditions of Contract'.

16.15
All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the Contractor as part of the work within the quoted rates.

16.16
The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel for such usage. Only the steel for making temporary structure (Cat head) for drum lifting will be provided by BHEL in random sizes materials available at site.

16.17
The Contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

16.18
Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

16.19
Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc.

16.20
The details of equipments to be erected under this contract are generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the bidder about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the Contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

16.21
Hangers & suspensions, supports etc for tubes, piping, & ducts etc will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

16.22
Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

16.23
Contractor shall lay/install the field-routed/small-bore pipelines to suit site condition/ requirement. Before laying/installing such pipelines, the contractor shall prepare necessary sketch for routing these pipe lines and get the same approved by BHEL. Contractor must take care of the location/layout of other systems and equipment before preparing such sketch to avoid

interference. There is a possibility of minor change in routing such pipelines even after completion of erection; contractor shall carry out the same without any extra cost to BHEL.

16.24
Welding of necessary instrumentation tapping points, thermowell, thermocouple pad, metal temp pad and clamps, root valve including reducer (to suit Control & Instrumentation Impulse Piping requirements), condensing vessel, flow metering & measurement devices, and control valves to be provided on boiler & its auxiliaries and piping are covered within the scope of this specification. The installation of all the above items will be Contractor's responsibility even if:

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

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

16.25
Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C & I erection agency will do storage / re-erection calibration etc.

16.26
Fixing and seal welding of thermowells & plugs before Hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermowells after hydro test/steam blowing of lines as part of work.

16.27
Actuators/drives of valves, dampers, gates, powered vanes etc may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.

16.28
All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. BHEL will provide the motorized insulation testers.

16.29
In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free -returnable basis which shall be returned to BHEL after the use.

16.30
The work shall be carried out strictly in accordance to the "Field Quality Plan" approved by BHEL/client. Contractor, jointly with BHEL, shall prepare all necessary records of measurements/readings/ protocols etc.

16.31
All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per the general engineering practice and as per BHEL engineers instructions at site, cutting, weld desposing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection work and necessary to complete the work satisfactorily shall be carried out by the Contractor as part of the work.

16.32
Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

16.33
Contractor shall regulate flow of material to and from site in such a manner and sequence that material accumulation at site does not lead to congestion at site. In case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.

16.34
It may so happen that certain components like manhole doors, hanger etc may be supplied in loose items. They need to be assembled as per relevent drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

16.35
The Contractor shall have total responsibility for all equipment and materials in his custody at Contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

16.36
BHEL is operating web based computerized site operation management system (SOMS) that includes, inter-alia, issue of materials, daily progress reporting, Contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work.

16.37
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.

16.38
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.

16.39
The Contractor shall make his own arrangements of Gate Pass with photo for his employees as prescribed and instructed by the Security deptt. i.e. CISF, Gujarat Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used by any employee. In case of termination of the service of any of his employee during the contractual period, the contractor shall have to surrender the Gate Pass issued to the employees to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's employees shall have to be returned.

16.40
The Contractor shall make his own arrangements of Gate Pass for his Vehicle, T&P etc. as prescribed and instructed by the Security deptt. i.e. CISF, Gujarat Refinery at his own cost, each gate pass has to be endorsed by the Security Officer of the Refinery before the pass be used. In case of termination of the service of any of T&P or Vehicle during the contractual period, the contractor shall have to surrender the Gate Pass to the Security Deptt. At the end of the project all the gate passes endorsed by the Security Deptt. for use of the contractor's Vehicle, T&P shall have to be returned.

16.41
Where permitted, by Customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

16.42
Contractor to note that in addition to BHEL requirements of safety, occupational health and environmental management, contractor shall strictly follow & abide the safety laws/rules & regulation requirements of IOCL at site and in the event of any deviation/ dispute, the requirements of IOCL in this regard shall supersede the BHEL requirements. Contractor shall arrange the required safety facilities as mentioned in the document number **Safety Document – IOCL-V-xxxx. (IOCL Safety Document Uploaded as File titled Safety Document – IOCL-V-xxxx)**

For non-compliances/violation of safety rules and fine/penalty imposed by IOCL as their rules & regulations shall be to the account of contractor & same shall be paid by contractor. In even of any recovery from BHEL bills by customer on account of contractor against such fine/penalty, BHEL shall recover such amount/payment in addition to 30% departmental overheads from any available bills/payments of contractor which is due for payment from BHEL.

DETAILS OF SCOPE OF WORK FOR HRSG, GTG, AUXILIARIES & PIPING

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

17.1 HRSG RECEIPT, UNLOADING, STACKING AND ERECTION OF MODULES:

17.1.1 ERECTION OF HEAT TRANSFER MODULES:

The heat transfer modules will be sent loose 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 the modules and a special frame will have to be used for unloading supplied by BHEL, manufacturing unit.

These modules will be unloaded directly at site and 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.

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. These slings shall be arranged by Contractor.

17.1.2 ERECTION OF HRSG DRUM:

The tentative weight and dimensions respectively are as under:

HRSG Drum: 1 no- weight – 29 MT, Dia.-1900 mm (approx), length- 9730 mm (approx), ID 1676 mm (approx). The elevation of Centre Line of HRSG Drum is 19550 mm (approx). Height (from bottom to top support plate/Hooks/Stand) is 2450 mm (approx).

These have to be erected with the help of adequate capacity crane from the side of HRSG after the erection of casing and heat transfer modules of respective circuits.

17.1.3
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.

17.1.4
Pressure Parts components like Headers, Modules, loose tubes / links 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.

17.1.5
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).

17.1.6
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.

17.1.7
Welding of all attachments, including those of stainless steel hooks/ pins on casing & inlet duct, non-pressure parts, pressure parts/ piping including those required for insulation work of HRSG with aux, steel stack and equipments, tanks / vessels, heaters, deaerator etc. of Gas Turbine set, piping’s is in the scope of work.

17.1.8
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.

17.1.9
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 wherever necessary. Required material will be provided by BHEL.

17.1.10

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

17.1.11
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.

17.1.12
PIPING (EXTERNAL / POWER CYCLE / FIELD PIPING, INTEGRAL PIPING, REGENERATIVE PIPING INCLUDING INSTRUMENT AIR & SERVICE AIR PIPING ETC.)

17.1.12.1
The work on various piping systems will include cutting to required length, edge preparation, laying, fixing & welding of the pipes / elbows / fittings/ valves etc. in the pipeline, fixing & adjustment of supports / anchors / shock absorbers and carrying out all other activities / work to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL Engineers instructions and / or as per approved drawings / documents.

17.1.12.2
Laying of pipelines as per the specifications, between equipments constituting terminal point, 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 both ends for all the piping schemes covered in the specification.

17.1.12.3
Aligning, matching and welding of piping to the terminal points (such as stubs, on terminal equipments, stubs on headers, battery limits etc), even if these terminal equipment/point do not form part of this scope of work / specification, and stress relieving and NDE of joints so made is also within the scope of work / specification. Also, where the piping connection to the terminal points involves flanged joints, mounting and welding of flanges on piping as well as terminal equipment matching of flanges as specified elsewhere herein, fixing of gaskets, bolting and tightening as per BHEL engineer’s instruction is also in this scope of work / specifications. Required fasteners and gaskets will be supplied by BHEL free of cost.

17.1.12.4

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

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

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

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

4) Increase or decrease in length of piping including change in layout to suit site conditions.

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

6) Matching of all fittings like tees, bends, flanges, reducers, valves, socket fittings, etc with pipes for welding. This may involve weld build up, edge preparation, etc.

7) Cleaning of all pipes as prescribed, flushing by compressed air etc.

8) Welding of root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) with small length of piping to the pressure, flow and level tapping points on piping or flow nozzles / orifices / metering elements fixed on piping.

9) Welding of weld blanks with due NDE & PWHT, if required, on a temporary basis.

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

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

12) Erection of under ground / buried piping shall involve rapping & coating protective coating as per drawing requirement. Erection, laying, welding, Rapping & Coating of this pipe shall be carried out. Civil works like - excavation and backfilling for this work is also in the scope of work.

17.1.12.5
On all steam piping, water piping, oil piping, air piping, etc, where butt welding is involved, root TIG welding and subsequent arc welding shall be adopted as instructed by BHEL engineer. The decision of BHEL engineer regarding welding procedure for welding of above lines will be binding on the contractor.

17.1.12.6
Pipes / tubes / structural materials, which are issued in running meters, may not be sent in standard lengths. These have to be cut to suit site conditions.

17.1.12.7
certain pipe lines of oil, air, steam and water will be field routed as per schemes approved at site or as per the instructions of BHEL engineer, and will be supplied in random lengths / running lengths. The contractor shall lay the piping according to instructions at sites, after carrying out the necessary fabrication, edge preparation, routing, supporting etc, in best professional manner and as per instructions. The supports for field-routed piping shall be fabricated and erected as per the requirement of the work. The steel required for the supports will be provided by BHEL free of cost at their stores.

17.1.12.9
All weld joints on piping shall be ground or filed on completion of welding and before radiography as per instructions BHEL engineer so as to achieve smooth surface free of notches, ripples, undulations, etc. and to limit the reinforcement as per the codes.

17.1.12.10
Contractor shall erect the piping by doing pre-assemble on ground if possible at the first instance. 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 spring compression achieved in the case of spring hangers.

17.1.12.11
Contractor shall carryout edge preparations for welds joints in accordance with BHEL drawings / BHEL standards / BHEL engineer's instruction.

17.1.12.12
The location of drain headers, valves, stations, steam traps of piping as indicated in the BHEL drawings are suggestive only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, it has to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be changed as per the site conditions. All such works shall be carried out expeditiously as per the instructions of BHEL engineer. The decision of BHEL engineer is final and binding on the contractor.

17.1.12.13
The rate quoted in rate schedule is also inclusive of pre-heating, welding, radiography, post heating, post weld heat treatment/ stress relieving and NDE.

17.1.12.14
Hanger rods shown in the piping arrangement drawing may have to cut and welded to suit site condition. The contractor shall do cutting and welding of these hanger rods. The NDE & stress relieving required on welded hanger rods shall be carried out. The hanger for piping will be tested for even distribution of load with the help of torque wrench.

17.1.12.15
The piping may be provided with hand holes. The hand holes will be opened up for inspection and seal welded prior to operation.

17.1.12.16
Structural materials required for the supporting / operating platforms required for the valves/equipments at various levels for the safe operation will be issued in random sizes to the contractor free of cost. however, the contractor's quoted rate shall include fabrication and erection of all such of platforms at site and no extra payments shall be allowed for this and only tonnage rate applicable for structures only will be payable.

17.1.12.17
Erection of piping systems shall be coordinated by the contractor as required, with the erection of the HRSG, Gas Turbine, GT Generators, Boiler feed pumps and other major equipments, approval must be obtained from the concerned BHEL engineer and other agencies concerned prior to making piping interface connections to the aforementioned equipments. Sequence of work shall be carefully planned to minimize interference with other groups working in the same area. Actual sequence to be followed shall be subject to the approval of engineer and engineers may, at time, direct the contractor to reschedule his work as per status of the site work.

17.1.12.18
While erecting the field run pipes, the contractor shall check the accessibility of valves, instruments tapping points and maintain minimum head room requirement and other necessary clearance from the adjoining work areas to avoid interferences.

17.1.12.19
All pipelines shall be given proper slope towards the drain points during erection.

17.1.12.20
All pipe lines shall be provided with suitable vent and the drain points with valve (s) on the highest and lower points of the pipe run although may not be specifically mentioned in the drawing as per the instructions of BHEL engineer.

17.1.12.21
For instrument connections, pipe stubs including the instrument tubing up to the root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) shall be installed by the contractor. Root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements) shall be located in the convenient location / place as required by the customer to facilitate easy operation as per the decision / instruction of BHEL engineer.

17.1.12.22
The contractor shall be responsible for correct orientation of all valves so that flow direction, seats, stem and hand wheel are in desired locations. Information regarding orientation of valves, not fully located on drawings, may be obtained from the BHEL engineers.

17.1.12.23
The piping systems, which come under the purview of IBR, should meet the requirement of IBR. The contractor shall be well versed with all the latest amendments of Indian boiler regulations.

17.1.12.24
All piping shall be grouped wherever practicable and shall be routed to present a neat appearance.

17.1.12.25
For field run piping, contractor shall erect all hangers and supports as required with due regard to general arrangement layout of other pipes, hangers, cable trays, ducting, structural members, etc.

17.1.12.26
For maintaining the slopes as given in the drawings for larger thickness and larger dia pipelines, edge preparation for welding may have to be altered suitably to achieve the slope.

17.1.12.27
It may become necessary to make & install temporary spool pieces for certain process requirements. Contractor's scope shall include preparation, erection, fit-up, welding, NDE

etc and dismantling of such spool pieces at appropriate stage without any additional payment.

17.1.12.28
In pipelines like re-heater lines, CRH lines, extraction lines, HP/IP & LP bypass lines etc., the NRVS and valves will also be erected by contractor under this tender specifications. though these NRVS & valves may be supplied from different units / different sources, the erection, alignment, welding, NDE test, heat treatment, radiography, supporting etc. along with their control/ governing oil system piping with tanks, pumps, power cylinders etc. including the oil flushing & commissioning of these valves shall be carried out by contractor as per instruction of BHEL engineer and drawings / documents requirement. Similarly erection / fixing, welding etc. of strainers, dummy devices in various lines, valves and their subsequent removal & re-fixing during pre-commissioning / commissioning stages of steam blowing, flushing etc. shall be carried out by contractor under these tender specifications.

17.1.12.29
All temporary lines required for chemical cleaning, hydraulic testing, steam blowing, etc., shall be supplied in 'as is where is' condition. The contractor shall arrange to carry out the required fabrication, dressing, grinding, cleaning, cutting, edge preparation etc., while carrying out erection. No extra claim on this account will be entertained. For human protection, temporary insulation over piping to be applied at no extra cost.

17.1.12.30
Before laying the piping on supports, the coordinates and elevations of all supports shall be checked by the contractor for correctness. Discrepancies from the execution drawings, if any, shall be promptly brought to the notice of BHEL engineer in writing and correction shall be carried out as per his instructions.

17.1.12.31
Normally, hangers setting in cold condition are done by simulation adding additional temporary weight, which will be roughly equal to the weight of the insulation. Attachment of temporary weights and floating of the joints in the simulation test to be treated as part of job. Hanger settings have to be repeated for achieving free-floating joints. Hanger adjustments to be repeated for steam blowing by resetting hot and cold values if required. This may have to be repeated several times after steam blowing and synchronization. The weights will be supplied by BHEL. Contractor has to transport from BHEL stores and return the same after completion of work. No extra claim on this account will be entertained.

17.1.12.32
All the instrumentation tap-off points like thermo-wells, root valves including reducer (to suit Control & Instrumentation Impulse Piping requirements), impulse lines, nipples etc., shall also be erected and welded by the contractor irrespective of whether such materials are supplied by BHEL or any other agency.

17.1.12.33
The weld grooves of MS line, HRH line, CRH line, BFD lines and other pipes will be as per BHEL standard specifications. Further, the edge preparation shall be done as per instruction of BHEL site engineer and same shall be binding on the contractor.

17.1.12.34
All equipments / works shall be preserved and protected properly during and after erection. Instructions / directions given by BHEL in this connection will have to be observed by the contractor.

17.1.12.35
The location of tanks, vessels, valves, stations etc in the pipelines indicated in the BHEL drawings may be indicative only. The final location and routings shall be decided to suit the site conditions. While routing such lines and fixing the stations, they have to be erected so as to provide easy accessibility and free path for the purpose of easy operation and maintenance. These locations shall be acceptable to the client. Sometimes, the locations of stations and routing of lines may have to be modified as per the site conditions. All such work shall be carried out expeditiously as per the instructions of BHEL engineer. The decision of BHEL engineer is final and binding on the contractor.

17.1.12.36
All G.I. pipelines shall be joined by threaded (screwed) joints. Pipes and fittings will be supplied by BHEL as commercially available. Contractor shall arrange to check and clean and ream the existing threads if necessary, by running thread cleaning die/tap or by machining. Fresh threading shall be done in case existing thread is found damaged beyond repair after cutting off the damaged portion within the quoted rates. Fresh threading shall also be done in G.I. pipe ends cut to suit site layout.

17.1.12.37
Both male and female threads shall be cleaned of oil, grease etc, with appropriate solvent etc. prior to jointing. Joints shall be sealed by applying teflon tape on male thread. All joints shall be tightened adequately so as to achieve leak-proof joint. Exposed portion of the external threads shall be coated with zinc silicate paint. Contractor shall arrange all consumables for cleaning, sealing and painting.

17.1.12.38
Pressure testing with compressed air and external application of soap solution or flame or any other BHEL-approved method shall be done on all joints. Such tests may have to be repeated several times to ensure a leak proof system. Leakages if any shall be repaired by the contractor promptly according to the BHEL-approved procedure/method. Any additional expenses for repair attributable to contractor shall be borne by the contractor.

17.1.13 OTHER PRODUCTS AND SYSTEMS

17.1.13.1
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.

17.1.13.2
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.

17.1.13.3
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.

17.1.14 HRSG STEEL STACK/ CHIMNEY ERECTION

17.1.14.1 THE DETAILS OF CHIMNEY IS AS FOLLOWS:

- Total height of chimney is 60m.
- Chimney Shells will be supplied as single items.
- Total number of shells is 24 shells.
- Height of each shells is 2.5m.
- Chimney ID is 3.5m.
- Thickness varying between 40mm (bottom) to 10mm (top).
- Tentative weight of bottom most shell = 10.0 MT
- Tentative weight of top most shell = 3.0 MT

- Chimney base plate will be supplied in two halves.
- Chimney base plate will be 40mm.

- Total weight (Tentative) of Chimney shells PGMA is 147.3 MT

All shells are to be welded as per erection detail. Flange holes are given for locating/ erection/ alignment purpose only.

17.1.14.2
Welding of chimney joints shall be carried out by certified welder. Wherever necessary, radiography has to be taken to meet the BHEL/statutory requirements.

17.1.14.3

Chimney has to be insulated up to full height and approximate. Insulation thickness: is 80mm LRB wool mattress, however actual insulation thickness shall be as per drawings which will be provided during execution of work at site.

17.1.14.4
Helical strakes as indicated in the erection drawings are to be welded onto the chimney.

17.1.14.5
Chimney base will be supplied in two halves, which will have to be assembled at site.

17.1.14.6
Painter's trolley will be supplied in parts and will have to be assembled.

17.1.14.7
All electrical works such as lightening arrestors, earthling and aviation lights etc. are in the scope of work.

17.1.14.8
Stack/ chimney have to be painted as per the requirement of aviation / Relevant BIS standards.

17.2
ERECTION OF GAS TURBINE WITH AUX, GAS TURBINE GENERATOR, DIVERTED DAMPERS, GUILLOTINE DAMPERS, STACK, DEAERATOR WITH FST & HEATER AND APPROACH PLATFORM, PUMPS WITH AUX. AND BALANCE OF PLANT WITH OTHER RELATED EQUIPMENTS & AUXILIARIES.

17.2.1
No any EOT crane or any other BHEL's crane (except 150 MT Crane which is in BHEL scope on sharable basis) will be available under this tender specification for erection of Gas Turbine, Gas Turbine Generator, Bypass Stack, Feed Storage Tanks or any other equipments. 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 turbo-generator, GT inlet ducts, GT off base enclosure, Filter unit of GT, Feed Storage Tanks & Heater of Deaerator etc.. Gas Turbines and Gas Turbine Generators weighing respectively about 64 MT & 92.6 MT shall be required to be lifted by Suitable capacity Crane/ jacks & support structure etc. to take minimum possible time in lifting and placement then on respective foundations. The contractor shall specific note of same and shall arrange required arrangements as per site requirement.

BHEL shall not provide any crane (except 150 MT Crane which is in BHEL scope on sharable basis) or transportation arrangement for this work. Contractor shall make all arrangements including cranes and other suitable arrangements as indicated in relevant Appendix- and required for completion of work in contractor's scope including the handling, lifting, placement, erection of heavy equipments like Gas Turbines, Gas Turbine Generators, Feed Storage Tank and Heater of

Deaerator, Bypass Stack items, HRSG Drums, Accessory Base, Diverter Dampers, Guillotine Dampers etc.

As an additional information, the tentative Elevation of operating Centre line of Feed Storage Tank (FST) and Heater of Deaerator is 16.6 Meter & 19.25 meters respectively and foundation elevation is about 15.5 Meters.

17.2.2
The Height of assembled Bypass Stack is about 32 meters and Internal Dia. Is 3.56 meters. These Bypass Stacks will be supplied in loose ducts / sections and have to assembled / erection at site involving welding, bolting, tack welding work and erection of Aviation Light and lightening arrestor. The Bypass Stack have to insulated upto full height followed by cladding/sheeting work. All these works are covered under the scope of work of contractor under these specifications.

17.2.3
Piping weight indicated in relevant Appendix- with valves/fittings, supports and all other piping schemes like fuel, gas, HSD, HP & LP feed water, HP & MP steam, LP Steam, Deaerator Steam & Feed Water, instrument air & service air, cooling water, LP Dosing (Hydrazine & Ammonia), DM water, CW make up, Drinking Water, service water piping, MUD Condensate piping and other Condensate System piping, Process air/n2 piping, GT off base Gas system for GT & HRSG etc. (excluding GTG sets integral piping) for GTG, HRSGs, Common system equipments and balance of plant equipments / systems & related auxiliaries. 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.

17.2.4
For the skid mounted equipment, the checking and realignment required at site is in the scope of work.

17.2.5
Components like generator auxiliary compartment, load gear and enclosures etc received loose are to be erected in position by contractor.

17.2.6
Air filter, inlet ducting, exhaust ducting will be supplied in individual assembled sections with inside insulation. Site job involves complete assembly and erection.

17.2.7
Water wash skid shall involve welding of stainless steel pipe from skid to the GT. The piping shall be site routed. The contractor shall complete the job within quoted rate.

17.2.8
Overhauling, cleaning, revisioning, 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.

17.2.9
Certain instrumentation like pressure switches, air sets, filter regulators, pressure gauges, and junction boxes, power Cylinders, dial thermometers, flow meters, valve actuators, flow indicators etc. are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration. Mounting of such instruments will be done by the erection agency.

17.2.10
Contractor shall provide the following for GTG set and balance of plant equipments and other related equipments with auxiliaries' erection:

1) Temporary bolts of required size for honing of generator coupling
2) Spanner & torque wrench/bolt stretching device for stretching / tightening of load and accessories coupling bolts.

17.2.11
Rain hood protection shall be provided for the equipments e.g. Fuel/HSD, naphtha forwarding skid located outside/ in open space.

17.2.12
The FRP Cooling tower will be erected by Original Equipment Manufacturer, However the connected system / piping / Pumps / Fans/ Cooling water treatment system etc. of these tender specification have to be hooked up with above FRP Cooling tower. Contractor under these tender specifications shall extend all the necessary help / assistance to OEM vendor to complete the work and shall carry out the all interface /terminal point works of connecting the piping, welding of flange joints etc. as per instructions of BHEL Engineer at site.

17.2.13
The supply, fabrication and erection of DM water tanks carried out by Original Equipment Manufacturer, However the connected system / piping / Pumps etc. of these tender specifications have to be connected up with above DM water tank. Contractor under these tender specifications shall extend all the necessary help / assistance to OEM vendor to complete the work and shall carry out the all interface /terminal point works of connecting the piping, welding of flange joints etc. as per instructions of BHEL Engineer at site

18 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT OF HRSG, GT, GTG & AUXILIARIES

18.1
Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL / Customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits have to be checked and logged by the Contractor. The permanent benchmark / reference marks will have to be transferred to new locations with sufficient care to maintain the accuracy and protected / preserved with adequate care (to enable rechecking at later dates) as per BHEL instruction.

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

18.2
All temporary foundations and anchor points required for installing erection Equipments and winches, foundations for pumps, tanks etc are in the scope of Contractor. All building materials like cement, steel including re-inforcement bars, grits cements etc for such temporary foundations shall have to be arranged by the Contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.

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

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

18.3
Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the leveling of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact between the two surfaces.

18.4
BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL, will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting / chiseling / grinding and de-burr the same. However, machining of the packers wherever necessary, shall be arranged by contractor.

18.5
Complete grouting of structures equipments, including anchor/ foundation bolts, beneath base, base hollows etc, as may be applicable, is included in the scope of Contractor. Arranging all labour, building materials including cement, ordinary portland as well as quick setting – free flow -

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

18.6
After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.

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

19.1 WELDING

19.1.1
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.

19.1.2
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.

19.1.3
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.

19.1.4
Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

19.1.5
Before any welder is engaged on work, he shall be tested and qualified by BHEL/ customer, though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason. All the expenditure in testing/qualification of the Contractor's welder shall be borne by Contractor.

19.1.6
Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

19.1.7
The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. For this consumables like paint /primer etc will be in the Contractor's scope.

19.1.8
HP joint fit-up, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The Contractor shall arrange consumables like protective paints/tapes etc.

19.1.9
The Contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability of the welds shall be final.

19.1.10

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

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

19.1.11
Joint fit up will be a stage of inspection. Where required, joints shall be offered for visual inspection after root run. Subsequent welding should be made only after the approval of root run.

19.1.12 SOCKET WELDING:

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

19.1.13
Welding electrodes have to be stored in enclosures having temperature and humidity control arrangements. This enclosure shall meet BHEL specifications.

19.1.14
Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the welding electrodes have to be carried in portable ovens.

19.2 HEAT TREATMENT:

19.2.1
For the purpose of temperature recording of stress relieving process, thermocouples have to be attached to the weld joint. The number of temperature measuring points and locations shall be as per the standards of BHEL. Thermocouples have to be attached using capacitor discharge type portable thermocouple attachment unit. Contractor shall arrange sufficient number of thermocouple attachment units.

19.2.2
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.

19.2.3
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.

19.2.4
In certain cases only the pre-heating of weld joints may be called for.

19.2.5
For weld joints of heavy structural sections, if heat treatment is required, the same shall be carried out as part of the work.

19.2.6
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.

19.2.7
Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the Contractor in accordance with BHEL engineer's instructions. Where the electric resistance heating method is adopted Contractor shall make all arrangement including heating equipment with automatic recording devices, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

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

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

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

19.2.8
All the recorded graphs for heat treatment shall be handed over to BHEL/ IBR authorities and due clearances obtained.

19.2.9
During welding & post weld heat treatment of main steam piping (P-91 material), the induction heating process shall continue un-interrupted. Therefore, contactor shall arrange back-up DG set to take care of power interruptions during the process.

19.2.10
Results of these processes shall be verified/ validated as per requirements of BHEL/client.

19.3 NON DESTRUCTIVE EXAMINATION:

19.3.1
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.

19.3.2
Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL Engineer. The minimum quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL Engineer/Boiler inspecting authority. Bidder shall also arrange the UT equipment with recording facility at his own cost. Usage of UT equipment shall be as per direction of BHEL engineer. Records of UT shall be produced as per site requirement.

19.3.3
All X-Ray / Gamma Ray films of weld joints shall be preserved properly and be handed over to BHEL/ IBR authorities and requisite clearances shall be obtained by the Contractor.

19.3.4
The field welded joints shall be subject to Dye-penetrate/MPT/RT/ other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

19.3.5
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.

19.3.6
Bidder 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.

19.3.7
100% radiograph of certain sizes in piping have to be taken as per BHEL standards/ drawings.

19.3.8
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.

19.3.9
After stress relieving 5% of UT for all critical lines and 2% of UT for other alloy steel lines to be taken to ensure soundness of joints particularly stress relieving cracks. No separate payment will be made.

19.3.10

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

19.3.11
In the case of P-91 piping wherever radiography is not possible, alternatively ultrasonic test has to be carried out apart from other nde checks.

19.3.12
For piping of thickness less than 25 mm no radiography plugs will be provided radiography shots to be taken by double wall technique or any other method to be adopted in consultation with BHEL engineer at site.

19.3.13
No separate payment for any NDE activities (including radiography) will be made.

20 LINING AND INSULATION

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

2. HRSG & auxiliaries including, but not limited to, ducts, fuel oil Equipments, fans etc
2. GT auxiliaries
3. By-Pass Stack
3. HRSG, GT integral piping and tanks & vessels
4. External / Field / Power cycle piping and critical piping including vessels and tanks & other equipments
5. LP piping and other equipments
6. Other equipments including BOIs, though not listed above but required for completion
7. Deaerator, FST and other auxiliaries, coolers & tanks.
8. Other then above mentioned major items wherever insulation is required and Items are covered in the erection scope of this contract, insulation work also in the scope of this contract.

20.1
The work shall conform to dimension and tolerances specified in the various drawing and documents that will be provided during the execution. if any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by engaging other agencies or departmentally and recoveries will be deducted from Contractor's bills towards expenditure incurred including 30% departmental charges.

20.2
The terminal points as decided by BHEL shall be final and binding on the Contractor.

20.3
All insulation and refractory materials including iron components and outer sheet casing materials, cladding sheets etc required will be supplied by BHEL and the same have to be erected/ applied as per the drawings and specifications of BHEL by the Contractor.

20.4
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during all stages of work. Scaffolding materials (poles, gratings etc) shall be of light weight construction. Contractor shall arrange steel pipes & clamps with accessories like base plate attachment, fixing pins, struts etc for scaffolding required for this work. However, BHEL's decision in this regard shall be final and binding. Contractor shall arrange the scaffolding materials in sufficient quantity.

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

20.5

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

20.6
Wool insulation is received at site as loose bonded mattresses in standard sizes. These are to be dressed/cut to suite the equipments. Multiple layers of wool have to be applied as directed and as per drawings and specifications for all equipments/ systems covered under the scope of work.

20.6
Cutting & dressing of insulation bricks to suit the site area of application is incidental to work.

21.7
Removable type of insulation has to be provided for valves fittings, expansion joints etc as per drawing or as directed by BHEL Engineer.

20.8
The cladding and outer casing are aluminum sheets. All relevant specifications and procedures with regards to beading, sealing etc for aluminum sheets have to be adhered to.

20.9
Cladding/outer casing shall be fixed expeditiously, so as to avoid damage to the insulation from the weather.

20.10
The overlapping surface of outer casing/cladding sheet shall be coated with sealing compound, which will be supplied by BHEL free of cost.

20.11
To take care of bimetal corrosion due to variety of metals in contact of each other viz retainer to support, support to outer casing/cladding, cladding-to-cladding etc, suitable paints specified by BHEL, to be applied and/or neoprene rubber packing/strips or any other insert may have to be fixed as required.

20.12
The Contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL Engineer to facilitate inspection by boiler inspector or during commissioning to fix gauges, fittings, instruments etc. these gaps will have to be finished as per drawings at later date by the Contractor at his cost.

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

20.13
A log book shall be maintained by the Contractor for the clearance of the area for application of refractory and insulation. Where the Contractor does the work on his own accord without prior permission, the work should be re-done, at his own cost, where necessitated.

20.14

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

20.15

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

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

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

20.16

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

20.17

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

20.18

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

20.19

HRSG casing, inlet and outlet ducts have to be fully insulated at site with ceramic wool and SS cladding on gas flow path side.

20.20

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

b) 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.

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

d) Outer sheet cladding by fabrication of aluminum 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.

e) 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.

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

g) 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. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.

h) The skin casing plate's 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.

i) wastage allowance for the materials issued shall be as under :-

- Refractory 2%
- Wool insulation 2%
- Cladding sheets 2%

j) The cladding inside the inlet duct, casings etc are of stainless steel material. Some trimming/ finishing required at site during fixing shall also be done as part of work.

20.21

Application of lining and insulation on all piping covered under this Specification is also the part of this work. Similarly, it is applicable for Lining and insulation of TG side auxiliaries such as heaters, de-aerators etc.

21 PAINTING

BHEL/Customer Specification for Shop & Field Painting with regard to surface preparation and final painting with colour codes / scheme for surface preparation and finish paints coating including primer coating for shop and field painting will be given at site at the time of painting work. Contractor shall carry out surface preparation and final painting works as per BHEL/Customer specification and instruction of BHEL engineer at site.

21.1
All the primer, thinner & paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, supervision is in contractor's scope.

21.2
Components of the boiler & auxiliaries will in general be supplied painted by BHEL manufacturing units as per their standard applicable painting schemes. Contractor shall carry out primer and finish painting coats and DFT requirement with colour codes & specifications as per requirement of customer.

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.

21.3
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 for touch-up painting on damaged areas.

21.4
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. Supply of applicable paints and primer is in Bidder's scope.

21.5
All exposed metal parts of the equipment including piping, structures, hand railing, grating etc shall be thoroughly cleaned off dust, rust, scales and other foreign materials by manual or mechanized wire brushing, scrapping, sand blasting etc and the same being inspected and approved by BHEL/customer engineer before application of primer. Afterwards, the above parts shall be finish painted with specified number of coats as per specification.

21.6
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.

21.7
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.

21.8
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.

21.9
Specified drying time shall be permitted from one to another coat.

21.10
This work requires working at higher altitudes from ground level to as high as 65 mtr 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.

21.11
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.

21.12
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.

21.13

In general, painting of structural parts and colour bands, lettering, marking of direction of flow/rotation etc will be carried out by brush painting. However, areas/equipments inaccessible for manual painting have to be painted by spray painting. The decision of BHEL engineer, in this regard, shall be final and binding on the Contractor. 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.

21.14
The Contractor shall provide all the necessary scaffolding materials, temporary structures and necessary safety devices etc, during execution of the work.

21.15
Final painting work shall be started after obtaining clearance from BHEL engineers and as per his instructions.

21.16 PRIMER AND PAINTS FOR FINAL PAINTING

Supply of Paints/Primer/Thinner and application of paints for final painting and all other consumables like brush, cleaning agents etc and all T&P including scaffolding materials, manpower, and supervision is in contractor's scope.

22.1
Testing, pre-commissioning, & commissioning will involve, though not limited to these, various testing e.g. hydro-static pressure, pressure decay tests, leak test, trial runs of equipments; flushing by air, water, oil, steam as applicable; checking/setting various clearances/ parameters, ensuring operation of various equipments free of undue restrictions, chemical **(EDTA)** cleaning & alkali boil out of boiler, steam blowing of the boiler and the critical piping, floating of safety valves, coal firing, trial operation and loading etc are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

22.2
All these tests should be repeated till all the equipments satisfy the requirement / obligations of BHEL to their client and also the relevant statutory authority.

22.3
Contractor shall lay / install necessary temporary piping, pumps, valves, blanks, gauges, cables, switches etc for conduct of hydraulic / pressure test, chemical cleaning, steam / air blowing etc. this may involve cutting of some portion of existing piping / valves, placing of rubber wedges / blanks in the valves and other openings, fabrication and installation of temporary tanks for chemical mixing, temporary access platforms to mixing tanks etc. Where required, bends have to be fabricated / formed at site from random length / size of pipes / structural steel. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work**.**

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

22.4
All materials, equipments necessary for installation of temporary system as above will be supplied by BHEL as free returnable issue in random sizes / lengths. However, servicing, fabrication, erection, dismantling of the same after completion of the process, and handing over back to BHEL stores will be the responsibility of the Contractor.

In accounting of materials following wastage allowances are provided:

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

No wastage allowance for valves & other equipments.

22.5
Fabrication, fit-up, pre-heating, welding, post-weld heating and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test / leakage test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system / line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

22.6

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

22.7
After chemical cleaning / pickling of lubricating system (including oil piping, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems as per instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machinery before and after oil flushing is in the scope of work.

22.8
Transportation of oil drums from customer's / BHEL's stores, filling of oil for flushing, first fill of lubricants and subsequent topping up during trials, tests and commissioning is included in the scope of this contract. The Contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, for various pre-commissioning / commissioning activities / processes mentioned in various clauses, transport of chemicals from BHEL/Customer's stores, charging of chemicals into the system and returning of remaining chemicals and the empty containers of the chemicals to Customer / BHEL stores is the responsibility of the Contractor.

22.9
During trial runs/ tests, pre-commissioning / commissioning, replacing / changing mechanical / other seals of equipments like pumps, removal and cleaning / replacing of filters etc is within the scope of work. Replacement spares for this purpose will be provided by BHEL.

22.10
In case any defect is noticed during tests, trial runs of all equipments and their auxiliaries, such as interferences, rubbing, loose components, abnormal noise or vibration, strain on connected equipment etc the Contractor shall immediately attend to these defects and take necessary corrective measures. Readjustment and/or realignment, if necessary, shall be done as per BHEL engineer's instructions. Claim, if any, for these works shall be governed by relevant clauses of 'General Conditions of Contract provided the cause of such work is not attributable to the Contractor.

22.11

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

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

22.12
During this period, though BHEL/ client's staff will also be associated in the work, the Contractor's responsibility will be to arrange for complete requirement of men and required tools and plants, consumables, scaffolding and approaches etc till such time the commissioned unit undergoes trial operations.

22.13
Commissioning activities will continue till the completion of trial operation. During this period Contractor shall make available the services of separate dedicated workforce comprising of suitable skilled and semi-skilled / un-skilled workmen and supervisory staff alongwith necessary tools and plants, consumables etc.

22.14
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period alongwith BHEL Engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

22.15
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

22.16
At various stages of completion boiler has to be preserved against corrosion either by wet preservation or by dry preservation as per the requirement of BHEL Engineer. Contractor shall carry out the entire incidental jobs like filling up of water, dozing of chemicals and pressurizing the system to the required pressure, change of gas refills etc. The boilers have a permanent N_2 blanketing arrangement.

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

22.17
Commissioning activities will continue till the completion of trial run, trial operation. During this period Contractor shall make available the services of separate dedicated labor force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc.

23.18
It shall be specifically noted that the Contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The Contractor's quoted rates shall be inclusive of all these factors.

22.19
Conducting of performance guarantee test is in the scope of work. Contractor shall install all necessary tapping points, instruments etc and provide necessary assistance in this regard**.**

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

22.20
The Contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the Contractor.

23.2 PRESERVATION & PROTECTION OF COMPONENTS

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

23.3
The Contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.

23.4
Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of Contractor in compliance of this requirement, BHEL will make suitable arrangement at Contractor's risk and cost.

23.5
The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc shall be returned to BHEL stores by the Contractor.

23.6
The Contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilization of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the Contractor. Decision of BHEL on this will be final and binding on the Contractor.

23.7
For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.