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

NO: BHE/PW/PUR/PLT-STG PKG-I/1229

FOR

RECEIPT OF MATERIALS FROM BHEL/CUSTOMER STORES/STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION BETWEEN STORES AND SITE OF WORK, ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING, INSULATION, FINAL PAINTING AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER, TG INTEGRAL PIPING, EQUIPMENT/TANKS/VESSELS, LP BYPASS SYSTEM & ASSOCIATED AUXILIARIES, R.E. JOINTS & B.F. VALVES ETC. OF 1X250 MW NEW PARLT TPS UNIT #3.

AT

NEW PARLI THERMAL POWER PROJECT

MAHARASHTRA STATE POWER GENERATION COMPANY LTD

PARLI VAIJNATH – 431 520

DISTT. BEED, MAHARASHTRA

TECHNICAL BID VOLUME – I

CONSISTING OF:

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

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

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

NO: BHE/PW/PUR/PLT-STG PKG-I/1229

FOR

RECEIPT OF MATERIALS FROM BHEL/CUSTOMER STORES/STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION BETWEEN STORES AND SITE OF WORK, ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING, INSULATION, FINAL PAINTING AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER, TG INTEGRAL PIPING, EQUIPMENT/TANKS/VESSELS, LP BYPASS SYSTEM & ASSOCIATED AUXILIARIES, R.E. JOINTS & B.F. VALVES ETC. OF 1X250 MW NEW PARLT TPS UNIT #3.

AT

NEW PARLI THERMAL POWER PROJECT

MAHARASHTRA STATE POWER GENERATION COMPANY LTD

PARLI VAIJNATH – 431 520

DISTT. BEED, MAHARASHTRA

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

ADDITIONAL GENERAL MANAGER (Purchase)
Place: Nagpur
Date :

CONTENTS			
Volume No	Description	No. of pages	Hosted in website bhel.com as files titled
NIL	Tender Specification Issue Details	2	(Part of **Vol-IA-1229**)
NIL	Notice Inviting Tender	21	(Part of **Vol-IA-1229**)
I-A	Technical Conditions of Contract	79	Vol-IA-1229
I-B	Special Conditions of Contract	47	Vol-IBCD-1229
I-C	General Conditions of Contract	29	(Part of **Vol-IBCD-1229**)
I-D	Forms & Procedures	71	(Part of **Vol-IBCD-1229**)
II	Price Bid Specification	3	Vol II

1229

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: **BHE/PW/PUR/PLT-STG PKG-I/1229** **dated 04/02/2014**

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/PLT-STG PKG-I/1229**	
ii	**Broad Scope of job**	**FOR RECEIPT OF MATERIALS FROM BHEL/CUSTOMER STORES/STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION BETWEEN STORES AND SITE OF WORK, ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING, INSULATION, FINAL PAINTING AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER, TG INTEGRAL PIPING, EQUIPMENT/TANKS/VESSELS, LP BYPASS SYSTEM & ASSOCIATED AUXILIARIES, R.E. JOINTS & B.F. VALVES ETC. OF 1X250 MW NEW PARLT TPS UNIT #3 AT NEW PARLI THERMAL POWER PROJECT MAHARASHTRA STATE POWER GENERATION COMPANY LTD PARLI VAIJNATH – 431 520 DISTT. BEED, MAHARASHTRA**	
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 Regional office at :*** ***Start : 04/02/2014, Time :*** ***Closes: 13/02/2014 , 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	*Applicabl*
v	**DUE DATE & TIME**	***Date : 14/02/2014 , Time : 15:00 Hrs***	*Applicable*

	OF OFFER SUBMISSION	***Place : <u>BHEL PS Regional office at :Nagpur</u>*** Tenders being submitted through representative shall be submitted at dispatch section of of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: • Pratish Gee Varghese/Sr Engineer(Purchase • Shivkesh Meena / Engineer (Purchase)	
vi	**OPENING OF TENDER**	***1 hours after the latest due date and time of Offer submission*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2.00 Lakhs (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Atleast 5 days before the due date of offer submission* *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	*Date :*	*Not applicable.*
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) **<u>and not in the newspapers</u>**. Bidders to keep themselves updated with all such information	

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

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

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

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

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

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

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

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

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

	OUTER COVER	
	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i	o Envelopes I o Envelopes II o Envelopes III	

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

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

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

9.0 Assessment of Capacity of Bidders:

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

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

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

i). Total number of Packages

Total number of Packages in hand = P

Where

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

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

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

i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':

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

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

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

c) Sum 'S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$,.... $S_{1\text{-}N}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}N}$). Similarly S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3, etc for the tendered

scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e 'S_T'= S_1+ S_2+ S_3+ S_4+ S_5+…. S_N.)

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

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	---------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

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

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

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

IV. **Explanatory note**:

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

Table-1

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

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

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

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

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

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

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

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

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

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

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

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

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

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

for BHARAT HEAVY ELECTRICALS LTD

AGM Purchase

Enclosure

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

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**FOR RECEIPT OF MATERIALS FROM BHEL/CUSTOMER STORES/STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION BETWEEN STORES AND SITE OF WORK, ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING, INSULATION, FINAL PAINTING AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER, TG INTEGRAL PIPING, EQUIPMENT/TANKS/VESSELS, LP BYPASS SYSTEM & ASSOCIATED AUXILIARIES, R.E. JOINTS & B.F. VALVES ETC. OF 1X250 MW NEW PARLT TPS UNIT #3 AT NEW PARLI THERMAL POWER PROJECT MAHARASHTRA STATE POWER GENERATION COMPANY LTD PARLI VAIJNATH – 431 520 DISTT. BEED, MAHARASHTRA**
TENDER NO	**BHE/PW/PUR/PLT-STG PKG-I/1229**

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, executed any one of the jobs listed below in the last seven (7) years as on latest date of bid submission (i.e. Bidder must meet B.1 OR B.2 OR B.3) **B.1** Executed Erection Testing & Commissioning (E T & C) of One STG job of one unit of 100 MW or higher OR **B.2** Executed Erection Testing & Commissioning (E T & C) of One GTG job of one unit of 190 MW or higher OR **B.3** Executed E T & C of Atleast One Boiler	**APPLICABLE**	

	(With Rotating Machines upto synchronization) of 400 MW or higher, under direct order of BHEL subject to:- **a)** Experience of (Executed) E T & C of STG of atleast 60 MW OR **b)** Entering into a technical tie up with an agency who has experience of (Executed) E T & C of STG of 60 MW or above		
C-1	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (Audited) of **Rs 86 Lakhs** or more over last three Financial Years (FY) i.e. 2010-2011, 2011-12 & 2012-13	**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		BY BHEL
G	Technical Tie up criteria (if applicable)	APPLICABLE FOR SL No B.3.b	
	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

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

16. <u>Explanatory Notes for PQR 'B.3.b'</u>

a. Agency with BOILER Experience shall be called as 'Prime Bidder' and the agency satisfying B.3.b shall be called as 'Tie-up Partner'

b. Prime bidder and Tie-up Partner shall meet their respective technical Pre qualifying Criteria.

c. Prime bidder shall meet all other Pre-Qualifying Criteria of the Tender

d. Prime Bidder shall be responsible for overall execution of the Contract.

e. Tie-up partner shall provide Technical Supervision and support to the Prime Bidder for execution of job.

f. Tie-up Partner shall submit Security Deposit (SD) equivalent to 2 % of Total contract value in addition to the SD to be submitted by the Prime Bidder for the Contract Value.

g. Prime bidder and the Tie-up partner are required to enter into a Tie-up Agreement with a validity period of Six months initially (During submission of tender). Thereafter both the agencies shall extend the validity of the agreement for the entire contract period, if the work is awarded.

h. In case Tie-up partner backs out, another Tie-up partner meeting the QR shall be engaged by the Prime Bidder.

i. In case Prime bidder backs out, the whole contract shall be considered cancelled and short closed

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

ANNEXURE - 2

CHECK LIST

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

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

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

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE 3

IMPORTANT INFORMATION

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

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

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

   i. Notice Inviting Tender: Sl No 9

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

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

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

5. **PRICE VARIATION CLAUSE**

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

6. **OVER RUN COMPENSATION**

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

7 Broad Terms & Conditions of Reverse Auction

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

7.1. Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

7.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid" in the Reverse Auction. Non-submission of „online sealed bid" by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

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

7.4. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit 'online sealed bid' in the Reverse Auction. Non-submission of 'online sealed bid' by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.

7.5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

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

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

7.8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

7.9. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

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

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

7.12. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.

7.13. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL"s standard practice.

7.14. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint

themselves of the “Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.

7.15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

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

7.17. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

1229

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

1.0 Project Information

1.1 INTROUCTION

The owner Maharashtra State Power Generation Company Limited is setting up a New 1x250MW Thermal power station named as New Parli Power Project Unit #3. The project is about 6 KM From the existing Parli Thermal Power Station.
This tender is for 3RD unit of New Parli Power project.

APPROACH TO SITE

Nearest railway station: Parli Railway station under South Central Railway. This project shall be connected to the Parli Vaijnath Rly siding as well as existing Rly Siding through broad guage rail system.

Site is also approachable by all weather Parbhani-Parli road.

Nearest Airport : Nanded about 130 KM & Aurangabad about 221 KM.

CLIMATE

1. Maximum temperature	:	48-50 Deg Celcius
2. Minimum temperature	:	6-8 Deg Celcius
3. Maximum Relative Humidity	:	91%
4. Minimum Relative Humidity	:	18%
5. Average Annual rainfall	:	860 mm
6. Seismic Zone	:	II
7. Height above MSL	:	433.5 M

2.0 SCOPE OF WORK

THE ERECTION, TESTING AND COMMISSIONING WORK OF STG & AUX PACKAGE AT 1X250 MW MAHAGENCO NEW PARLI#3 WAS UNDER EXECUTION BY OTHER AGENCY AND AGENCY HAS ALREADY DONE SOME WORKS. THE SCOPES OF WORK UNDER THIS CONTRACT ARE FROM ALL BALANCE WORKS ISOLATED FROM THE SCOPE OF PREVIOUS AGENCY. SCOPE OF WORK WILL START FROM AS IS WHERE IS CONDITIONS AND CONTRACTOR HAS TO COMPLETE ALL THE WORKS UNDER THE SCOPE OF THIS CONTRACT IN ALL RESPECT FOR ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION, PG TEST AND ATTENDING THE ALL PENDING / PUNCH POINTS.

PRESENT STATUS OF BALANCE WORK, FROM WHERE FURTHER WORKS ARE TO BE CARRIED OUT UNDER THE SCOPE OF THESE TENDER SPECIFICATIONS, IS BROADLY AS UNDER:

SN	Equipments / Area Description	Status
1	Steam Turbine	HP turbine and IP turbine modules placed in position, HP Turbine Exhaust flange fixed in position. LP Turbine Longitudinal Girders (both left and right) placed in position, Interceptor Valve (IV valve) frame blue matching partially carried out.
2	Generator	Stator placed on foundation, End shields blue matching partially done.
3	Heat Exchangers (Condenser, Heaters and Coolers)	
3.1	Condenser	06 TSPs welding carried out. LP Heater support erection partially carried out.
3.2	H.P. & L.P. Heaters	LPH2, LPH3, HPH5 & HPH6 placed in position
3.3	GSC and Drain Cooler	Drain Cooler in position.
4	Condensate Extraction Pumps	Both CEP placed in position.
5	Debris Filters, Re joints, Me Bellows, Dirty, Clean oil tanks, Enclosures, CO2/H2 cylinder racks etc	Dirty, Clean oil tank in position.
6	Erection / Testing and Commissioning of Main Oil Tank, MOP, JOP,EOP,AOP, Centralized Lube Oil Purification System, Along with All Auxiliaries	MOT, Oil Coolers and Oil Centrifuges are placed in position. Oil coolers foundation bolts grouting completed. Lube oil piping partially erection carried out.
7	Erection , Testing & commissioning of control fluid tanks, C.F coolers, C.F pumps , Purification unit Etc.	Control fluid tanks, C.F coolers, C.F pumps, Purification unit Placed in position.

8	Erection , Testing & commissioning of condenser on load tube cleaning package/condensate transfer pumps	Not started
9	Erection , Testing & commissioning of misc Hoist & chain pulley blocks	Not started
10	TG Integral Piping	Seal steam piping and Lube oil piping partially carried out.
11	Flash Tank & Flash Vessels	H.P, L.P. and unit flash tank placed in position.
12	Insulation	Not started
13	R.E. Joints and Butterfly Valves	Not started

ABOVE TABLE OF BALANCE WORK STATUS IS TENTATIVE AND ONLY TO PROVIDE THE GENERAL IDEA AND STATUS OF BALANCE WORK, HOWEVER BIDDER IS ADVISED TO VISIT THE SITE AND GET FULL DETAILED STATUS OF BALANCE WORK AND GET ACQUAINTED WITH THE SITE CONDITIONS AND SITUATIONS PREVAILING AT SITE AND NEAR BY.

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

Collection of materials from BHEL/client's stores/storage yard; transportation to site; erection, testing & assistance for commissioning, trial operation, PG Test and handing over of the following:-

1. Steam Turbines & Turbo Generators along with associated equipment.
2. Condensate system comprising of Surface condenser, Gland steam Condenser.
3. Regenerative cycle auxiliaries comprising of CEP, LP Heaters, HP Heaters along with associated Auxiliaries and piping.
4. LP Bypass system
5. 2x100% Condenser air evacuation system
6. Central Lube oil storage & transfer system (common for Turbine Generator set) with associated piping.
7. TG integral piping
8. External piping
9. Thermal insulation refractory & cladding of piping & equipments.
10. BFV's RE joints and debris filter.
11. Condenser On load Tube cleaning system.
12. Special grouts like Pagel VI for grouting for TG.
13. Empty H2 & CO2 cylinder.
14. Filling & top up of H2, CO2 & N2, lube oil, lubricants and consumable till handing over.
15. Generator Hydrogen gas purity analyzer including all accessories like piping, valves, flanges etc.
16. Operating platforms around local platforms for various inaccessible valves and equipment etc

17. Painting of all erected equipments and structures.

of 1x250 MW New Parli # 3.

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

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Open space for labour colony (as per availability)		Yes	
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	**ELECTRICITY**			
3.2.1	**Electricity For construction purposes** of Voltage 415/440 V	Yes		Free; however, bidder shall be required to pay for electricity duty and taxes as levied by the Govt at the prevailing rates
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	**Electricity for the office, stores, canteen etc of the bidder**			Chargeable as per standard rates

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**			Chargeable as per standard rates
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	**WATER SUPPLY**			

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.3.1	**For construction purposes**			Free; duty & taxes, if levied by the Govt, shall be payable by the bidder
a	Making the water available at single point	Yes		In case of inadequate supply / non-availability of construction water from customer, contractor shall have to arrange construction water at his own expenses.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	**Water supply for bidder's office, stores, canteen etc**			
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			
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**			

Sl.No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Telephone, fax, internet, intranet, e-mail etc		Yes	
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 drawings for all the equipments covered under this scope	**Yes**		
b	Drawings for construction methods	**Yes**		
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		**Yes**	In consultation with BHEL
d	Shipping lists etc for reference and planning the activities	**Yes**		
e	Preparation of site erection schedules and other input requirements		**Yes**	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	**Yes**	**Yes**	In consultation with BHEL
g	Weekly erection schedules based on Sl No. e		**Yes**	In consultation with BHEL
h	Daily erection / work plan based on Sl No. g		**Yes**	In consultation with BHEL

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

A: MAJOR TOOLS AND PLANTS & MMDs TO BE DEPLOYED BY THE CONTRACTOR

S.N.	DESCRIPITION	CAPACITY	QUANTITY
1	CRANES	OF SUITABLE CAPACITY	AS PER REQUIREMENT
2	TRAILER WITH HORSE	OF SUITABLE CAPACITY	-DO-
3	TRAILER TROLLEY	OF SUITABLE CAPACITY	-DO-
4	WELDING GENERATOR SETS (ELECTRIC AS WELL AS DIESEL)		AS PER REQUIREMENT
5	3- PHASE COMPLETE SET UP FOR DRAWAL OF POWER		-DO-
6	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURSE AND FILM VIEWER		-DO-
7	TIG WELDING SET		-DO-
8	STRESS RELIEVING EQUIPMENT WITH TEMPERATURE RECORDERS		-DO-
9	ELECTRICAL BAKING OVEN – BIG		-DO-
10	ELECTRODE BAKING OVEN – PORTABLE		-DO-
11	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS		-DO-
12	VACUUM CLEANER (INDUSTRIAL)		-DO-
13	PIPE CUTTING AND BEVELLING MACHINE		-DO-
14	PIPE BENDING M/C	ELECTRIC/ ELECTRO - HYDRAULIC - UPTO 4" SIZE	-DO-
15	AIR COMPRESSOR	120 CFM	AS PER REQUIREMENT
16	STEP DOWN TRANSFORMER	230V/24V	AS PER REQUIREMENT
17	CONDENSER TUBE EXPANDER SET		DO
18	ELECTRICALLY OPERATED WINCHES	3T/5T	DO
19	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES (FOR ST. TURBINE ROLL CHECKS ETC.)		DO
20	**HYDRAULIC JACKS OF VARIOUS CAPACITIES FOR ST. TURBINE AND GENERATOR :**		
	A) - JACKS (WITH HAND OPERATED PUMPS)	100 MT	04 NOS.
	B) - JACKS (WITH HAND OPERATED PUMPS)	50 MT	04 NOS.
	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :		
	A) - JACKS (HAVING BROAD BASE ONE INCH LIFT)	100 MT	04 NOS.
	B) - JACKS (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	63 MT	04 NOS.
	C) - LONG HIGH PRESSURE HOSES (FOR		08 NOS.

	GENERATOR ALIGNMENT)		
ABOVE JACKS FOR GENERATOR ALIGNMENT SHOULD HAVE SUITABLE COUPLING FOR JOINING THE TWO OR MORE HOSES TOGETHER TO GET DESIRED LENGTH OF HOSES, SHOULD HAVE HAND OPERATED PUMPS & ALSO SHOULD BE ABLE TO FIT WITH HYDRAULIC UNIT.			
21	TORQUE WRENCH	0 TO 200 N-M	01 NO.
22	TORQUE WRENCH	UPTO 2000 N-M	01 NO.
23	SLINGS FOR LP TURBINE ROTOR		01SET
24	SLINGS FOR HP & IP TURBINE MODULE		01SET
25	SLINGS FOR GENERATOR ROTOR		01SET
26	SLINGS FOR OTHER EQUIPMENTS / ITEMS		AS PER REQUIREMENT
27	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FOUNDATION BOLTS)		AS PER REQUIREMENT
28	LONG FEELER GAUGE SET		AS PER REQUIREMENT
29	SPANNERS / EYE BOLTS (OF ALL SIZES)		AS PER REQUIREMENT
30	HYDRAULIC TEST PUMPS AND FILL PUMPS		AS PER REQUIREMENT
	ANY OTHER MAJOR T&P REQUIRED FOR SATISFACTORY COMPLETION OF THE WORKS.		
30			

B: MEASURING AND MONITORING DEVICES (MMD):

To be finalized at site as per requirement.

NOTE:

The above list at A & B is only indicative and neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL engineer and required for completion of work.

SN	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	130/30 MT EOT CRANE IN TG HALL	2 Nos.	FOR HANDLING AND ERECTION WITHIN TG HALL ON SHARING BASIS AS AVAILABLE AND SUBJECT TO THEIR ACCESSIBILITY AND APPROACHABILITY.

NOTE:

1. **Operator for EOT crane will be provided by the contractor.**

2. EOT crane will be used on sharing basis by other agencies working within the TG hall under the instruction of BHEL. The contractor shall extend the services of his operator to such other agencies as well on mutually agreed mode of cost sharing.

3. Above T&P will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use.

6.1 MOBILIZATION, TIME SCHEDULE & CONTRACT PERIOD

6.1.1
INITIAL MOBILIZATION

Contractor shall reach at site, make his site establishment ready to commence the erection work within 10 days from the date of issue of Fax Letter of Intent or as per the directions of Construction Manager/ Project Manager of BHEL.

6.1.2
MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC

The activities for erection, testing etc shall be started as per the 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 the requirement to commence the work of erection, testing etc of TG and auxiliaries and progressively augment the resources to match schedule of the project.

6.1.3
COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on its designated foundation/location, of the first major permanent equipment/component/column or start of any major activity/ Alignment of major equipment covered in the scope of these specifications shall be recognized as "start of contract period" and same shall be as certified by BHEL at site. Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.

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

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

ACTIVITY	TENTATIVE SCHEDULE OF MILESTONE
Boiler Light Up	**Mar-14**
Hydro test of Condenser	**May-14**
Turbine Box up	**Jun-14**
Barring Gear	**Jul-14**
Rolling & Synchronization	**Aug-14**
Completion of Trial Operation	**Sep-14**
PG Test & Completion of all facilities	**Oct-14**

In order to meet above milestone schedule in general and any other intermediate targets set or revised / squeezed milestone schedule given by BHEL, to meet customer/ project schedule requirements, contractor shall arrange & augment all necessary resources from time to time as per the instructions of BHEL.

6.1.4

DURATION

The total contract period for completion of entire work shall be **08 (Eight) months** from the start of erection. Erection of the first major equipment on its permanent location/ foundation or start of any major activity / Alignment of major equipment covered in the scope of these specifications shall be recognized as "start of contract period" and same shall be as certified by BHEL at site. Erection of small components like packer plates, insert plates, etc. will not be considered for this purpose.

However the contractor shall have to mobilize his resources earlier than the start of contract period for preparatory work.

The contractor shall complete all the works in the scope of this contract within the contract period. Pending points identified by the customer/BHEL during the execution of the contract are to be liquidated during the contract period itself. Contractor to carry out installation of impulse pipes, fittings, thermowells /thermo couples etc required for successful completion of Performance Guarantee test and provide in assistance for installation & removal of PG test instruments and conductance of test.

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

FOR EACH STG

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
	Overall weightage for each area out of lumpsum value quoted for STG	**20%**	**20%**	**12%**	**10%**	**10%**	**12%**	**16%**	
Sl. No.	**Activity/Work Description**	**%**							-
I	**PRO RATA PAYMENTS (85%)**								-
1	**CONDENSER (weightage 20%)**								-
1.1	PREPARATION OF FOUNDATION (Balance work)	1%			--			--	-
1.2	PLACEMENT, ALIGNMENT, ASSEMBLY AND WELDING OF BOTTOM PLATE SEGMENTS, HOT WELL, NDT AND SPRING ELEMENTS PLACEMENT & GROUTING. (Balance work)	2%			--			--	-
1.3	ASSEMBLY AND POSITIONING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY (Balance work)	2%		--	--			--	-
1.4	ASSEMBLY, ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC. (Balance work)	4%		--	--			--	-
1.5	ASSEMBLY, WELDING & NDT OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING AND STEAM THROW DEVICE, LPH-1 SUPPORT ETC. (Balance work)	4%		--	--			--	-
1.6	INSERTION, EXPANSION, CUTTING ETC. OF CONDENSER TUBES	30%		--	--			--	-
1.9	HYDRO TEST OF STEAM AND WATER SIDE	16%		--	--			--	-
1.10	WELDING OF CONDENSER NECK JOINT AND NDT& COMPLETION OF BALANCE WORKS	20%		--	--			--	-
1.11	ERECTION, COMMISSIONING, LOAD TESTING OF CONDENSER WATER BOX HANDLING SYSTEM	6%		--	--			--	-

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
	Subtotal for condenser	**85%**							-
2	**TURBINE (20 %)**							--	-
2.1	PREPARATION OF FOUNDATION, PLACEMENT, ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS (Balance work)	--	1%		--			--	-
2.2	PLACEMENT AND ALIGNMENT OF LP OUTER CASING BOTTOM PORTION AND CENTRE GUIDE KEYS (Balance work)	--	1%		--			--	-
2.3	PLACEMENT OF LP ROTOR AND ALIGNMENT WITH INNER CASING AND CHECKING OF BLADE CLEARANCE	--	10%		--			--	-
2.4	ASSEMBLY, ALIGNMENT & WELDING OF LP OUTER CASING UPPER HALF	--	10%		--			--	-
2.5	PLACEMENT AND ALIGNMENT OF IP TURBINE (Balance work)	--	6%		--			--	-
~~2.6~~	~~PLACEMENT AND ALIGNMENT OF IP ROTOR WITH LOWER CASING AND BOXING UP OF INNER & OUTER CASING (UPPER HALVES) & ROLL CHECK~~	~~--~~	~~0%~~	-	~~--~~	-	-	~~--~~	-
~~2.7~~	~~FINAL BOX UP OF IP TURBINE~~	~~--~~	~~0%~~	-	~~--~~	-	-	~~--~~	-
2.8	BOXING UP OF LP INNER-INNER & INNER- OUTER AND ROLL CHECK	--	7%		--			--	-
2.9	PLACEMENT OF HP TURBINE, LOWERING OF HP ROTOR ON BEARINGS AND CHECKING OF CLEARANCES, COUPLING, HP TURBINE SWING CHECKS ETC. (Balance work)	--	6%		--			--	-
2.10	ALIGNMENT OF ALL ROTORS INCLUDING REAMING, HONING AND FIXING OF COUPLING BOLTS		10%						-
2.11	ASSEMBLY OF GOVERNING SYSTEM/EQUIPMENT		5%						-
2.12	INSTALLATION OF ESVS, IVS, LPBP VALVES, MS STRAINERS (INTERNALS), HRH STRAINERS (INTERNALS)	--	10%		--			--	-
2.13	ERECTION, ALIGNMENT AND WELDING OF CROSS AROUND PIPING	--	6%		--			--	-
2.14	FINAL BOX-UP OF LP TURBINE	--	7%		--			--	-

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
2.15	ASSEMBLY AND PREPARATION OF HYDRO-TEST, STEAM BLOWING DEVICES AND NORMALISATION ETC.	--	0%		--			--	
2.16	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION	--	6%		--			--	
	Subtotal for Steam Turbine		**85%**						
3	**TURBO GENERATOR (12%)**	--		--	--			--	
3.1	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES (Balance work)	--		1%				--	
3.2	LIFTING, LEVELLING AND ALIGNMENT OF STATOR (including erection and dismantling of portal crane if used for stator lifting) (Balance work)			16%				--	
3.3	FIXING OF END SHIELDS ON TO FOUNDATION BEAMS (Balance work)	--	--	5%				--	
3.4	ROTOR INSERTION (Balance work)	--	--	8%				--	
3.5	BOXING UP OF GENERATOR AND ASSEMBLY OF HYDROGEN SEALS	--	--	12%				--	
3.6	ALIGNMENT OF GENERATOR ROTOR WITH LP TURBINE ROTOR, RUN-OUT CHECKS AND REAMING, HONING OF COUPLING HOLES AND FIXING OF COUPLING BOLTS	--	--	10%				--	
3.7	ERECTION OF EXCITATION EQUIPMENTS & ALIGNMENT OF GEN.-EXCITER ROTORS INCLUDING SWING CHECK AND COMPLETION OF BALANCE WORKS	--	--	12%				--	
3.8	INSTALLATION OF ENCLOSURES OF GENERATOR/EXCITER WITH ALL AUXILIARIES	--	--	7%				--	
3.9	GROUTING OF GEN BEARING PEDESTALS AND EXCITOR	--	--	7%				--	
3.10	FINAL GAS TIGHTNESS TEST OF STATOR WITH COMPLETE SYSTEM	--	--	7%				--	
	Subtotal for Generator			**85%**					
4	**PUMPS AND AUXILIARIES (10 %)**	--	--		--			--	

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
4.1	ERECTION / TESTING and commissioning OF MAIN OIL PUMP, JOP, EOP, AOP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES (Balance work)	--	--		60%			--	
~~4.2~~	~~ERECTION / TESTING and commissioning OF THREE MOTOR DRIVEN BFP, ALONG WITH ALL AUXILLIARIES~~	-	-	-	~~0%~~	-	-	-	
~~4.3~~	~~ERECTION, TESTING, GROUTING ETC. OF DMCW (BOILER & TG) PUMPS~~	~~--~~	~~--~~	~~--~~	~~0%~~	-	-	~~--~~	
4.4	ERECTION, TESTING, GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS (Balance work)	--	--	--	25%			--	
	Subtotal for pumps and Auxiliaries				**85%**				
5	**HEATERS AND DEAERATORS (10%)**								
5.1	ERECTION, TESTING & COMMISSIONING OF HP & LP HEATERS (Balance work)	--	--	--		40%		--	
5.2	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLERS (Balance work)	--	--	--		45%		--	
~~5.3~~	~~ERECTION, TESTING & COMMISSIONING OF DE-AERATOR, FEED STORAGE TANK AND ASSOCIATED APPROACH PLATFORM WITH LADDERS ETC.~~	~~--~~	~~--~~	~~--~~	-	~~0%~~	-	~~--~~	
	Subtotal FOR HEATERS AND DEAERATORS	**--**	**--**	**--**		**85%**		**--**	
6	**MISCELLANEOUS ITEMS (12%)**								
6.1	DEBRIS FILTERS, RE JOINTS, ME BELLOWS, DIRTY, CLEAN OIL TANKS, ENCLOSURES, CO2/H2 CYLIDER RACKS ETC (Balance work)						20%		
~~6.2~~	~~CW PUMPS, RELATED ITEMS~~	~~--~~	~~--~~	~~--~~	-	-	~~0%~~	-	
~~6.3~~	~~ACW PUMPS, RELATED ITEMS/ BOILER FILL PUMPS~~	~~--~~	~~--~~	~~--~~	-	-	~~0%~~	-	
6.4	ERECTION, TESTING & COMMISSIONING OF CONTROL FLUID TANK, C.F. COOLERS, C.F. PUMPS, PURIFICATION UNIT ETC. (Balance work)	--	--	--			10%		
6.5	ERECTION, TESTING & COMMISSIONING OF FLASH TANKS & FLASH VESSELS (Balance work)	--	--	--			10%		

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
~~6.6~~	~~ERECTION, TESTING & COMMISSIONING OF PLATE HEAT EXCHANGER PACKAGE~~	~~--~~	~~--~~	~~--~~	-	-	~~0%~~	-	-
6.7	ERECTION, TESTING & COMMISSIONING OF CONDENSER ON LOAD TUBE CLEANING PACKAGE/ CONDENSATE TRANSFER PUMPS	--	--	--			25%		-
~~6.8~~	~~ERECTION, TESTING & COMMISSIONING OF SELF CLEANING STRAINER PACKAGE~~	~~--~~	~~--~~	~~--~~	-	-	~~0%~~	-	-
6.9	ERECTION, TESTING & COMMISSIONING OF MISC. HOISTS & CHAIN PULLEY BLOCKS.						20%		-
	Subtotal for MISCELLANEOUS ITEMS						**85%**		-
7	**INTEGRAL PIPING (16%)**	--	--	--				--	-
7.1	Turbine Integral piping and Generator Integral piping consisting of Lube oil, Jacking oil, Oil vapour extraction, Seal Oil, Control oil, Seal steam, Condensate spray/Exhaust Hood spray, Turbine water drainage, Gas Piping, Primary Stator Water piping, etc including all accessories like thermowells, probes, orifices etc and hangers and supports (Erection and commissioning on prorata basis)	--	--	--				85%	-
	Total for integral piping							**85%**	-
~~8~~	~~**PIPING**~~	-	-	-	-	-	-	-	-
~~8.1~~	~~ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION TO BE PAID ALONG WITH PLACEMENT IN POSITION)~~	-	-	-	-	-	-	-	~~0%~~
~~8.2~~	~~PLACEMENT IN POSITION~~	-	-	-	-	-	-	-	~~0%~~
~~8.3~~	~~ALIGNMENT~~	-	-	-	-	-	-	-	~~0%~~
~~8.4~~	~~WELDING/BOLTING/FIXING~~	-	-	-	-	-	-	-	~~0%~~
~~8.5~~	~~COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be clubbed with next activity)~~	-	-	-	-	-	-	-	~~0%~~
~~8.6~~	~~HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG~~	-	-	-	-	-	-	-	~~0%~~
~~8.7~~	~~HYDRAULIC TEST/PNEUMATIC TEST WHERE EVER APPLICABLE~~	-	-	-	-	-	-	-	~~0%~~
	Total for Prorata (85%)	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	~~**0%**~~

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATORS (5)	MISCELLANEOUS ITEMS (6)	INTEGRAL PPG (7)	~~PIPING (8) ON PER MT BASIS~~
II	**STAGE/MILESTONE PAYMENTS (15%)**								-
1	Boiler Light Up	0%	0%	0%	0%	0%	0%	0%	~~0%~~
2	ABO	0%	0%	0%	0%	0%	0%	0%	~~0%~~
3	Steam Blowing	0%	0%	0%	0%	0%	0%	0%	~~0%~~
4	Safety Valve Floating	0%	0%	0%	0%	0%	0%	0%	~~0%~~
5	Oil Flushing (TG)	1%	1%	1%	1%	1%	1%	1%	~~0%~~
6	Barring Gear (TG)	1%	1%	1%	1%	1%	1%	1%	~~0%~~
7	Rolling and Synchronisation	3%	3%	3%	3%	3%	3%	3%	~~0%~~
8	Coal Firing	0%	0%	0%	0%	0%	0%	0%	~~0%~~
9	Full Load	2%	2%	2%	2%	2%	2%	2%	~~0%~~
10	Trial Operation of Unit	2%	2%	2%	2%	2%	2%	2%	~~0%~~
11	Painting (including arrow marking, nomenclature, etc)	2%	2%	2%	2%	2%	2%	2%	~~0%~~
12	Area cleaning, temporary structures cutting/removal and return of scrap	1%	1%	1%	1%	1%	1%	1%	~~0%~~
13	Punch List points/pending points liquidation	1%	1%	1%	1%	1%	1%	1%	~~0%~~
14	Submission of 'As Built Drawings'								-
15	Material Reconciliation	1%	1%	1%	1%	1%	1%	1%	~~0%~~
16	Completion of Contractual Obligations	1%	1%	1%	1%	1%	1%	1%	~~0%~~
	Total for Milestone/Stage payments (15%)	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**~~0%~~**
									-
	Total of I & II	**100 %**	**100%**	**100 %**	**100%**	**100%**	**100%**	**100 %**	**~~0%~~**

Note:

- Wherever application of INSULATION is applicable, same shall be covered under the respective item/equipment for 'Terms of Payment'.

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

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

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

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.

SPECIFIC INCLUSIONS

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

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

9.3
Servicing and assembly of control valves/regulating valves, fixing of filter elements/strainers & steam blowing & blanking devices in LP bypass, MS strainer, HRH strainer & and blanking of LP bypass, ESV & IV system, for hydro test, steam blowing etc is the part of scope of work.

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

9.5
Complete control fluid system of LP bypass system is included in this specification. Associated assistance for commissioning like lube oil flushing, filling and topping up of lube oil etc shall be part of the work.

9.6
Assembly and installation of strainer elements of MS and HRH system is within the scope of work. Cleaning of these strainer elements during trial operation of machine is also covered under this scope.

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

9.8
Most of the Misc. Pumps with drive motors, base frame, fittings etc will be supplied in loose parts/ dismantled condition as skid mount. These pumps along with drive and fittings shall be assembled at site. The Delivery will be taken from BHEL stores/storage yard and will be assembled/ installed at different locations as per drawing and instruction of BHEL Engineer at site. The work involved is preservation, assembly, installation, erection, alignment, foundation grouting including providing non-shrink free flow grout mix material, fixing of loose items, filling

of lubricants, greasing, commissioning, no load/ load trial run of motors & pumps. All the works shall be carried our as part of scope of work.

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

9.9

Electric wire rope hoists shall be erected tested and commissioned for vacuum pump motor handling and CW butterfly valves handling. Chain pulley blocks with trolley (manual operated) shall be erected, tested and commissioned for control fluid system, central lube oil system etc.

9.10

CONSUMABLES

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

9.11

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

9.12

PRIMERS & PAINTS

BHEL will provide paint & primer for final painting only. Primers and paints for other requirements are in contractor's scope.

9.13

WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

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

9.14

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

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

9.15

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

9.16

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

10.0 EXLUSIONS

The following are specific exclusions from the scope of work/ specification:-

A) All cable connections, except those specified as scope of work.

B) Measuring instruments, monitoring, relaying, protection and signaling equipments other than those supplied with the equipments by / on behalf of BHEL and which have been indicated as scope of work.

C) Erection, testing and commissioning of electrical panels and starting resistors for DC JOP and DC EOP pumps

D) Electrical testing of motors, turbo-generator. However erection of these items will be under the scope of this tender specification.

E) Impulse piping and fittings from the tapping points of various equipments other than those specified as scope of work.

F) Civil works to the extent not specifically provided for in this tender.

G) Supply of materials for temporary piping (pipe, valve, structural steel etc.) required for hydraulic test, chemical cleaning, flushing or steam/air blowing of the pipelines.

H) Supply of chemicals and lube oil for pre-commissioning and commissioning activities.

I) Some sub-delivery items and electrical components such as push-buttons, junction boxes etc.

J) E&C work of cable trays, cables and earthing etc

K) All electrical and control & instrumentation items except those specified elsewhere in these specifications.

L) Supply of primer and paints for final painting

M) Pneumatic copper tubing and fittings thereof.

N) Application of spray insulation of steam turbine.

O) E&C of CW / ACW / Pumps.

P) E&C of DMCW / ECP Pumps.

Q) E&C of Boiler Fill Pumps, Boiler Feed Pumps.

R) E&C of Plate type heat exchangers, self cleaning strainers of Power Cycle Piping.

S) E&C of Power Cycle Piping (80 Group)

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
A.	**STEAM TURBINE:**		
1.	HP TURBINE	5060x3100x2900	56100
2.	HP INLET ASSY.	450X450X200	45
3.	HP EXHAUST ASSY.	1625X1335X675	1378
4.	HPT RELATED PARTS	1000X1000X500	190
5.	FRONT BEARING PEDESTAL	2950X2600X1600	12386
6.	PARTS OF FRONT BEARING	1800X1700X1000	600
7.	PARTS OF FRONT BEARING PEDESTAL	SUITABLE PACKAGE	115
8.	VALVE SUPPORT FOR HP OVERHAUL	1000X1000X400	800
9.	COMPONENTS OF ASSY. FIXTURE FOR HPT	3800X2500X1200	6864
10.	COMPONENTS OF ASSY. FIXTURE FOR HPT	3800X2100X900	1800
11.	COMPONENTS OF ASSY. FIXTURE FOR HPT	3300X2100X1210	3352
12.	COMPONENTS OF ASSY. FIXTURE FOR HPT	5010X4000X120	3356
13.	HYDRAULIC TURNING GEAR	2100X1000X600	746
14.	STEAM BLOWING & TEST DEVICE	2900X2100X1140	3160
15.	GLAND STEAM VALVE WITH ACT.	1750X1400X850	500
16.	ESV & CV CASING WITH VALVES	2850X2600X1900	2X8515
17.	ESV SERVO MOTOR WITH L.S.V MTG.	2100X1350X1250	2X1662
18.	LIMIT SWITCH MTG. TEST VALVES	2100X1350X1250	2X1900
19.	CONTROL VALVES SERVO MOTORS	2000X1500X1500	2X1900
20.	IP TURBINE	5750x3800x4070	58175
21.	I.P. TURBINE PARTS	700X700X500	285
22.	I.P. INLET PIPE ASSY	3700X2200X1900	7088
23.	INSPECTION SHAFT FOR IPC	3300X700X700	775
24.	HP-IP BEARING PEDESTAL ASSY.	4080X2005X2126	13275
25.	HP-IP BEARING PEDESTAL PARTS	1000X600X600	388
26.	HP-IP BEARING PEDESTAL PARTS	500X200X150	38
27.	AUX. OF IP TURBINE	1050X480X550	390
28.	AUX. OF IP TURBINE	1100X500X650	2X204
29.	SUSPENSION OF VALVE (IV)	3500X1500X700	2X2700
30.	ASSY DEVICE FOR VALVES	920X1000X450	213
31.	I.P. CONTROL VALVE SERVOMOTORS	2000X1300X1350	2X1880
32.	IV & CV CASING WITH VALVES	3790x3450x2565	2X18696
33.	FRAME FOR SUSPENSION (IV)	3100X3100X560	2X765
34.	LOOSE ITEMS OF FRAME FOR SUSPENSION	600X450X250	300
35.	SOLE PLATE PEDESTAL ASSY.	3400X1200X800	2510
36.	BASE PLATE ASSEMBLY	4500X1400X1200	4500

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
37.	BASE PLATE ASSEMBLY	2300X1250X600	2560
38.	BASE PLATE LP CASING	2300X2075X981	2680
39.	LP ROTOR	6200x3010x2920	56572
40.	LP OUTER CASING PARTS	7060X1480X2760	2X8085
41.	LPC OUTER CASING PARTS	4570X3230X980	2X2500
42.	COMPONENTS OF LP CASING UPPER PART	3500X300X300	495
43.	LP OUTER CASING PATRS	3450 X 1000X1100	900
44.	ASSEMBLY DEVICES	900X700X550	180
45.	AUX. OF LP TURBINE	3000X1300X1000	2100
46.	AUX. OF LP TURBINE	2000X1000X1825	2X1142
47.	LP JOINT COVERING	2300X1800X940	1041
48.	ASSY. TOOLS	1900X1000X890	500
49.	CAP (SPRING SUPPORT)	825X500X400	2X400
50.	CAP (COMPEN.ASSY)	3240X1740X1340	3400+3512
51.	CAP (OBLIQUE REDUCER ASSY)	1400X1400X1200	800
52.	CAP (MIDDLE BEND ASSY)	1550X1550X1300	670
53.	CAP (COMPLEN. ASSY)	3240X1740X1340	3512
54.	CAP (MAN-HOLE ASSY)	1500X1600X1100	2X750
55.	CAP (MITRE BEND ASSY)	1550X1550X1300	2X670
56.	CAP (PIPE ASSY)	2000X1100X1200	645
57.	CAP (MITRE BEND ASSY)	1550X1550X1300	670
58.	LONGITUDINAL GIRDER (LEFT & RIGHT)	6800X1820X1570	2X15182
59.	LP FRONT WALL (TS & GS)	6820X3750X910	2X10053
60.	LP SHAFT SEALING FRONT	1800X1700X740	2X2260
61.	LP SHAFT SEAL COMPENSATOR ASSY (TS)	1440X1420X520	2X1456
62.	LP CASING ASSY (FATRENERS)	1800X1700X740	2653
63.	LP CASING ASSY (PARTS)	3760X2060X860	4900
64.	LP CASING ASSY (PARTS)	450X450X250	140
65.	EXTRACTION PIPE LINE (LPC)	2600X1100X700	607
66.	EXTRACTION PIPE LINE (LPC)	1400X1300X700	2x326
67.	EXTRACTION PIPE LINE (LPC)	2600X1100X700	607
68.	EXTRACTION PIPE LINE (LPC)	1650X800X450	470
69.	EXTRACTION PIPE LINE (LPC)	2700X1200X750	575
70.	EXTRACTION PIPE LINE (LPC)	1100X850X850	308
71.	EXTRACTION PIPE LINE (LPC)	2700X1750X1100	689
72.	EXTRACTION PIPE LINE (LPC)	1550X1450X900	530
73.	EXTRACTION PIPE LINE (LPC)	2000X600X600	366
74.	L.P. EXTRACTION PIPE SHEATHING	2600X2000X1400	1330
75.	INNER GUIDE PLATE OF DIFFUSER (TS & GS)	2600X2400X1000	2X2118
76.	DIFFUSER (TS & GS)	4880X1730X2340	2X3275

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
77.	LP- GEN. PEDESTAL ASSY	3220X2285X2075	10200
78.	IP- LP PEDESTAL ASSY	3700X1860X2100	14600
79.	LP INNER OUTER CASING (U/H)	6720X3150X2325	21750
80.	LP INNER OUTER CASING (L/H) & LP INNER INNER CASING (L/H)	6750X3500X2325	30907
81.	LP INNER CASING ASSY (FASTENERS)	1800X1700X740	1760
82.	LP INNER-INNER CASING (U/H) PARTIAL	4000X1570X2000	11722
83.	STEAM INLET PIPE (LPT)	2700X1300X900	840
84.	BEARING PEDESTAL PARTS	1000X700X700	1135
85.	STUD HEATING DEVICE & BREACHNUT HEATING DEVICE	1500X1200X250	315
86.	CRH NRV WITH SERVOMOTOR	2500X1800X1850	5860
87.	STEAM BLOWING DEVICE CRH NRV	2000X1000X500	878
88.	GOVERNING CONTROL RACK ASSY	4700X1900X3300	4510
89.	LPBY PASS VALVE SUSPENSION	2900X1200X300	1000
90.	OIL FLUSHING & PRESSURE TEST DEVICE	750X400X550	130
91.	MAIN OIL TANK & NOZZLE ARGMNT.ASSY.	5180 x 3120 x 2650	9100
92.	MAIN OIL TANK & NOZZLE ARGMNT.ASSY.	3600 x 1100 x 800	550
93.	INJECTION FOR SUCTION PIPE NB300	3300X1750X1200	999
94.	INJECTION FOR SUCTION PIPE NB350	3300X800X800	588
95.	OIL STRIPPER	600X600X850	133
96.	OIL STRINERS	2050X1200X1410	568
97.	VARIABLE ORIFICES THROTTLE VALVE	1000X500X250	115
98.	LEAKAGE OIL TANK	1000X1000X3000	515
99.	WASTE OIL TANK	1000X1000X3000	515
100.	OIL STRAINERS	2050X1200X1410	470
101.	CHANGE OVER VALVE	500X400X200	49
102.	ATT. SOLENOID VALVES	600X300X300	90
103.	TURBINE INTRUMENT RACKS	2750X1000X800	988
104.	TURBINE INTRUMENT RACKS	2300X750X750	760
105.	HOUSING FOR MS STRAINER	1700X1025X900	3000
106.	HOUSING FOR MS STRAINER	1725X1025X730	3000
107.	STEAM STRAINER ASSY DEVICE	2140X1400X500	652
108.	OPEN HOUSING FOR HRH STEM STRINER	2200X1450X1100	2X3500
109.	MAIN STEAM STRAINER	1100X700X350	2X374
110.	HRH STRAINER	1600X1450X750	2X485
111.	COMPENSATOR	600X600X900	50

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
112.	MAIN OIL PUMP ASSEMBLY	1400X1200X1000	550
113.	RATING, COLLABORATION AND MONOGRAM PLATES	850X550X150	50
114.	DAMPING DEVICE	500X500X500	40
115.	GLAND STEAM PRESSURE INDICATOR	400X300X300	20
116.	EMERGENCY GOVERNOR	495X395X695	57
117.	IMPULSE PIPES (CARBON STEEL)	6900X650X650	1525
118.	PRESS.TRANSMITTERS,SWITCHES & GAUGES	2800X1250X1250	925
119.	TRANSMITTERS & J.B.OF BEARINGS	500X300X200	110
120.	IMPULSE PIPES (ALLOY STEEL)	6900X500X500	1049
121.	BLANKING ARRANGEMENT FOR MS STRAINER HOUSING	1000X900X500	2X490
122.	BLANKING ARRANGEMENT FOR HRH STEAM STRAINER HOUSING	1600X1200X600	2X1090
123.	STEAM STRAINER HOUSING GASKETS	700X700X300	50
B:	**GENERATOR :**		
14.	FOUNDATION ITEMS OF GEN.	3550X715X880	4656
15.	FOUNDATION ITEMS OF GEN.	3100X1050X850	3374
16.	STATOR	7520X4200X4770	218000
17.	ROTOR	10550X1560X1660	47742
18.	END SHIELD LOWER HALF (TE)	3640X1140X2000	6020
19.	END SHIELD LOWER HALF (EE)	3640X1140X2000	6020
20.	END SHIELD UPPER HALF (EE)	3640X1140X2000	5620
21.	END SHIELD UPPER HALF (TE)	3640X1140X2000	5620
22.	H.V. BUSHING	2000X950X600	590
23.	LOOSE ITEMS OF WOUND STATOR	1500X1200X1000	1010
24.	GENERATOR ACCESSORIES	1800X1000X550	1546
25.	TERMINAL BUSHING BOX	3500X1950X1250	4075
26.	GAS BAFFLE RING, INSERT COVER ETC	3700X3500X1340	4364
27.	BEARING SHELLS	1100X835X950	953
28.	SEAL RINGS	600x600 x200	73
29.	DEVICE FOR ROTOR INSERTION	2240X940X1220	1036
30.	ERECTION DEVICES	2550X1180X800	997
31.	WIRE ROPES	1800X1450X200	201
32.	DRY AIR BLOWER	1350X1250X800	190
33.	TERMINAL CONNECTORS	660X660X400	286
34.	BRUSHLESS EXCITER SET	5670x2390x2810	22386
35.	EXCITER FRONT COVER	4310X2950X2950	4122

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
36.	RR. WHEEL COVER & SEALING WALL DE FOR EXCITER	1800X1600X1600	970
37.	EXCITER REAR COVER	4330 X 3050 X 2950	3909
38.	EXCITER BED PLATE ACCESSORIES	5500 X 1050 X 800	3212
39.	EXCITER ACCESSORIES	2000X500X500	350
40.	SEAL OIL STORAGE TANK	3500X1300X1280	1460
41.	H2 DISTRIBUTER	3480X1540X440	333
42.	CO2 DISTRIBUTER	2770X1240X440	247
43.	SEAL OIL UNIT	5900X2400X2850	9325
44.	~~SEAL OIL UNIT-II~~	~~3610X2040X1850~~	~~3263~~
45.	COOLER RACK ASSY FOR EXCITER	3000X1800X1100	1551
46.	GAS UNIT	2550X1790X2560	1150
47.	LIQUID DETECTOR RACK	1700X900X1800	450
48.	LOOSE VALVES	2000X1000X1000	959
49.	LOOSE INSTRUMENTS	500X500X300	40
50.	CO2 VAPURISER	1520X640X840	225
51.	GEN. PIPING	6500 X1200 X1000	6374
52.	GEN. PIPING	6500X1000X800	1926
53.	GEN. PIPING	1900X1500X800	1615
54.	CONSUMABLES FOR FOUNDATION ITEMS	500X500X200	15
55.	CONSUMABLES	500X600X300	30
56.	LOOSE ITEMS	1000X600X400	30
57.	LOOSE ITEMS	1000X800X400	90
C:	**HEAT EXCHANGERS** **I) CONDENSER**		
1.	HOTWELL	11000x 2000x1200	6497
2.	BOTTOM PLATE	7100x3500x650	2x6844
3.	BOTTOM PLATE	7100x3500x650	8296
4.	BOTTOM PLATE LOOSE ITEMS	Suitable Packing	222
5.	CONDENSER SUPPORT	1750X1200X850	3X2760 + 3680
6.	CONDENSER SUPPORT LOOSE ITEMS	Suitable Packing	4419
7.	WATER CHAMBER (LHS)	5300X3650X350	2X6065
8.	WATER CHAMBER (RHS)	5300X3650X350	2X6065
9.	FRONT WATER BOX (G.S.)	6000X3650X2500	14894
10.	FRONT WATER BOX (T.S.)	4800X3650X2050	14894
11.	REAR WATER BOX (GEN. SIDE)	4800X3650X2050	9032
12.	REAR WATER BOX (TUR. SIDE)	4800X3650X2050	9032
13.	SIDE WALL (TUR. SIDE)	5300X1750X16	1105

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
14.	SIDE WALL (TUR. SIDE)	5300X2500X16	3X1645
15.	SIDE WALL (TUR. SIDE)	5300X1700X16	1080
16.	SIDE WALL (TUR. SIDE)	1000X350X250	170
17.	SIDE WALL (TUR. SIDE)	1000X200X150	484
18.	SIDE WALL (GEN.END)	5240X1750X16	1105
19.	SIDE WALL (GEN.END)	5300X2500X16	3X1645
20.	SIDE WALL (GEN.END)	5300X1700X16	1080
21.	SIDE WALL (GEN.END)	1000X350X250	170
22.	SIDE WALL (GEN.END)	5850X200X150	484
23.	SHELL INTERNAL DETAILS	Suitable packing	4X9009
24.	SHELL INTERNAL DETAILS	1000X750X350	653
25.	SHELL INTERNAL DETAILS	Suitable packing	4165
26.	AIR EXTRACTION PIPING	5460X990X410	1070
27.	SHELL INTERNAL DETAILS	4700X3350X80	7X3860
28.	SHELL INTERNAL DETAILS	5500X940X630	7126
29.	SHELL INTERNAL DETAILS	4440X260X100	861
30.	SHELL INTERNAL DETAILS	3000X1500X500	3790
31.	LOWER DOME WALL (T.S)	11000X4000X550	8767
32.	LOWER DOME WALL (T.S)	4000X800X100	668
33.	LOWER DOME WALL (T.S)	900X300X300	245
34.	LOWER DOME WALL (G.S)	11000X3950X910	8368
35.	LOWER DOME WALL (G.S)	4000X800X100	668
36.	LOWER DOME WALL (G.S)	900X300X300	245
37.	LOWER DOME WALL (F.W.B SIDE)	7502X4046X545	6012
38.	LOWER DOME WALL (F.W.B SIDE)	6238X934X1155	1444
39.	LOWER DOME WALL (F.W.B SIDE)	1325X1150X500	514
40.	LOWER DOME WALL (R.W.B SIDE)	7550X4000X1800	6728
41.	LOWER DOME WALL (R.W.B SIDE)	6236X1134X1160	1427
42.	LOWER DOME WALL (R.W.B SIDE) LOOSE ITEMS	1300X1065X305	193
43.	DOME INTERNAL STIFFENING	6016X200X200	4X726
44.	DOME INTERNAL STIFFENING	3400X200X200	2X380
45.	DOME INTERNAL STIFFENING	1760X1480X1230	3610
46.	DOME INTERNAL STIFFENING	2380X1310X1100	4199
47.	UPPER DOME WALL (T/GEN.SIDE.)	6800X460X310	2X1083
48.	UPPER DOME WALL (F/R.WB.SIDE.)	5880X2600X300	2X3635
49.	UPPER DOME WALL LOOSE ITEMS	5400X350X32	475
50.	UPPER DOME WALL LOOSE ITEMS	SUITABLE PACKING	1669
51.	UPPER DOME WALL LOOSE ITEMS	SUITABLE PACKING	1669
52.	WATER BOX REMOVAL DEVICE	2500X1000X750	788
53.	WATER BOX REMOVAL DEVICE	2000X1500X500	2500
54.	FRAME	1840X840X230	2X594

SN	DESCRIPTION	PACKAGE SIZE IN MM	GROSS WT. IN KG.
55.	STEAM THROW DEVICE	1000X800X800	2X1029
56.	CONDENSER LOOSE ITEMS	2800X450X450	541
57.	CONDENSER LOOSE ITEMS	2850X1000X500	1252
58.	CONDENSER LOOSE ITEMS	1000X800X800	103
59.	CONDENSER LOOSE ITEMS	600X320X200	103
60.	CONDENSER INSTRUMENTATION		159+27
61.	CONDENSER INSTRUMENTATION		278
62.	STAND PIPE No.1	2800X450X450	199
63.	CONDENSER STAND PIPE	3150X350X330	285
64.	STAND PIPE No.2	2800X450X450	189
65.	CONDENSER SPRING SUPPRTS-2X28 Nos.)	--	17545
66.	CONDENSER SS TUBES (OD 28.575 MMX 0.889 MM TH.-296 Nos. AND OD 28.575 MMX 0.7112 MM TH.-15368 Nos.)	SUITABLE BOXES	87000
C:	**HEAT EXCHANGERS** **ii) HEATERS & COOLERS**		
1.	HP HEATER 5	2250x2300x10500	30000
2.	HP HEATER 6	2250x2300x11850	38600
3.	LP HEATER 1	11520x1400x1550	11300
4.	LPH-1 SUPPORT	SUITABLE PACKAGE	2200
5.	LPH-1 SUPPORT STRUCTURE LOOSE	SUITABLE PACKAGE	1300
6.	LP HEATER 2	9600x1350x1735	10500
7.	LP HEATER 3	9600x1270x1835	10500
8.	DRAIN COOLER	4650x1000x1250	3400
9.	TURBINE OIL COOLERS –2 NOS.	4650x1650x1980	2x8100
10.	T O C LOOSE ITEMS	750X500X200	60
11.	T O C LOOSE ITEMS	800X600X600	60
12.	AIR COOLER	2700X850X550	892
13.	SEAL OIL STORAGE TANK	3500X1300X1280	1460
14.	HYDROGEN COOLERS - 4 NOS.	8150X830X700	4X2400
15.	HYDROGEN COOLER ITEMS	400X200X250	250
16.	EXCITER AIR COOLERS –2 NOS.	2700X850X550	2X892
17.	COOLER RACK ASSMBLY FOR EXCITER	3000X1800X1100	1551
18.	CONTROL FLUID COOLERS- 2 NOS.	2700X850X550	2X1400
19.	LOOSE ITEM CFC	6000X600X500	103

D- Details of Condensate Extraction Pumps.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

SN	Description	Qty.	Each Size in mm	Total wt. (Kg.)
1.	Condensate Extraction Pump Assembly	2	6700x1700x1800	2x4150
2.	Foundation Frame	2	1600x1600x300	2x700
3.	Canister	2	4600x1200x1300	2x1920
4.	Basket type suction strainer at CEP suction	2	1600x1600x1700	2x2700
5.	Local Gauge Racks	4	1300x900x2000	4x300
6.	CEP Motor	2	2600x2600x2900	2x7000

E- R.E. Joints & Butterfly Valves packages:

Sl.NO	DESCRIPTION	Qty Nos.	PACKAGE SIZE	WT. IN KG.
1.	R. E. Joints- Inlet Assy.	2	5365x2800x3200	2x9300
2.	R. E. Joints- Outlet Assy.	2	2950x2800x3700	2x8500
3.	Hydraulically operative Butterfly valve (Type-1)	3	2000x2500x720	3x7296
4.	Hydraulically operative Butterfly valve (Type-2)	4	2200x2700x900	4x9388
5.	Electrically operative Butterfly valve (Type-3)	2	930x1160x405	2x1164
6.	Manually operative Butterfly valve (Type-4)	4	700x865x300	4x544
7.	Manually operative Butterfly valve (Type-5)	4	600x750x275	4x336
			Total weight	98798

F- TG-INTEGRAL PIPING

1.For Turbine (C.S. & A.S.) - 31.0 MT

2.For Turbine Fire Retardant Fluid (S.S.) - 15.0 MT

3. For Generator (CS & A.S.) for seal oil, Gas system etc. – 13.0 MT

G- Flash Tanks & Vessels

Sl. NO	DESCRIPTION	PACKAGE SIZE	WT. IN KG
1.	HP Drain Flash Tank – 1 No.	2600X3000X3950	4750
2.	LP Drain Flash Tank - 1 No.	2950X2200X2700	2200
3.	Flash Vessel – 1 No.	1400x1300x2300	850
4.	Clean Oil Tank with fittings/ attachment with associated piping – 1 No.	5000X4500X3000	12000
5.	Dirty Oil Tank with fittings/ attachment with associated piping – 1 No.	5000X4500X3000	12000
6.	Oil unloading Tank with fittings/ attachment with associated piping – 1 No.	2000X1000X500	950

J- PEM Packages tentative weight: **25.00 MT**

I - Insulation materials: **50 MT**

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
WEIGHT DETAILS

NOTE:

1.

The list is tentative and has been given to enable the contractor to study the nature of work to be done in this contract. There may be variation in size, weight, quantity etc. and no claim, whatsoever, will be entertained on account of this by BHEL.

2.

Some of the packages may be sent in parts to suit the site condition / transportation, the same is to be assembled at site without any extra cost, likewise the package may be assembled together and send as a single assy. Contractor may have to dismantle and erect or, erect as single assembly as per the instruction of BHEL Engineers without any extra cost.

3.

The weight indicated above is approximate and there may be a variation in weight of equipment / package. No claim, whatsoever, will be entertained by BHEL on account of variation in weight & quantities in respect of TG Equipments, TG Integral piping along with other equipments & PEM Supplied items.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-II
PROPOSED PAINTING SCHEME FOR FINAL PAINTING

SN	AREA / DESCRIPTION	COLOUR SHADE WITH IS / RAL CODE	PAINT TYPE WITH IS CODE
1	A) SUPPORTS & HANGER (VARIABLE LOAD) B) FURNACE BUCKSTAYS C) PF COAL PIPING, COUPLING, ORIFICES AND SUPPORTS D) GATES ON DUCTS & FANS AND RAW COAL PIPES E) PLATFORMS F) BOILER STRUCTURE, G) FAN HANDLING STRUCTURE, H) FLOOR BEAMS. I) ESP STRUCTURE AND GALLERIES J) OIL GUN MAINTENANCE VICE K) SUPPORTS FOR WIND BOX, DUCTS, FANS L) ESP PENT HOUSE, OUTER ROOF M) LINKAGES FOR DAMPERS N) MANHOLE DOORS IN ESP AND DUCT	SMOKE GREY SHADE NO. 692 OF IS 5	SYNTHETIC ENAMEL IS 2932
2	A) STAIR SIDE CHANNEL B) ESP-FLOOR GRILLS, C) DRUM SUSPENSION RODS, D) STAIR CASE STEP TREADS.	TRAFFIC BLACK SHADE NO. RAL 9017	SYNTHETIC ENAMEL IS 2932
3	SUPPORTS & HANGER (CONSTANT LOAD)	PHIROZI SHADE NO. 176 OF IS 5	SYNTHETIC ENAMEL IS 2932
4	A) LIGHT OIL PIPING B) DIRTY OIL TANK C) LUB OIL FOR AIR HEATERS D) LUB OIL FOR FANS E) TG LUB OIL PIPING F) TG LUB OIL TANK	GOLDEN BROWN SHADE NO. 414 OF IS 5	SYNTHETIC ENAMEL IS 2932
5	A) COOLING WATER PIPING B) AUX COOLING WATER PIPING C) BOILER FILL PIPING D) AIR HEATER WASH MANIFOLD E) AIR HEATER CLEANING EQUIPMENT F) LP PIPING DRAINS G) BOILER WASH WATER H) CONDENSATE PIPING I) ECW PIPING	SEA GREEN SHADE NO. 217 OF IS 5	SYNTHETIC ENAMEL IS 2932
6	A) HAND RAILS AND POSTS B) CHUTE PIPE C) LADDER D) ELECTRICAL AND MECHANICAL HOISTS E) HOISTS FOR AIR HEATER F) FAN HANDLING EQUIPMENTS G) MONORAIL BEAMS	GOLDEN YELLOW SHADE NO. 356 OF IS 5	SYNTHETIC ENAMEL IS 2932

7	A) TOE GUARD PLATE B) STEAM PIPING (BAND - EACH 5MTR)	POST OFFICE RED SHADE NO. 538 OF IS 5	SYNTHETIC ENAMEL IS 2932
8	A) SILENCERS FOR SAFETY VALVES AND START UP VENT, B) ACCESS DOORS AND OBSERVATION PORT FOR AIR HEATERS, C) INSPECTION DOORS ON FURNACE AND ESP, D) FURNACE BOTTOM SEAL PLATES ASSEMBLY, E) INSTRUMENT TAPPING POINTS ON FURNACE AND DUCTS	METALLIC ALUMINIUM	HEAT RESISTENT ALUMINIUM IS13183 Gr-I
9	EQUIPMENT(MILL, HT & LT MOTORS, SB/WB, FANS, BFP HYD COUPLING, VALVES, RE JOINTS,ACTUATORS ETC) AND PANELS.	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL IS 2932
10	A) ATOMISING AIR PIPING, B) SCANNER AIR PIPING, C) IGNITOR AIR PIPING D) GUN COOLING AIR PIPING, E) MILL SEAL AIR PIPING F) AIR HEATER AIR MOTOR PIPING G) CONDENSER AIR EVACUATION PIPING H) INSTRUMENT AIR PIPING I) SERVICE AIR PIPING J) AIR DUCTS FOR MILL	SKY BLUE SHADE NO. 101 OF IS 5	SYNTHETIC ENAMEL IS 2932
11	AIR HEATER FIRE FIGHTING	FIRE RED SHADE NO. 536 OF IS 5	SYNTHETIC ENAMEL IS 2932
12	A) TURBINE B) CONDENSER	BOTTLE GREEN SHADE NO. RAL 6007	SYNTHETIC ENAMEL IS 2932
13	A) GENERATOR B) EXCITER	DEEP ORANGE SHADE NO. 591 OF IS 5	SYNTHETIC ENAMEL IS 2932
14	LEGEND IN BLOCK LETTER OVER GOLDEN YELLOW BACKGROUND	TRAFFIC BLACK RAL 9017	SYNTHETIC ENAMEL IS 2932
15	BUS DUCT	PEBBLE GREY RAL7032	SYNTHETIC ENAMEL IS 2932

NOTE:

- Painting scheme is enclosed for information purpose only. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents.

11 GENERAL

11.0.1
The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship for fabrication, engineering and construction management. The Bidder should ensure timely completion of work. The Bidder must have adequate quantity of tools, construction aids, equipments etc, in his possession. He must also have on his rolls adequate, trained, qualified and experienced supervisory staff and skilled personnel.

11.0.2
The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Bidder and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

11.0.3
All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the Bidder.

11.0.4
The Bidder shall at his cost perform any services, tests etc, although not specified but nevertheless required for the completion of work.

11.0.5
Contractor shall erect all the equipments as per sequence prescribed by BHEL at site. The sequence of erection, methodology will be decided by the BHEL engineers depending upon the availability of material, work fronts etc. No claims for extra payment from the Contractor will be entertained on the grounds of deviation from the methods and sequence of erection adopted in erection of similar TG sets or for any reasons whatsoever.

11.0.6
All the necessary certificates and licenses required to carryout this work are to be arranged by the Contractor expeditiously at his cost.

11.0.7
The work to be carried out under the scope of these specifications covers the complete work of collection from stores/storage yard, handling, transporting, unloading at erection site, pre-assembly, erection, alignment, hot alignment, bolting, fastening, welding, radiography, leveling, cold pulling, adjusting, Non-destructive testing, Post weld heat treatment, hydraulic test, chemical cleaning, passivation, steam blowing, oil flushing, water flushing, air flushing, pre-commissioning tests, trial running of auxiliaries covered under these specifications, commissioning and all other activities till handing over of the unit. The work shall conform to dimensions and tolerances specified in the various drawings, documents etc. That will be provided during the course of installation. 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 BHEL at the cost and risk of the contractor. Contractor may please note that the loading of materials at storage yard/Stores in contractor's Trailer / Carriers while collecting materials will be done by material handling agency deployed by BHEL.

11.0.8
The terminal points as decided by BHEL shall be final and binding on the Contractor.

11.0.9
The indicative schedule of weight of major equipments given in relevant appendices is meant for providing a general idea to the Contractor about the magnitude of the work involved.

11.0.10
During the course of execution of this work, certain rework/ modification/ rectification/ repairs/ fabrication etc will be necessary on account of feed back from various thermal power stations on units already commissioned and/or units under erection and commissioning and also on account of design discrepancies and manufacturing defects and site operation/maintenance requirements. Contractor shall carryout such rework/ modification/ rectification/ fabrication/ repairs etc promptly and expeditiously. Daily log sheets indicating the details of work carried out, man hours; consumables used etc, shall be maintained by the Contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per relevant clauses of General Conditions of Contract.

11.0.11
All tools and tackles, fixtures, equipments, materials, manpower, supervisors/ engineers, consumables etc required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause.

11.0.12
The contractor shall make adequate security arrangements including employment of security personnel and ensure protection from theft, fire, pilferage, damage and loss of materials/equipments issued to him for the work. Special care will have to be taken to guard against pilferage / theft of copper tubing, brass fittings, brass valves and other costly materials.

11.0.13
All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc, shall be used for handling of the equipments without the specific permission of the engineer.

11.0.14
Contractor shall ensure proper housekeeping and remove all scrap materials periodically from various work area covered in the scope and deposit the same at the place earmarked for this purpose. In case of contractor's failure to do the same, BHEL reserves the right to remove scrap at contractor's cost and risk.

11.0.15
Access to site for inspection by BHEL and customer engineers shall be made available by the contractor at all times.

11.0.16
Contractor shall mobilize sufficient quantity of sleepers for stacking of materials in his custody.

11.0.17
Performance testing of equipment and first fill and one year topping requirement of consumables/ chemicals will also form part of the work to be carried out by the contractor.

11.0.18
The Contractor's scope of work is further described in the following clauses:

11.1 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

11.1.1
Contractor shall take delivery of the components, equipments, lubricants, chemicals, special consumables, steel etc from the storage yard/stores/sheds of BHEL/ client. The Contractor should note that the transport of equipments to erection site, assembly yards etc should be done by the prescribed route, without disturbing the other works and contractors and in the most professional manner. Special equipments such as laboratory equipments, measuring and controls equipments, special electrodes, valves, shims, packing materials for joints and seals, lubricants, actuators etc, shall be stored, when taken over by the Contractor, in appropriate manner as per BHEL's instructions.

11.1.2
The contractor shall return all parts, materials, consumables etc. remaining extra over the normal requirement with proper identification tags to BHEL stores. In case of any misuse or use over actual requirement, BHEL reserves the right to recover the cost of parts/materials used in excess or misused, with departmental charges.

11.1.3
Transportation of lube oil, Chemicals, Gas cylinders etc from stores, is included in the scope of this contract. The contractor shall have to return all the empty and excess drums to the customer/BHEL stores. Similarly, transport of chemicals for various pre-commissioning activities/ processes mentioned in clauses herein from BHEL/customer's stores and charging of chemicals into the system for carrying out various pre-commissioning activities and processes mentioned herein and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of contractor. After completion of oil flushing operation, the used oil shall be filled in empty drums and which in turn shall be returned to BHEL/customer's stores.

11.2 TEST TAPPING POINTS

Installation and welding of Tapping Points for taking performance test measurements shall be carried out by the contractor as part of this work for the equipments covered under this tender specification under the guidance of BHEL engineer. The scope will be limited to all the tapping points for which materials are available and their locations identified within the regular contract period and extensions thereof.

11.2.1
All packing and forwarding material shall be returned as soon as the material is unpacked. The location for storage of such materials shall be as indicated by BHEL Engineer.

11.2.2
All Measuring and Monitoring Devices (MMD) used for the work in scope of these tender specifications shall be calibrated by the accredited agencies that are approved by BHEL or calibration tractability is established upto National Physical Laboratory.

11.2.3
Contractor shall furnish the consumption details of chemicals, lubricants, TIG welding filler wire, welding electrodes and other consumables on monthly basis.

11.3 GENERAL

11.3.1
During the course of erection, platforms and floor grills are to be cut at certain places to route steam, oil, water and air piping, cable trays, etc or for accommodating erection, rigging etc, the cutting of platforms and grills should be minimum and as approved by BHEL Engineer. After completion of work, the platform/grills cut shall be made good neatly as instructed by BHEL engineer.

11.3.2
Erection and welding of stainless steel fittings including supply of necessary stainless steel welding electrodes is within the scope of the work/specification.

11.3.3
No temporary supports should be welded on to the piping.

11.3.4
Contractor shall carry out preservation painting on all items taken from stores. The preservation painting has to be carried out on material taken from stores and also on material erected wherever the shop painting has given away. Periodical inspection shall be made as per the instructions of BHEL engineer and the portion of items or the complete items needing painting shall be carried out to the satisfaction of BHEL engineer. This facility shall be provided by the contractor till the commissioning and handing over of the equipment to the customer. Preservative and touch up painting on equipments covered under this specification stored at stores/storage yard shall also be carried out by the contractor.

11.3.5

Adjustment of spring hangers for piping shall be done by the contractor during initial erection. After initial commissioning trials, it is possible that the spring hangers have to be adjusted repeatedly till the correct spring compression is achieved. Contractor shall do the same to the satisfaction of BHEL engineer. The marking of cold and hot positions on the hangers shall be done by the contractor.

11.3.6
The contractor shall return to BHEL the excess materials left over after completion of work, materials issued for temporary pipelines for HT, chemical cleaning, flushing, blowing etc. and materials issued on returnable basis in neatly dressed condition. Necessary grinding, edge cutting (square facing), edge preparation (vee), painting etc. to the condition similar to the one at the time of issue shall be in scope of work.

11.3.7
Wherever the equipments are erected by the contractor and connected piping is done by other agency, contractor shall weld / tighten the incoming pipes to either the equipment or the counter flange provided on the equipment.

11.4 HANDLING OF HEAVIER EQUIPMENTS

Heavy and voluminous Equipments/consignments like HP Turbine module (wt. About 57 MT,), IP Turbine module (wt. About 59 MT,), LP Rotor (wt. About 57 MT), LP turbine (Inner outer & Inner Inner) Lower half casing (Wt about 31 MT), , LP turbine (Inner outer) Upper half casing (Wt about 22 MT), Generator rotor (wt. About 48 MT), Generator Exciter (Wt. About 23 MT), HP Heaters (wt. About 30 MT & 40 MT,), etc. along with other Equipments shall be handled carefully. Contractor shall have to arrange his own Tools & Tackles including suitable capacity lifting Crane, Trailer and any other arrangement required to handle right from collection of materials from BHEL/Customer store yards/stores, transportation to site of works and erection & their placement on respective elevation/foundation. BHEL Shall not provide any T&P other than Customer's 130/30 MT capacity EOT Crane in TG hall for erection of TG equipments.

12 PREPARATION OF FOUNDATION

12.1
Buildings, foundations and other necessary civil works for supporting structures, equipments etc, will be provided by the customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits and also adjustments of foundation level, dressing and chipping of foundation surfaces of all equipments contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations upto 25mm for achieving proper levels will be within the scope of work/specification.

12.2
All minor foundations and anchor points required for installing erection equipments like winches, anchors etc. are to be cast by the contractor.

12.3
The complete work of secondary grouting of equipments is included in the scope of work/specification. Contractor shall arrange all manpower, T&P, form work and shuttering materials, all grouting materials such as ordinary Portland cement, sand, stone chips etc & quick-setting-non-shrink-free-flow special grout mix of required specification (like conbextra-gp-2 or equivalent).

12.3.1
The quick-setting-non-shrink-free-flow special grout mix shall be purchased only from the following BHEL approved vendors:

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

In order to ensure the quality, the major grouting of equipments using any of above grout mixes shall essential be done as per the recommendations of supplier with regard to grout preparation and use of machinery etc under the supervision of the respective supplier. **Contract shall consult BHEL engineer before deciding upon the vendor for the above.**

12.3.2
Cleaning of the foundation surfaces, pocket holes, anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods will be within the scope of this work.

12.4

BHEL will provide only shims and packer plates (either machined or plain), which are received from BHEL's manufacturing plants and go as permanent part of the equipment. Additional packer plates and shims if required will have to be prepared by the contractor out of steel

plates, steel sheets to meet site requirements. Necessary steel plates for this purpose will be provided by BHEL free of cost.

12.5
The contractor shall carry out scrapping and matching of embedded plates, permanent spacers and all the matching parts of turbine, generator, pumps and other equipments under scope wherever required. The support and sole plates matching and concrete surface bedding is also covered in the scope of work. The fine dressing of concrete shall be with Prussian blue-match checks.

12.6
Packer plates shall not only be blue matched with foundations but also inter-packer contact surfaces, contact surfaces between packer and pedestals, contact surface between packer and foundation frame etc. shall also be blue matched and required percentage contact shall be achieved by chipping and scrapping as per engineer's instructions.

13 EQUIPMENTS INSTALLATION –

13.1.1 COMMON REQUIREMENTS

13.1.1
Filling of lubricants for steam turbine, turbo-generator and other rotating auxiliaries for purpose of oil flushing, initial fill up and subsequent topping up during various stages of work is in the scope of the contractor.

13.1.2
All works such as cleaning, leveling, aligning, hot alignment, trial assembly, dismantling of certain equipments/components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, grinding, straightening, chamfering, filling, machining, chipping, drilling, reaming, scraping, lapping, shaping, fitting-up, drilling of holes, making dowel pins, minor rectification of foundation bolts etc. are incidental to the erection/commissioning and any other work/activity which is necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work.

13.1.3
Cleaning, servicing, lubrication of actuators, pumps, headers, governing system, ESV & IV, control valves, LP bypass, HP Overload Bypass valves, Cold Re-heat Non Return Valves with power cylinders and other valves, tanks, vessels etc. during erection and commissioning stages is in the scope of work. However, gaskets/pickings/lubricants for replacement will be provided by BHEL free of cost.

13.1.4
All equipment shall be preserved and protected periodically before and after erection as per advice of BHEL engineer. The journals of steam turbine rotors, generator rotor, HT motors and other rotating machines shall be thoroughly cleaned, greased/painted with preservative agents periodically as instructed by BHEL engineer.

13.1.5
Trial run of all motors including checking direction of rotation in uncoupled condition, check alignment and re-couple the motor to driven equipment.

13.1.6
After initial trial of rotating equipments, control and power cabling for motors and other equipments/instrumentation may have to be disconnected for checking alignment and resetting/realignment/hot alignment. Contractor will have to provide services for disconnection and reconnection of control and power cables.

13.1.7
All racks or assembled units like Governing Rack, LP Bypass Rack, Cold Re-heat Non Return Valve, Seal Oil Unit, Gas Unit, Seal Oil Valve Rack, Gas Cylinder Racks etc supplied from manufacturing units will be tested in BHEL/ Customer stores or at site. This may require

transportation, filling of oil, water etc in these racks for carrying out testing of these racks. Defects noticed during testing of these racks will have to be rectified by the contractor free of charges. Further, any pipeline / flanges / fittings not found assembled properly, the same have to be rectified / corrected by the contractor free of charges.

13.2 ~~DEAERATOR~~ & HEAT EXCHANGERS INSTALLATION

~~13.2.1~~

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

13.2.2

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

13.2.3

Hot/monorail hoist including monorail beam / crane to be erected commissioned for various areas indicated below -

(a) Pumps (Pumps which are in the scope of this work).
(b) Butterfly valves.
(c) Control fluid room.
(d) Central lube oil system room
(e) Other equipment covered under TG package

14 PIPING INSTALLATION

14.1
The scope of work in piping system (air, Gas, Water, Oil, Steam, Governing oil/Control oil etc.) will include cutting to required length, edge preparation, laying, fixing and welding of the elbows/fittings/valves etc, fixing supports/hangers/shock absorbers/ guides and restraints etc and carrying out all other activities/works to complete the erection and also carrying out all pre-commissioning/ commissioning operations mentioned in these specifications as per engineer's instructions and/or as per approved drawings. Weld joints and NDT requirement for all TG Integral piping, and other piping's as applicable under tender specification shall be as per drawings/schemes and suiting to site requirement. The necessary drawings/documents for these weld joints will be provided at site during execution of work.

14.2
Carrying out of piping as per the specifications between equipments constituting terminal points, whether the terminal equipments fall within the scope of the work/specification or not, is within the scope of the work/ specification. The contractor shall complete terminal joints at either ends, with due NDE & PWHT if applicable, for all the piping schemes covered in the scope of work.

14.3
Fit up and welding/bolting/fastening of piping to the terminal points (such as stubs, valves, flanges on terminal points/equipments, stubs on headers, battery limits etc) forming part of the scope of work/specification and stress relieving and radiography of joints so made are also within the scope of work. Permanent fasteners and gaskets will be supplied by BHEL.

14.4
Interconnection/ Hook-up, if any, with the existing system shall form part of work. Such interconnections, hook-ups may require shut down of running plant and the relevant work has to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

14.5
All drains / vents / relief / escapes / safety valve piping to various tanks/ sewage / drain canal / flash box / condenser / sump / atmosphere etc. from the stubs on the piping and equipments erected by contractor is completely covered in the scope of this tender specification.

14.6
The following items of work shall be incidental and forming part of piping fabrication and erection:

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

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

14.7
Pipelines will be field routed as per schemes/ suggestive layout or as per the instructions of BHEL engineer. Pipes & tubes will be supplied in random lengths and running lengths. The contractor shall have to lay the piping after carrying out the necessary fabrication, edge preparation, routing etc to suit site requirement in best professional manner.

14.8
As far as possible, pre-assembly shall be done. The pipe laying shall be carried out from the available terminal point/points or any other area between the terminal points. The erection can be carried out on temporary supports to obtain proper alignment and welding. After fixing the permanent supports, all the temporary supports shall be removed. The alignment, distances and loading of the supports shall be checked and the required settings to be ensured as per requirement.

15 CONDENSER INSTALLATION

15.1
The condenser will be dispatched in loose parts mainly comprising of bottom plates, dome valves, front and rear water chamber, front and rear water boxes, side walls, hot well, spring elements, support plates, air extraction pipes, baffles, stiffening rods and pipes etc. the condenser is to be assembled at site in position by welding the different parts. Condenser tubing and tube expansion (roller expansion) is to be done at site by the contractor, after taking due care to clean all the tube holes. After final alignment and leveling of turbine exhaust and condenser, the same has to be welded to the exhaust position of LP exhaust as per the sequential welding procedure. Condenser tube material is stainless steel.

15.2
Before insertion of tubes, the contractor shall clean the holes in the tube plates and tube support plates to remove paint, corrosion spots, oxide scales etc. Usage of suitable cleaning agent may also be required which has to be supplied by the contractor.

15.3
The tubes shall be expanded using an Automatic Electronic Torque Controlled Tube Expanding unit or Pneumatic Tube Expander. Tube expansion shall be checked with dial bore gauge. The total set up including tube expanders and tube cutting tools etc. for carrying out the complete condenser tube expansion works shall be provided by the contractor.

15.4
The contractor shall carry out the condenser neck welding with LP cylinder exhaust hood only after final installation of LP casing. Neck welding shall be subjected to specified non-destructive testing.

15.5
The hydrostatic testing of steam space and hydraulic testing of water space up to the terminal point after assembly of water boxes are also included in the scope.

15.6
Work of painting of condenser surfaces in various area and at various stages of work are specified elsewhere in these specifications.

16.1 GENERATOR INSTALLATION

16.1.1 GENERATOR STATOR

~~The Generator stator, weighing approximately 218 MT may be transported from Manufacturing Unit to site by special wagon consisting of 8 bogies (four on either side) with facilities to swivel or by special hydraulic trailer. The contractor shall have to unload the generator stator from the Wagon / Trailor at a suitable place outside Machine Hall. The Stator shall be moved from the place of unloading and placed within the reach of EOT crane by the contractor in consultation with BHEL Engineer. For any demurrage Charges on account of delay in Handling, Unloading from Trailor shall be the responsibility of Contractor.~~

16.1.2

~~The Generator Stator shall be lifted and placed by the contractor with the help of Two numbers of Customer EOT Crane (Each of Capacity 130 MT) in tandem operation and Lifting Beam in TG hall building.~~ The Lifting beam/ slings and EOT cranes will be provided by BHEL/Customer free of hire charges. Contractor shall have to collect the Lifting Beam/Slings from BHEL/Customer stores/storage yard, transport to site of work, assemble and provide necessary assistance to make EOT Cranes tandem operation through for safe lifting of stator and return the lifting beam/slings to BHEL/Customer storage yard/stores as per BHEL Engineers instruction after completion of work.

~~The assembly of the special wagon for return after unloading of stator is in the scope of this work.~~

Generator Stator already placed in position and end shields blue matching work partially carried out.

17 HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

17.1
Contractor shall carry out the following tests required to complete the erection and commissioning of the TG Set:

(1) Hydraulic testing of individual equipments like condenser, coolers, heaters, other auxiliaries and equipments. Required capacity Hydraulic test pump/Fill pump and other necessary arrangement shall be provided by contractor to carry out hydraulic testing, chemical cleaning of the equipments and piping as part of scope of work under this tender specification.
(2) Ultrasonic test
(3) Dye Penetrate test
(4) Magnetic Particle Test.

All above facilities (men, materials, equipments, consumables etc) with operating engineer/experienced person and proper approach wherever required shall be provided by the contractor for satisfactory completion of the above tests.

17.2
Contractor shall lay all necessary temporary piping, welding, supports, install pumps, valves, pressure gauges, electric cables and switches etc, required for the Hydro test, Air leak test, Chemical cleaning, Steam blowing etc.. After the test is over, all the temporary piping, pumps, etc will be removed. It may also specifically be noted that servicing, erection and dismantling of piping and equipments for conducting above tests will be done by the contractor. No separate payment shall be made for this purpose.

17.3
All the above tests shall be repeated till all the equipments, piping and systems satisfy the technical and statutory requirements. All related works form part of the scope.

17.4
Suitable welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable de-aeration/ venting /drain points with valves as per BHEL engineer's instruction, for performing hydro test of piping is within the scope of work**.** Required valves, fasteners, blank flanges, blanks or steel for blank flanges shall be provided by contractor. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL engineers' instruction.

17.5
Hydro test of piping may have to be repeated several times to meet technical and statutory requirements before application of insulation.

17.6

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

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

18 PRE-COMMISSIONING TESTS, COMMISSIONING, POST COMMISSIONING

18.1
Commissioning of the TG equipments with associated Aux. and other Equipments with auxiliaries shall involve the following tests and activities of the equipments erected:

(a) Trial run of CEP, Vacuum Pumps etc and other pumps/equipments like Misc pumps etc and other various rotating machineries / pumps as per tender specification.

(b) Trial run of motors/ drives for various auxiliaries.

(c) Hydraulic Test, Chemical Cleaning, Oil flushing of lube oil system, Jacking oil/Lifting oil, HP oil supply system, Governing oil system/Control oil system, LP Bypass system, Air cleaning/blowing of pipelines, closed systems, Tanks and Vessels.

(d) Flushing of all pipelines by air/oil/water/Chemicals/steam as the case may be.

(e) Servicing of all valves, Hydraulic Power cylinders, HP Valves (ESV), HP Overload Bypass valves, IP Valves, LP Bypass valves, CRHNRV and fittings.

(f) Manual/mechanical cleaning of Oil tanks, Suction Strainers / Filter elements of CEP, Vacuum Pumps, Misc. Pumps, and other various equipments & tanks /vessels erected by the contractor. This may have to be repeated several times during the commissioning process.

(g) Chemical cleaning of piping systems, as per requirement. Contractor shall carry out disassembly and reassembly of vulnerable components like spray nozzles, gauges, instruments etc. as instructed by BHEL during this process.

(h) Putting turbine on barring gear.

(i) Rolling and synchronization.

(j) Full load operation.

(k) Trial operation

(l) Assistance in PG Test.

The above activities/tests/trial runs may have to be repeated till satisfactory results are obtained and also to meet the technical and statutory requirements.

18.2
Contractor shall lay temporary pipelines with fittings and accessories etc. as instructed by BHEL engineer for the purpose of pre-commissioning and commissioning activities like Hydraulic testing, chemical cleaning, oil flushing, steam blowing etc. of piping and other equipments as

part of the scope of work. Temporary installations shall be dismantled by contractor and returned to BHEL stores as specified elsewhere in this technical specification.

18.3
The contractor shall provide necessary assistance to facilitate/enable electrical and instrumentation testing and commissioning of equipments under this scope of work, to BHEL and their Testing & Commissioning agency.

18.4
The contractor shall carry out any other test as desired by BHEL engineer on erected equipments covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or parts of work performed by the contractor.

18.5
In case any malfunctioning and / or defect is found during tests / trial runs such as loose components, undue noise or vibrations, strain on connected equipments etc. The contractor shall immediately attend to these defects/ malfunctioning and take necessary corrective measures. If any readjustment and realignments are necessary, the same shall be done as per BHEL engineer's instructions, free of cost.

18.6
Cleaning of oil tank by sand blasting or other methods as per instructions of BHEL engineer before and after oil flushing is responsibility of contractor.

18.7
The contractor shall associate for initial and subsequent fillings of gas in generator gas system as and when required till unit is handed over to Customer.

18.8
The contractor shall carry out leak test of generator air cooling system to the satisfaction of BHEL engineer.

18.9
Replacing/changing mechanical/other seals of equipment, pumps etc. during commissioning stage is within the scope of work.

18.10
During the stages of commissioning, and till Unit is handed over, if any part of TG and auxiliaries need repair/rectification/rework/replacement, the same shall be done expeditiously and promptly by the contractor. Contractor's claim if any, for such repair/rectification/rework/ replacement etc for reasons not attributable to the contractor will be governed by relevant clauses of 'General Conditions of Contract'. The parts to be replaced shall however, be provided by BHEL free of cost.

18.11
During this period, though BHEL's and customer's engineers will also be associated in the work, the contractor's responsibility will be to make available resources in his scope till such time the commissioned units are taken over by the customer.

18.12
In case any malfunctioning and/or defects are found during tests, trial run such as loose component, undue noise or vibration, strain on connected equipment etc., The contractor shall immediately attend to these defects/ malfunctions and take necessary corrective measures. If any readjustment or realignment is necessary, same shall be done as per BHEL engineer's instruction.

18.13
The pre-commissioning activities will start prior to Lube oil, HP Oil supply System, Governing/ Control oil flushing etc. of the TG and various trials, commissioning operations shall continue till the TG is handed over to customer. Simultaneous commissioning checks, activities will be in progress in various areas like trial run of various equipment, checking of equipment erected, making ready for trial runs, filling up of lubricants, chemicals etc. All these works need specialized gangs including electricians, Instrument Technicians, Fitters, in each area to render assistance to BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted. The mobilization of these commissioning gangs shall be sufficient so that planned commissioning activities are taken up in time and also completed as per schedule and the work is to be undertaken round the clock if required.

18.14
Contractor shall cut open works if 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.

18.15
After the start of commercial operation of machine, commissioning activities will continue. It shall be the responsibility of contractor to provide following manpower along with supervisor as part of commissioning assistance for a period of three months.

1)	Supervisor	2 Nos.
2)	Pipe fitter/Millwright fitter	2 Nos.
3)	Welder	2 Nos.
4)	Rigger	2 Nos.
5)	Electrician/instrument technician	1 No. each
6)	Unskilled worker	6 Nos.

18.16

The above figures shows only minimum required over and above labour required for completing pending erection and commissioning works and clearing of punch lists. Contractor has to provide number of personnel and other resources as per work demand.

18.17
It shall be specifically noted that above employees of the contractor may have to work round the clock along with BHEL commissioning engineers.

18.18
During commissioning, opening of valves, changing of gaskets, checking, realigning of rotating and other equipment, attending to leakages in piping, tanks etc and adjustments of erected equipment may arise. Valves shall be serviced and lubricated to the satisfaction of BHEL engineer during the erection and commissioning as per BHEL engineer's instructions.

18.19
It is the responsibility of the contractor to provide for necessary resources till the completion of work under these specifications, even in case erection, testing and commissioning of the TG and other equipments are delayed due to reasons not attributable to the contractor.

19.1 WELDING AND HEAT TREATMENT

19.1.1
Removal of welding slag and burrs by hand files, with brushes and/or flexible grinders will be carried out simultaneously.

19.1.2
On all steam, oil, instrument, gas, air (Instrument air/services air) piping, Cooling water Piping, DM water piping etc. both TIG welding and subsequent arc welding or total TIG welding process is to be adopted as instructed by BHEL engineer.

19.1.3
All weld joints on piping shall be ground / filed / dressed on completion of welding and before NDE as per instructions BHEL engineer.

19.1.4
The Contractor shall procure all electrodes and filler wires of approved quality / brand as per the standards and specifications of BHEL and instruction of BHEL Engineer.

19.1.5
Contractor should purchase the electrodes as per the recommendations of BHEL engineer, welding manual, welding schedule and other relevant documents. The electrodes shall be purchased only from BHEL approved manufacturers.

19.1.6
The purchase of electrodes shall be accompanied by proper test certificate and these certificates should be submitted regularly for the scrutiny of BHEL engineer.

19.1.7
All electrodes shall be stored in a clean dry area. The storage room shall be of permanent nature and damp proof, and the room shall be exclusively meant for storage of welding electrodes and filler wires. Excepting for a vent in the top, it is not preferred to have any other opening like windows or ventilators. The temperature inside the room has to be kept in the range of 8-10^0 c above atmospheric temperature and humidity should be less than 50&. This is to be accomplished by using electric heaters or infrared lamps. The storage room must be provided with hygrometer and thermometer. Temperature and humidity are to be monitored regularly. 15-20 holders, welding cables, connecting cables to equipments and other welding accessories including temporary electrical connection from construction power point to individual equipment like winches, hoisting equipment, welding generators, transformers, heat treatment equipment and other construction equipment shall be arranged by contractor.

19.1.8
All racks and other items used for storage of electrodes shall be of steel and not of wood.

19.1.9

All electrodes soon after purchase shall be offered for inspection to the BHEL engineer. Contractor shall be strictly prohibited from using electrodes not inspected/approved by BHEL engineer.

19.1.10
All welding consumables shall be issued to the welders only by authorized person who is controlled by contractor's welding engineer. The necessary baking requirements are to be ensured by Contractor's welding engineer.

19.1.11
All welders shall be tested and approved by BHEL engineer/customer before they are actually engaged on work though they may possess the requisite certificate. BHEL reserves the right to reject any welder without assigning any reasons. Statutory requirements like IBR approval for welders are to be complied with before starting of the work. If required, the welders may have to undergo Procedure Qualification test also. The decision of BHEL Engineer will be final in this regard.

19.1.12
All charges for testing of contractor's welders including destructive and non-destructive tests conducted by BHEL at site shall have to be borne by the contractor. However for initial testing of welders the test plates will be provided by BHEL. However, if deployed welders fails in initial testing due to lack of experience OR frequent testing of new welders, due to non-availability/non-deployment of earlier qualified/tested welders, it shall be the responsibility of Contractor to provide necessary test plates at his cost for above testing.

19.1.13
BHEL engineer is entitled to stop any welder from his work if his work is unsatisfactory for any technical reason or if there is a high percentage of rejection of joints welded by him, which, in the opinion of BHEL engineers, will adversely affect the quality of welding though the welder has earlier passed the tests prescribed. The fact that the welders have passed the test does not relieve the contractor from his contractual obligations to check the performance of the welders. Contractor shall submit a monthly performance record of all welders.

19.1.14
All welded joints shall be subject to acceptance by BHEL engineer whose decision will be final and binding.

19.1.15
Pre-heating and stress relieving before and after welding are part of erection work and shall be performed by the contractor in accordance with instructions of BHEL engineer. Contractor has to arrange for the recorders along with accessories and suitable technicians for heat treatment purpose. The temperature recorders and thermocouples shall be duly calibrated. During preheat and stress relieving operations the temperature shall be measured as per the instructions of BHEL engineers by thermocouples and recorded graphs for the heat treatment works carried out shall be the property of BHEL.

19.1.16

For the purpose of stress relieving, thermocouples have to be attached to the weld joint. The number of temperature measuring points and locations are as per the standards of BHEL. Thermocouples have to be attached using battery operated portable thermocouple attachment unit and not by manual arc welding. Contractor shall arrange sufficient number of thermocouple attachment units.

19.1.17
Wherever necessary, contractor should provide temperature indicator/temperature recorder as required by BHEL engineer for measuring preheat temperature for welding or for controlling temperature of metal for hot correction etc. Decision of BHEL engineer on method and of checking preheat temperature or controlling temperature for hot correction and welding shall be final and binding on contractor.

19.1.18
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 labour required for the same as per directions of BHEL.

19.1.19
Heat treatment requirements shall be as per the Welding Schedules of BHEL

19.1.20
For weld joints of heavy structural items like beams, I-sections, if heat treatment is required, the same shall be carried out as part of the work.

19.1.21
Checking effectiveness of stress relieving by hardness tests (either by Poldi 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.

19.1.22
TIG welding process is to be used for all root pass welds in pipes. Subsequent welding after root pass can be carried out by manual metal arc welding with basic coated electrodes. For the pipe of thickness less than 6mm, the entire welding has to be carried out by TIG welding. However, BHEL site engineer will have the option of changing the method adopted. For manual arc welding shall be done as per weaving technique and the width of weaving shall not exceed 1.5 times of the dia of the electrodes.

19.1.23
Two pieces to be joined shall be individually checked for the weld edge preparation and profile dimensions and with respect to the template. Dye penetrant check shall be carried out on edge prepared surfaces at random. The percentage shall depend on piping system as specified by BHEL engineer.

19.1.24
Joint fit up will be a stage for inspection.

19.1.25
All joints shall be offered for visual inspection after root run. Subsequent welding should be made only after the approval of root run.

19.2 RADIOGRAPHY

19.2.1
Radiographic inspection of welds shall be arranged by the contractor including all consumables like isotope camera, x-ray film, chemicals etc. Scaffolding and approaches for taking radiographs.

The contractor shall provide the necessary skilled technician and labours for taking the radiographs. While taking radiographs, the contractor has to use proper pentameter / image quality indicators as instructed by the BHEL engineer. All the processed and accepted films will be the property of BHEL. In this regard, the contractor has to adhere to the safety rules/regulations laid by BARC authorities from time to time. It may please be noted that invariably the radiographic work will be carried after the normal working hours.

19.2.2
Contractor shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found 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/rejection of the joints will be final and binding on the contractor.

19.2.3
Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re-shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if defect persists after first repair, as per radiograph, carrying out repairs and radiography shall be repeated till joint is made acceptable in case, the joint is not repairable, the same shall have to be cut and repaired at contractor's cost. Decision of BHEL engineer in all these matters is final and binding on the contractor.

19.2.4
100% radiography of weld joints of certain piping has to be carried out as per BHEL standards/drawings/specification.

19.2.5
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. Necessary trained personnel shall be deployed for this purpose.

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

20.1
Contractor shall lay and erect temporary pipelines with fittings and accessories and also erect/commission the chemical cleaning/ circulating pumps after servicing as per requirements, tanks and other installations, as a system as instructed by BHEL for the purpose of chemical cleaning, steam blowing, steam washing, steam flushing, water flushing, water washing, oil flushing of piping and shall provide all other arrangements as per requirement as part of scope of work.

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

20.2
After the chemical cleaning/ flushing have been successfully completed, dismantling of all temporary installations as instructed by BHEL is within the scope of work under this specification. The dismantled materials shall be dressed and returned to BHEL as stated elsewhere in this tender spec.

20.3
Preservation of the cleaned surfaces will be the responsibility of contractor under the guidance of BHEL engineer.

20.4
Hydraulic test of temporary piping is to be carried out as per the instructions of BHEL Engineer. Carrying out repairs, if any, is in the scope of work/specification.

20.5
For chemical cleaning of the piping system, contractor will have to lay temporary piping to connect the entire system irrespective of whether the equipment/system connected is in the scope of contractor or not. Decision of BHEL Engineer in this regard will be final and binding on the contractor.

20.6
During the initial stages of work, trenches for draining water may not be available after alkali flushing or mass flushing for discharging and emptying. Necessary low point drains and temporary piping for this will have to be provided by contractor from materials provided by BHEL.

20.7
Laying effluent discharge line from mixing tank (for acid cleaning or any other chemical cleaning process) as per the instructions of BHEL engineer and dismantling, servicing for

preservation and handing over the same to BHEL stores after completion of the job is within the scope of work/specification.

20.8
Radiographic examination of weld joints on temporary pipes as required by the Engineer In-charge should be carried out.

20.9
Contractor shall also carry out the repairs or attend leaks etc., in the temporary piping and equipments for the above operations / activities while carrying out the above activities / operations.

20.10
For chemical cleaning of system which consist of equipment/piping erected by the contractor and also equipment/piping erected by other contractors of BHEL/customer's contractor has to arrange for workers and supervisory staff as required supplementing/complimenting the labour and supervisory staff mobilized by other agencies for chemical cleaning of the portion of equipment erected by them in the system. Decision on the strength of gangs and supervisory staff for deployment of labour and allocation of work for them at site by BHEL engineer is final and binding on the contractor.

20.11
Contractors quoted rate shall be inclusive of fabrication, cost of consumables, erection, dismantling of temporary piping and servicing of the equipments and valves and handing over to BHEL. No separate payment on this account shall be entertained.

20.12
After acid cleaning/pickling of lubricating system (including oil piping of lube oil system, HP Oil supply system, oil tank and other fittings) of rotating machines, oil flushing for lubricating systems, LP Bypass systems etc as per instructions of BHEL Engineer shall be carried out. Cleaning of oil tank of lubricating oil system of rotating machineries, cooler etc before and after oil flushing is the responsibility of the contractor.

20.13
For full welding of structures, tanks and piping etc, only welding generators shall be used. The use of welding transformers will be subject to the approval of BHEL Engineer.

20.14
Erection and commissioning of connecting piping – permanent and temporary for oil purification equipments and all operations for cleaning, oil flushing, dismantling of temporary piping during pre and post-commissioning of equipment up to full load shall be the responsibility of contractor as part of scope of work.

21 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

21.1
The contractor shall provide all (except those indicated in BHEL scope) required tools and plants, monitoring and measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. Contractor has to provide suitable cranes for material handling at BHEL/client's stores/storage yard. BHEL's crane will not be available for this purpose. Please refer relevant appendix for the list of T&P being provided by BHEL free of charges on sharing basis.

21.2
All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification. Indicative list of major T&P to be arranged by contractor has been furnished in relevant appendix. Contractor shall also mobilize all other T&P necessary for timely and satisfactory completion of the work in scope.

21.4
Contractor shall provide all required suitable cranes and trailers for materials handling during collection from BHEL/ client's stores/ storage yard, transportation to site of work and at work site for all equipments and consignments including heavy and voluminous equipments/ components/ consignments like HP turbine module, LP turbine inner–outer casing, LP turbine inner casing, LP rotor, generator rotor, brushless exciter, HP heaters, etc. BHEL/customer shall not provide any T&P other than mentioned in relevant appendix for the purpose identified. The contractor shall make suitable arrangements/arrange crane well in advance for lifting and placement to final position of sections at required elevation/ location with utmost care.

21.5
Contractor shall provide the complete operating crew like operator, helpers for handling trailing cable for EOT It may be specifically noted that the EOT crane shall be shared by many other agencies working within the TG hall. The contractor shall have to extend the services of the EOT crane operation to all such other agencies as instructed by BHEL; the operation cost (for crew) will be shared proportionately amongst the beneficiary agencies on mutually agreed terms and rate.

21.6
Contractor has to provide spanners of all sizes for carrying out the complete erection / commissioning works. No spanners will be provided by BHEL to the contractor.

21.7
Contractor has to arrange slings of all sizes for completing the works covered under these specifications except the special slings for generator stator lifting/handling, which will be provided by BHEL free of charges on returnable basis.

21.8
All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification.

21.9
Timely deployment of adequate quantity of T&P is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned program and to achieve the milestones.

21.11
Complete set of hydraulic jacks of 50 tones and 100 tones capacity shall be arranged by the contractor for use during erection and commissioning of turbine. Also, the contractor shall arrange hydraulic jacks of 100 tones and 63 tones capacity along with long high pressure hoses of suitable length for generator erection and alignment. These jacks shall be of internationally reputed make, highly reliable and maintained in excellent working condition. They shall be tested for safe working before deploying in actual work. These jacks shall not be permitted for use anywhere other than steam turbine/ generator area.

21.12
All jack bolts that are required during erection for carrying out roll-check etc will have to be arranged by the contractor. No jack bolts will be provided by BHEL.

21.13
Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternative arrangements expeditiously so that the progress of work is not hampered.

21.14
In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make the alternative arrangement at the risk and cost of the contractor.

21.15
The T&P to be arranged by the contractor shall be in proper working condition and their operation shall not lead to unsafe condition. Contractor shall obtain prior approval of BHEL for all the T&P before deploying in actual work. The movement of cranes and other equipment should be such that no damage / breakage occur to foundations, other equipments, material, property and men. All arrangements for the movement of the T&P etc shall be the contractor's responsibility.

21.16
Normally, use of welding generators only is permitted for welding. The use of welding transformers will be subject to prior approval of BHEL.

21.17

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

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

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

2) Two coats of steam washable paints shall be applied on steam side of LP turbine and condenser components, as advised by BHEL. The steam washable paints, primer and thinner will be provided by contractor as part of scope of work along with other like arrangements for surface preparation and paint application like sand/shot-blasting, consumables like surface cleaning agents, paint brush, brush cleanser, labour and necessary tools and plants as required for completion of work.

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

4) All site weld joints falling in steam side shall be painted with two coats of steam washable paint.

5) All water side surfaces of water chambers including tube plate shall be thoroughly surface prepared and painted. Required primer & paints and other consumables for condenser water box and tube plates shall be provided by Contractor.

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

7) Prior to hydraulic testing of water side of condenser, interior surfaces of water boxes shall be painted.

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

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

10) Condenser internal components/parts/surfaces have to be surface protected with steam washable paint as per BHEL standards.

23 LINING AND INSULATION

23.1

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

1 TG integral piping and tanks & vessels
2. Other equipments including bois, though not listed above but required for completion
3. ST-TG auxiliaries including, but not limited, to heat exchangers, pumps, tanks and vessels and other equipments
4. TG integral piping including condensate and extraction system piping

23.2

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

23.3

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

23.4

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

23.5

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

23.6

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

23.7

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

23.7

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

23.8

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

23.9

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.

23.10

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

23.11

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

23.12

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

23.13

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

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

23.14

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

23.15

Wastage allowances for the material issued are envisaged as follows:

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

The wastage allowance will be applicable on the net issued quantity i.e. Total quantity issued reduced by the quantity returned to stores as unused/fresh item. Contractor shall reconcile the material issues periodically as prescribed by BHEL site. Payment for the done will be regulated as per relevant section.

23.16

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

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

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

23.17

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

23.18

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

23.19

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

24 FINAL PAINTING

24.1

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

24.2 Touch-up painting on damaged areas –

a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. Minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer. Primer coat of touch-up primer has to be applied by brush immediately after the surface preparation.
Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer.
Painting scheme is enclosed for information at relevant annexure. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

24.3

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

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

24.4

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.

24.5

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

24.6

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.

24.7

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.

24.8

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.

24.9

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

24.10

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

24.11

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.

24.12

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.

24.13

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

24.14

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

24.15

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

24.16 BHEL will provide paint & primer for final painting.