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

BHE/PW/PUR/CHT-STG U-9/1100

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 500 MW UNIT # 9

AT

MAHARASHTRA STATE POWER GENERATION COMPANY LIMTED

CHANDRAPUR SUPER THERMAL POWER STATION EXPANSION PROJECT (2X500MW)

CHANDRAPUR, DIST- CHANDRAPUR (MAHARASHTRA)

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

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Tender Specification Issue Details

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

BHE/PW/PUR/CHT-STG U-9/1100

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF 500 MW UNIT 9

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EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION . Refer Notice Inviting Tender

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

M/s. ……

……

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date :

1100

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/ CHT- STG U-9/1100 Date: 31/01/2013

NOTICE INVITING TENDER (NIT)

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

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To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHE/PW/PUR/CHT-STG U 9/1100**	
ii	**Broad Scope of job**	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION ,TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF **500 MW UNIT 9** AT MAHARASHTRA STATE POWER GENERATION COMPANY LIMTED **CHANDRAPUR SUPER THERMAL POWER STATION** EXPANSION PROJECT **(2X500MW)** CHANDRAPUR, DIST- CHANDRAPUR (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*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :Nagpur*** ***Start :31/01/2013*** ***Closes: 06/02/2013 , Time :16.00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents can however be downloaded	*Applicable*

		from website till due date of submission	
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 07/02/2013 , Time :15.00Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be handed over to PSWR HQ-Nagpur Dispatch Section. For any assistance bidder may contact the following BHEL officials: RK Ranade/ Sr. Manager (Purchase) Pratish Gee Varghese/Engineer(Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***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, tenders shall be opened on next working day at the same time.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2,00,000/- (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Date: Atleast 3 days before the due date of offer submission* *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	*Date : Not applicable.*	*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*Not Applicable*	*Not Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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

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

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

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

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

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

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

vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

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

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

	OUTER COVER	
	ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK:	

	PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING:**	
i	o Envelopes I o Envelopes II o Envelopes III	

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

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

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

9.0 Assessment of Capacity of Bidders:

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

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

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

i). Total number of Packages

Total number of Packages in hand = P

Where

- P is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced.

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

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

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

consideration. The 'Period of Assessment' shall be 6 months preceding the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the month two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

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

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

a) $P_1, P_2, P_3, P_4, P_5, \ldots P_N$ 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 '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

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

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions →	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$

									ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	---
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

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

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

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

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

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

IV. **Explanatory note**:

a) Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or CI, etc at the individual level irrespective of rating of Plant, and irrespective of whether the subject

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

b) Identified Packages (Unit wise)

Table-1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

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

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

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

26.0 Order of Precedence

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

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

for BHARAT HEAVY ELECTRICALS LTD

(AGM (Purchase)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List .
03 Annexure -3: Important Information

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE ; ERECTION ,TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER AND DEAERATOR, INSULATION AND FINAL PAINTING ETC OF **500 MW UNIT 9** AT MAHARASHTRA STATE POWER GENERATION COMPANY LIMTED **CHANDRAPUR SUPER THERMAL POWER STATION** EXPANSION PROJECT **(2X500MW)** CHANDRAPUR, DIST- CHANDRAPUR (MAHARASHTRA)
TENDER NO	**BHE/PW/PUR/CHT-STG U-9/1100**

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 Erection, Testing and Commissioning (Up to Synchronization of the Unit or beyond) of One set of Steam Turbine Generator (STG) of 190 MW or higher rating in last seven years as on the latest date of offer Submission.	**APPLICABLE**	
C-1	**Financial** **TURNOVER** Bidders must have achieved an average Bidders must have achieved an average annual financial turnover (Audited) of **Rs 195 Lakhs** or more over last three Financial Years (FY) i.e. 2009-2010, 2010-2011, 2011-2012	**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)	**APPLICABLE**	BY BHEL

	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.		
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E	**APPLICABLE**	BY BHEL
F	Consortium criteria (if applicable)	**NOT APPLICABLE**	

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

1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures
2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three.
3. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)
4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above
5. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :~~
   - ~~I. 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~~
   - ~~II. '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:
   - ~~i. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP~~
   - ii. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG
   - ~~iii. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping~~
   - ~~iv. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping~~
   - ~~v. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears~~
   - ~~vi. "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.~~
   - ~~vii. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
   - ~~viii. 'Readiness for coal Filling" in respect of Bunker Structure Work.~~
9. ~~Boiler means HRSG or WHRB or any other types of Steam Generator~~
10. ~~Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines~~
11. ~~For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.~~
12. ~~In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and~~

	~~erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.~~ ~~13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR.~~ ~~14. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR.~~

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

ANNEXURE - 2

CHECK LIST

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

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

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

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE 4: IMPORTANT INFORMATION

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

2 Any bidder meeting qualifying requirement set in NIT can participate in the tender. However final qualification the vendor executing Unit # 8 STG Jobs at subject project shall purely be at the sole discretion of BHEL.

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

1.0 Project Information

1.1 INTROUCTION

1	OWNER	:	Maharashtra State Power Generation Company Ltd.
2	PROJECT TITLE	:	Chandrapur Thermal Power Expansion Project Unit- 8&9
3	PROJECT RATING	:	2X500 MW
4	LOCATION	:	Chandrapur, Distt – Chandrapur, Maharashtra
5	NEAREST RAILWAY STATION	:	Chandrapur Railway Station on Delhi - Chennai rail route- 6 Km from project site
6	NEAREST PORT	:	Vishakhapatanam
7	NEAREST AIRPORT	:	Nagpur - 150 Kms
8	MAIN ROAD HIGHWAYS	:	**State Highway**- SH 264 connecting Chandrapur with Jam, Rajura & Mul **National Highway**– NH-7 connecting Varanasi to Madurai passing through Jabalpur, Seoni, Nagpur, Buti Bori, Jam, Adilabad and Hyderabad. Jam is at a distance of 100 Km from Chandrapur
9	LATITUDE	:	19° - 59'12" N
10	LONGITUDE	:	79° - 17'20" E

1.2 CLIMATIC CONDITIONS

1	MAXIMUM TEMPERATURE	:	48.3°C
2	MINIMUM TEMPERATURE	:	2.8°C
3	MAXIMUM RELATIVE HUMIDITY	:	70%
4	MINIMUM RELATIVE HUMIDITY	:	20%
5	AVERAGE ANNUAL RAINFALL	:	1420 mm
6	HEIGHT ABOVE MSL	:	189.70 mtr

2.0 SCOPE OF WORK

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

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

1. Steam Turbines along with auxiliary systems:-
    a. Turbine Gland Sealing system
    b. Turbine Lube Oil and Control Oil system
    c. Water Spray System
    d. Steam Washing System
2. Generator sets coupled to steam turbines and complete with auxiliary systems:-
    a. Seal Oil System
    b. Hydrogen Cooling System
    c. Stator Cooling System
    d. Carbon dioxide Purging System
3. Water cooled, horizontal surface condenser with integral accessories
4. Turbine Oil Purification System including Turbine Oil Storage, Dirty & Clean Oil Pumps, etc
5. HP & LP Feed Water Heater
6. Deaerator
7. HP/LP Steam Bypass System excluding power cycle piping and valves
8. Boiler Feed Pumps (2X50% Turbine Driven 1X50% Motor Driven)
10. Condensate Extraction Pumps (3X50%)
11. Steel Storage Tanks/Vessels such as Condensate Storage tank, Main oil Tank, Dirty Oil tank etc
12. 2X100% Capacity Boiler Fill Pumps
13. 2X100% Capacity Condensate Transfer Pumps
14. Closed Loop Equipment Cooling Water System
15. Turbine integral and other miscellaneous piping
16. Insulation of equipment and piping
17. Painting of all erected equipments and structures

of ONE UNIT OF 500 MW UNIT # 9, Chandrapur Super Thermal Power Station Expansion Project (2x500MW), Chandrapur, Maharashtra.

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			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		
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
a	Single point source	Yes		
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
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**			
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		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	

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

Sl.No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Telephone, fax, internet, intranet, e-mail etc		Yes	
3.6.0	**COMPRESSED AIR wherever required for the work**		Yes	
3.7.0	**Demobilization of all the above facilities**		Yes	
3.8.0	**TRANSPORTATION**			
a	For 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**		In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		**Yes**	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**	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	TYRE MOUNTED HYDRAULIC CRANES	14 MT	1 NOs
2	TRAILER WITH HORSE	30 TON	1 NO
3	TRAILER WITH TROLLEY	20 TON	1 NO
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	01 NO
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	06 NOS.
	B) - JACKS (WITH HAND OPERATED PUMPS)	50 MT	06 NOS.
	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :		
	A) - JACKS (HAVING BROAD BASE ONE INCH LIFT)	100 MT	06 NOS.
	B) - JACKS (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	63 MT	04 NOS.
	C) - LONG HIGH PRESSURE HOSES (FOR GENERATOR ALIGNMENT)		12 NOS.

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 TURBINE MODULE		01SET
25	SLINGS FOR GENERATOR ROTOR		01SET
26	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FOUNDATION BOLTS)		AS PER REQUIREMENT
27	LONG FEELER GAUGE SET		AS PER REQUIREMENT
28	SPANNERS / EYE BOLTS (OF ALL SIZES)		AS PER REQUIREMENT
29	HYDRAULIC TEST PUMPS AND FILL PUMPS		AS PER REQUIREMENT

B: MEASURING AND MONITORING DEVISES (MMD):

To be finalized at site as per requirement.

NOTE:

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

SN	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	EOT CRANE IN TG HALL	1	FOR HANDLING AND ERECTION WITHIN TG HALL ON SHARING BASIS AS AVAILABLE AND SUBJECT TO THEIR ACCESSIBILITY AND APPROACHABILITY.
02	CRAWLER CRANE 75 T	1	FOR UNLOADING OF TG COMPONENTS AT ERECTION SITE.
03	PORTAL GANTRY CRANE WITH ACCESSORIES (360 MT CAPACITY)/ STRAND JACK SYSTEM	AS PER AVAILABILITY	FOR GENERATOR STATOR HANDLING & LIFTING ONLY

NOTE:

1. **Operator** for EOT crane and portal 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.

4. In case BHEL cranes, at S.No 1 & 2, are not available due to any reason, contractor shall make his own arrangements and carry out the job without any financial implication to BHEL.

5. Contractor shall provide all necessary tools & tackles, crane, trailers etc for transportation of portal gantry crane/strand jack components/parts from BHEL stores/ storage yard, assembly/erection at site, testing, commissioning, dismantling after completion of works and returning to BHEL stores/storage yard as per instruction of BHEL engineer.

6.1 MOBILIZATION, TIME SCHEDULE & CONTRACT PERIOD

6.1.1
INITIAL MOBILIZATION

Contractor shall reach site, make his site establishment and be ready to commence the erection work within two weeks 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 covered in the scope of these specifications shall be recognized as "start of contract period". Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.
Based on the availability of civil foundations from customer and materials from manufacturing units, contractor may have to advance the start of erection after getting clearance from construction manager, or the start of erection may get delayed due to site condition.

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

SN	ACTIVITY	TENTATIVE SCHEDULE OF COMPLETION FROM START OF CONDENSER ERECTION
		UNIT-9
1	TURBINE BOX UP	14th Month
2	COMPLETION OF OIL FLUSHING	15th Month
3	BARRING GEAR	16th Month
4	SYNCHRONISATION	17th Month
5	COAL FIRING	18th Month
6	TRIAL OPERATION COMPLETION	20th Month
7	PG TEST	21st Month

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

6.1.4

DURATION

The total contract period for completion of entire work shall be **21 (Twenty One)** months from the start of erection as specified earlier.

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

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

The progressive payment for 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%**	**18%**	**15%**	**13%**	**11%**	**7%**	**16%**	**NOT APPLICABLE**
Sl. No.	**Activity/Work Description**	**%**							
I	**PRO RATA PAYMENTS (85%)**								
1	**CONDENSER (weightage 20%)**								
1.1	PREPARATION OF FOUNDATION	2%			--			--	
1.2	PLACEMENT, ALIGNMENT, ASSEMBLY AND WELDING OF BOTTOM PLATE SEGMENTS, HOT WELL, NDT AND SPRING ELEMENTS PLACEMENT & GROUTING.	10%			--			--	
1.3	ASSEMBLY AND POSITIONING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY	12%		--	--			--	
1.4	ASSEMBLY, ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.	13%		--	--			--	
1.5	ASSEMBLY, WELDING & NDT OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING AND STEAM THROW DEVICE, LPH-1 SUPPORT ETC.	10%		--	--			--	
1.6	INSERTION, EXPANSION, CUTTING ETC. OF CONDENSER TUBES	15%		--	--			--	
1.9	HYDRO TEST OF STEAM AND WATER SIDE	10%		--	--			--	
1.10	WELDING OF CONDENSER NECK JOINT AND NDT& COMPLETION OF BALANCE WORKS	10%		--	--			--	
1.11	ERECTION, COMMISSIONING, LOAD TESTING OF CONDENSER WATER BOX HANDLING SYSTEM	3%		--	--			--	
	Subtotal for condenser	**85%**							

		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	**TURBINE (18 %)**							--	
2.1	PREPARATION OF FOUNDATION, PLACEMENT, ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS	--	7%		--			--	
2.2	PLACEMENT AND ALIGNMENT OF LP OUTER CASING BOTTOM PORTION AND CENTRE GUIDE KEYS	--	5%		--			--	
2.3	PLACEMENT OF LP ROTOR AND ALIGNMENT WITH INNER CASING AND CHECKING OF BLADE CLEARANCE	--	9%		--			--	
2.4	ASSEMBLY, ALIGNMENT & WELDING OF LP OUTER CASING UPPER HALF	--	9%		--			--	
2.5	PLACEMENT AND ALIGNMENT OF IP TURBINE OUTER CASING AND INNER CASING (LOWER HALVES)	--	2%		--			--	
2.6	PLACEMENT AND ALIGNMENT OF IP ROTOR WITH LOWER CASING AND BOXING UP OF INNER & OUTER CASING (UPPER HALVES) & ROLL CHECK	--	5%		--			--	
2.7	FINAL BOX UP OF IP TURBINE	--	0%		--			--	
2.8	BOXING UP OF LP INNER-INNER & INNER- OUTER AND ROLL CHECK	--	5%		--			--	
2.9	PLACEMENT OF HP TURBINE, LOWERING OF HP ROTOR ON BEARINGS AND CHECKING OF CLEARANCES, COUPLING, HP TURBINE SWING CHECKS ETC.	--	5%		--			--	
2.10	ALIGNMENT OF ALL ROTORS INCLUDING REAMING, HONING AND FIXING OF COUPLING BOLTS		9%						
2.11	ASSEMBLY OF GOVERNING SYSTEM/EQUIPMENT		5%						
2.12	INSTALLATION OF ESVS, IVS, LPBP VALVES, MS STRAINERS (INTERNALS), HRH STRAINERS (INTERNALS)	--	9%		--			--	
2.13	ERECTION, ALIGNMENT AND WELDING OF CROSS AROUND PIPING	--	5%		--			--	
2.14	FINAL BOX-UP OF LP TURBINE	--	5%		--			--	

		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	--	5%		--			--	
	Subtotal for Steam Turbine		**85%**						
3	**TURBO GENERATOR (15%)**	--		--	--			--	
3.1	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES	--		5%				--	
3.2	LIFTING, LEVELLING AND ALIGNMENT OF STATOR (including erection and dismantling of portal crane if used for stator lifting)			23%				--	
3.3	FIXING OF END SHIELDS ON TO FOUNDATION BEAMS	--	--	6%				--	
3.4	ROTOR INSERTION	--	--	6%				--	
3.5	BOXING UP OF GENERATOR AND ASSEMBLY OF HYDROGEN SEALS	--	--	11%				--	
3.6	ALIGNMENT OF GENERATOR ROTOR WITH LP TURBINE ROTOR, RUN-OUT CHECKS AND REAMING, HONING OF COUPLING HOLES AND FIXING OF COUPLING BOLTS	--	--	9%				--	
3.7	ERECTION OF EXCITATION EQUIPMENTS & ALIGNMENT OF GEN.-EXCITER ROTORS INCLUDING SWING CHECK AND COMPLETION OF BALANCE WORKS	--	--	10%				--	
3.8	INSTALLATION OF ENCLOSURES OF GENERATOR/EXCITER WITH ALL AUXILIARIES	--	--	5%				--	
3.9	GROUTING OF GEN BEARING PEDESTALS AND EXCITOR	--	--	5%				--	
3.10	FINAL GAS TIGHTNESS TEST OF STATOR WITH COMPLETE SYSTEM	--	--	5%				--	
	Subtotal for Generator			**85%**					
4	**PUMPS AND AUXILIARIES (13 %)**	--	--		--			--	

		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	--	--		18%			--	
4.2	ERECTION / TESTING and commissioning OF ONE MOTOR DRIVEN BFP, ALONG WITH ALL AUXILLIARIES				14%				
4.3	ERECTION / TESTING and commissioning of TWO NOS TURBINE DRIVEN BFP, ALONG WITH ALL AUXILLIARIES				30%				
4.5	ERECTION, TESTING, GROUTING ETC. OF DMCW (BOILER & TG) PUMPS	--	--	--	13%			--	
4.6	ERECTION, TESTING, GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS	--	--	--	10%			--	
	Subtotal for pumps and Auxilliaries				**85%**				
5	**HEATERS AND DEAERATORS (11%)**								
5.1	ERECTION, TESTING & COMMISSIONING OF HP & LP HEATERS	--	--	--		27%		--	
5.2	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLERS	--	--	--		12%		--	
5.3	ERECTION, TESTING & COMMISSIONING OF DE-AERATOR, FEED STORAGE TANK AND ASSOCIATED APPROACH PLATFORM WITH LADDERS ETC.	--	--	--		46%		--	
	Subtotal FOR HEATERS AND DEAERATORS	**--**	**--**	**--**		**85%**		**--**	
6	**MISCELLANEOUS ITEMS (7%)**								
6.1	DEBRIS FILTERS, RE JOINTS, ME BELLOWS, DIRTY, CLEAN OIL TANKS, ENCLOSURES, CO2/H2 CYLIDER RACKS ETC						20%		
6.2	ACW PUMPS, RELATED ITEMS/ BOILER FILL PUMPS	--	--	--			10%		
6.3	ERECTION, TESTING & COMMISSIONING OF CONTROL FLUID TANK, C.F. COOLERS, C.F. PUMPS, PURIFICATION UNIT ETC.	--	--	--			9%		

		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
6.4	ERECTION, TESTING & COMMISSIONING OF FLASH TANKS & FLASH VESSELS	--	--	--			8%		
6.5	ERECTION, TESTING & COMMISSIONING OF PLATE HEAT EXCHANGER PACKAGE	--	--	--			10%		
6.6	ERECTION, TESTING & COMMISSIONING OF CONDENSER ON LOAD TUBE CLEANING PACKAGE/ CONDENSATE TRANSFER PUMPS	--	--	--			12%		
6.7	ERECTION, TESTING & COMMISSIONING OF SELF CLEANING STRAINER PACKAGE	--	--	--			8%		
6.8	ERECTION, TESTING & COMMISSIONING OF MISC. HOISTS & CHAIN PULLEY BLOCKS.						8%		
	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)								15%
8.2	PLACEMENT IN POSITION								20%
8.3	ALIGNMENT								15%
8.4	WELDING/BOLTING/FIXING								20%
8.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be clubbed with next activity)								5%
8.6	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG								5%
8.7	HYDRAULIC TEST/PNEUMATIC TEST WHERE EVER APPLICABLE								5%

		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
	Total for Prorata (85%)	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**
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%	1%
6	Barring Gear (TG)	1%	1%	1%	1%	1%	1%	1%	1%
7	Rolling and Synchronisation	3%	3%	3%	3%	3%	3%	3%	3%
8	Coal Firing	0%	0%	0%	0%	0%	0%	0%	0%
9	Full Load	2%	2%	2%	2%	2%	2%	2%	2%
10	Trial Operation of Unit	2%	2%	2%	2%	2%	2%	2%	2%
11	Painting (including arrow marking, nomenclature, etc)	2%	2%	2%	2%	2%	2%	2%	2%
12	Area cleaning, temporary structures cutting/removal and return of scrap	1%	1%	1%	1%	1%	1%	1%	1%
13	Punch List points/pending points liquidation	1%	1%	1%	1%	1%	1%	1%	1%
14	Submission of 'As Built Drawings'								
15	Material Reconciliation	1%	1%	1%	1%	1%	1%	1%	1%
16	Completion of Contractual Obligations	1%	1%	1%	1%	1%	1%	1%	1%
	Total for Milestone/Stage payments (15%)	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**
	Total of I & II	**100 %**	**100%**	**100 %**	**100%**	**100%**	**100%**	**100 %**	**100%**

		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
	Note-A: In case strand jack system for stator lifting is also included in scope of contractor, then 10% of the lumpsum value quoted/ derived per unit of STG package will be paid upon lifting and placement of stator in position of respective unit, using the strand jack system. In such a case, 90% of lumpsum value quoted/ derived per unit of STG package shall be considered for progressive payments as per terms of payment for the respective unit of STG package								

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 02 dated 20/09/2012)

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

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

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

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

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

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

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

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

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

8.3 New Taxes/Levies

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

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

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

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

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

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

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

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

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

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

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 both HP and 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 these will be taken from BHEL stores/storage yard and will be assembled/ installed at different locations as per drawing and instruction of BHEL Engineer at site. The work involved is preservation, assembly, installation, erection, alignment, foundation grouting including providing non-shrink free flow grout mix material, fixing of loose items, filling

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

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

9.9

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) Regenerative system piping is <u>excluded</u> from the scope. For details of piping *<u>included</u>* in scope of this tender specification, please refer 'annexure-I' enclosed herewith.

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

C) 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.

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

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

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

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

H) 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.

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

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

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

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

M) Supply of primer and paints for final painting.

N) Pneumatic copper tubing and fittings thereof.

O) Application of spray insulation of steam turbine.

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
A	STEAM TURBINE			
1	75001	EMBEDMENT FOR ANCHOR POINTS	4400X1600X1000	4940
2	75003	COMPONENTS FOR BASE PLATE ASSEMBLY	4900X1200X600	6350
3	75004	COMPONENTS OF BASE PLATE	2800X1700X600	3700
4	75101	BASE PLATE FOR LP CASING	1850X1400X500	7200
5	75102	LP OUTER CASING PARTS	9000X2187X3460	15520
6	75103	LP OUTER CASING PARTS	9000X2190X3460	15520
7	75104	LP OUTER CASING PARTS	5670X3290X1140	4600
8	75105	LP OUTER CASING PARTS	5670X3290X1140	4600
9	75106	LP OUTER CASING PARTS	3400X1200X1200	1255
10	75107	LP LONGITUDINAL GIRDER (LEFT)	8200X1680X1950	21412
11	75108	LP LONGITUDINAL GIRDER (RIGHT)	8200X1680X1950	21412
12	75109	LP FRONT WALL (TS)	8760X3850X1150	18300
13	75110	LP FRONT WALL (GS)	8760X3850X1150	18300
14	75111	LP SHAFT SEALING (FRONT)	1800X1700X740	2300
15	75112	LP SHAFT SEALING (REAR)	1800X1700X740	2300
16	75113	LP SHAFT SEAL COMPENSATOR (TS)	1500X1500X650	350
17	75114	LP SHAFT SEAL COMPENSATOR (GS)	1500X1500X650	350
18	75115	AUXILARIES OF LP TURBINE	2300X1200X900	2340
19	75201	HP/IP BRG.PED.ASSLY.	4080X2005X2126	13275
20	75202	HP/IP BRG.PED.PARTS	1000X600X600	400
21	75301	ASSEMBLY DEVICES	1000x 750x 750	300
22	75302	INSPECTION SHAFT FOR IPC	4050x 600x 900	1430
23	75304	COMPONENTS OF ASSEMBLY FIXTURE FOR HPT	3800x 2500x 1300	6860
24	75305	COMPONENTS OF ASSEMBLY FIXTURE FOR HPT	2300x 2100x 900	1800
25	75306	COMPONENTS OF ASSY FIXTURE FOR HPT	3300x 1800x 1300	3350
26	75307	COMP.OF ASSY.FIXT.FOR H.P.T.	5450x 4050x 400	3400
27	75308	AUXILARIES OF LP TURBINE	3750x 1000x 1000	1680
28	75309	AUXLIARIES OF LP TURBINE	2000x 1000x 1550	890
29	75310	AUXLIARIES OF LP TURBINE	2000x 1000x 1550	890
30	75311	ASSEMBLY TOOLS	1700x 800x 400	1020
31	75312	AUXILIARIES OF IP TURBINE	1200x 500x 550	260

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
32	75313	AUXILIARIES OF IP TURBINE	1100x 500x 650	210
33	75314	AUXILIARIES OF IP TURBINE	1100x 500x 650	210
34	75315	BOLT HEATING EQUIPMENT AND BREECH NUT HEATING DEVICE	1700x 900x 700	150
35	75316	GROMMET SLINGS	1700x 1700x 300	625
36	75318	OIL FLUSHING AND PRESSURE TEST DEVICE	750x 550x 400	250
37	75319	STEAM BLOWING & HYDRAULIC TEST DEVICES	2900x 2100x 1200	4650
38	75320	TOOLS FOR GOV.SYST.&VALVES	1750x 1200x 1000	1500
39	75321	VALVE SUPPORT FOR HPT OVERHALL	1500x 750x 750	905
40	75401	IP-LP BEARING PEDESTAL ASSLY	3700X1860X2100	14500
41	75501	LP/GEN. PEDESTAL ASSEMBLY	3200X2280X2070	9370
42	75502	BEARING PEDESTAL (PARTS)	1600x 800x 600	1150
43	75601/1	FRONT BEARING PEDESTAL	3140x 3140x 2050	12386
44	75601/2	HYDRAULIC TURNING GEAR	2100x 1000x 600	750
45	75601/3	MAIN OIL PUMP ASSEMBLY.	1400x 1200x 1000	550
46	75704/1	LP CASING ASSEMBLY	2250x 1350x 750	3000
47	75704/2	PARTS OF LP OUTER CASING ASSLY	1000x 800x 800	300
48	75705	LP EXTRACTION A1	4400x 1620x 870	1820
49	75706	LP EXTRACTION A1	4400x 1620x 850	1814
50	75707/1	LP EXTRACTION A1	3420x 1620x 870	1286
51	75707/2	LP EXTRACTION A1	950x 750x 750	330
52	75708	LP EXTRACTION A2	2920x 2120x 1370	1730
53	75709	LP EXTRACTION A2	3420x 1220x 1120	1350
54	75710	LP EXTRACTION A3	1920x 1120x 920	655
55	75711	LP EXTRACTION A3	3120x 920x 870	1050
56	75716	LP EXTRACTION PIPE SHEATHING	2900x 2050x 1180	2650
57	75717	INNER GUIDE PLATE OF DIFFUSER(TS)	2300x 2300x 500	1850
58	75718	DIFFUSER (TS)	5050x 1800x 2550	6800
59	75719	DIFFUSER (GS)	5050x 1800x 2550	6800
60	75720	LP INNER OUTER CASING (U/H)	8640x 3650x 2550	36100
61	75721	LP INNER CASING (L/H)	9100x 3890x 3180	54540
62	75722	LP INNER INNER CASING (U/H)	4600x 1900x 2350	13300
63	75723	LP CASING ASSEMBLY	5000x 2500x 800	5910
64	75724	LP INNER CASING ASSLY/FASTENER	2000x 1000x 600	2050

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
65	75725	INNER GUIDE PLATE OF DIFFUSER(GS)	2300x 2300x 500	1700
66	75728	STEAM INLET PIPE (LPT)	3200x 1500x 1500	1700
67	75801	LP ROTOR	8800x 4000x 4162	95240
68	75901	IP ROTOR	4800x 2120x 1995	23132
69	75902	IP OUTER CASING (U/H)	4050x 3800x 2650	25850
70	75903	IP OUTER CASING (L/H)	3400x 5250x 2600	25870
71	75904	IP INNER CASING (U/H)	2900x 3200x 1850	15200
72	75905	IP INNER CASING (L/H)	2900x 3200x 1850	15200
73	75906	IP INLET ASSEMBLY	4500x 3725x 1300	13550
74	75907	IP SHAFT SEALING	1400x 1200x 900	950
75	75908	IP TURBINE (PARTS)	2000x 1900x 1000	3125
76	75909	I.P. TURBINE PARTS	1000x 1000x 750	475
77	76001/1	HP TURBINE	5675x 3400x 2900	88650
78	76001/2	EMERGENCY GOVERNOR	495x 395x 695	57
79	76002	HP INLET ASSLY. & HP EXHAUST ASSLY.(PARTS)	1200x 1200x 500	80
80	76003	HP EXHAUST ASSEMBLY	1650x 1400x 900	2000
81	76004	HPT RELATED PARTS	1300x 1300x 700	200
82	76104	ESV & CV CASING WITH VALVES	3360x 3360x 2590	23146
83	76105/1	ESV SERVOMOTOR WITH LIMIT SWITCHES	2300x 1200x 1200	4250
84	76105/2	ESV SERVOMOTOR WITH LIMIT SWITCHES	2300x 1200x 1200	4250
85	76107	HP CONTROL VALVE SERVOMOTOR	2800x 1200x 2100	3280
86	76108	ESV & CV CASING WITH VALVES	3360x 3360x 2590	23146
87	76112	HP CONTROL VALVE SERVOMOTOR	2800x 1200x 2100	3288
88	76201	SUSPENSION OF VALVE (IV)	4250x 2640x 750	8078
89	76202	IV & CV CASING WITH VALVES	5040x 4690x 2770	33276
90	76203/1	IV SERVOMOTOR WITH LIMIT SW. MOUNTINGS	2700x 1450x 1400	3965
91	76203/2	IV SERVOMOTOR WITH LIMIT SW. MOUNTINGS	2700x 1450x 1400	3965
92	76204	IP CONTROL VALVE SERVOMOTOR	3240x 1240x 1950	3019
93	76205/1	FRAME FOR SUSPENSION (IV)	3400x 3150x 750	2026
94	76205/2	FRAME FOR SUSPENSION (IV)	3400x 3150x 750	2026

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
95	76205/3	LOOSE ITEMS FOR FRAME FOR SUSPENSION	300x 200x 200	20
96	76206	IV & CV CASING WITH VALVES	5040x 4690x 2770	33276
97	76210	IP CONTROL VALVE SERVOMOTOR	3240x 1240x 1950	3019
98	76301/1	SUSPENSION OF LPBP VALVES	3600x 1700x 800	1836
99	76301/2	SUSPENSION OF LPBP VALVES	3600x 1700x 800	1836
100	76402	INJECTOR FOR SUC. PIPE NB 350	3300x 800x 800	588
101	76403	INJECTOR FOR SUC. PIPE NB 300	3300x 1750x 1200	999
102	76404	MAIN OIL TANK & NOZZLE ARRGT. ASSY	6180x 3260x 2650	10697
103	76405	MAIN OIL TANK & NOZZLE ARRGT. ASSY	4200x 1200x 900	402
104	76406	OIL STRAINERS	1500x 1000x 1200	228
105	76407	OIL STRAINERS	1500x 1000x 1200	228
106	76409	OIL STRAINERS	2050x 1200x 1410	470
107	76412	DIRTY/LEAKAGE OIL TANK	1000x 1000x 3000	515
108	76413	WASTE OIL TANK	1000x 1000x 3000	515
109	76414	VAR.ORIFICES THR.VALV.&FLUSH.PARTS	1700x 700x 760	255
110	76415	VARIABLE ORIFICE 125	400x 300x 200	50
111	76601	PARTS OF A CROSS AROUND PIPE	3500x 1750x 1800	2150
112	76602	PARTS OF A CROSS AROUND PIPE	3500x 1750x 1800	2150
113	76603	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3190
114	76604	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3190
115	76605	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3190
116	76606	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3190
117	76607	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3270
118	76608	COMPENSATOR ASSEMBLY(CAP)	1900x 1950x 1750	3270
119	76609	REDUCER ASSEMBLY(CAP)	1250x 1250x 500	242
120	76610	REDUCER ASSEMBLY(CAP)	1250x 1250x 500	242
121	76611	CROSS AROUND PIPE (PARTS)	2000x 1150x 600	2030
122	76612	CROSS AROUND PIPE (PARTS)	2000x 1150x 600	2030
123	76613	MITRE BEND ASSEMBLY(CAP)	3640x 1540x 2040	2240
124	76614	MITRE BEND ASSEMBLY(CAP)	3640x 1540x 2040	2240
125	76701	CHANGE OVER VALVE	800x 500x 200	97
126	76702/1	CRH NRV WITH SERVOMOTOR	3200x 2300x 2600	10528
127	76702/2	STEAM BLOWING DEV. FOR NRV CRH LINE	2500X1600X1200	5600
128	76703	GLAND STEAM PRESSURE INDICATOR	300X300X300	15

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
129	76801	RATING,COLLABORATION&COMPANY'S MONOGRAM PLATE	850x 550x 200	55
130	76901	OIL STRIPPER	600x 600x 850	133
131	76902	OIL STRIPPER	600x 600x 850	133
132	76903	HOUSING FOR M.S STRAINER	1725x 1250x 730	2370
133	76904	HOUSING FOR M.S STRAINER	1725x 1250x 730	2370
134	76908	HOUSING FOR HRH STEAM STRAINER	2275x 1650x 1100	4480
135	76909	HOUSING FOR HRH STEAM STRAINER	2275x 1650x 1100	4480
136	76912/1	BLANKING ARRANGEMENT FOR MS STRAINER HOUSINGS	1000x 900x 800	948
137	76912/2	BLANKING ARRANGEMENT FOR HRH STEAM STRAINER HOUSINGS	1600x 1200x 1000	2535
138	76913	GASKETS FOR MS & HRH STRAINER HOUSINGS	1000x 1000x 600	37
139	76914	COMPENSATOR	600x 600x 900	50
140	76915	ASSY. & DISASSY. DEVICES FORMS & HRH STEAM STRAINERS	2140x 1400x 500	564
141	76917	STEAM STRAINER (MS)	1200x 900x 500	350
142	76918	STEAM STRAINER (HRH)	1800x 1500x 800	750
143	77001	GOV.SYSTEM CONTROL RACK ASSLY. & TRANSPORT DEVICE	2800x 1360x 2750	1847
144	77002	SUPPLY RACK HP VALVE-2 (RIGHT)	2300x 1400x 2550	1797
145	77003	SUPPLY RACK HP VALVE-1 (LEFT)	2300x 1400x 2550	1797
146	77004	SUPPLY RACK FOR IP VALVES 1 & 2	2300x 1400x 2550	2080
147	77006	GOVERNING SYSTEM PROTECTION RACK & TRANSPORT DEVICE	2450x 1300x 2250	1622
148	77201	TURBINE INSTRUMENTS RACKS-FRAME	2750x 1500x 800	2600
149	77202	TEMP. AND PRESSURE CONNECTIONS	1700x 750x 750	750
150	77203	IMPLUSE PIPES (CARBON STEEL)	6900x 650x 500	1225
151	77204	GAUGES AND SENSORS	2800x 1250x 1250	1035
152	77205	TRANSMITTERS & J.B.OF BEARINGS	500x 300x 200	118
153	77206	IMPULSE PIPES (ALLOY STEEL AND SS)	6900x 500x 500	1136
			SUB TOTAL (A)	**946599**

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
B	**GENERATOR**			
1	501	STATOR	8830x 4100x 4120	258000
2	502	ROTOR	14000x 1850x1750	73159
3	503	END SHIELD LOWER HALF (TE)	6000x 2296x 2640	31473
4	504	END SHIELD UPPER HALF (TE)	6000x 2296x 2640	28747
5	505	END SHIELD LOWER HALF (EE)	4700x 1500x 2420	12847
6	506	GENERATOR BEARING (2 NOS.).	1250x 1150x 1250	3006
7	508	BAFFLE RING,BAFFLE RING CARIER & AIR GAP SEAL ASSLY.	1682x 1688x 1095	347
8	509	TERMINAL BUSHING (6 NOS.)	2200x 1830x 610	1427
9	510	TERMINAL BUSHING BOX WITH COVER	3600x 2500x 1940	11580
10	511	SHAFT SEALS (EE & TE) AND OIL CATCHER(INNER & OUTER)	2140x 1140x 840	1560
11	512	COMPRESSOR BAFFLE RING ASSLY.	1920x 1920x 1340	1745
12	515	GENERATOR END SHIELD BASE EE & TE (2 NOS EACH)	1940x 1550x 980	3464
13	516	PRIMARY WATER TANK	8100x 2000x 1200	2000
14	517	P.W.TANK PIPE LINES	6800x 2100x 500	818
15	518	FOUNDATION PLATES	2895x 760x 840	3030
16	519	ANCHOR BOLTS	2740x 655x 600	1485
17	520	CHANNELS,ANGLES,PIPES & STUDS	5800x 1120x 520	1558
18	521	ROTOR & GENERAL ASSY.DEVICES	2460x 1170x 1240	2952
19	524	WIRE ROPE FOR ROTOR (2 NO.)	1800x 1800x 400	289
20	530	GENERATOR ACCESSORIES	2140x 2140x 1240	1608
21	530/1	GENERATOR ACCESSORIES	1350x 850x 300	472
22	531	GENERATOR ACCESSORIES	2240x 940x 1220	1525
23	532/1	DRY AIR BLOWER	1100x 1000x 700	80
24	532/2	GENERATOR MAINTENANCE DEVICES	2550X1180X1140	1405
25	533	ERECTION DEVICES/FOUNDTN ITEMS	1640x 1140x 1240	2781
26	534	BRUSHLESS EXCITER SET WITH COVERS	5750x 2350x 3400	32928
27	535	BRUSHLESS EXCITER FRONT COVER WITH PACKING	4400x 3400x 3100	4478
28	536	BRUSHLESS EXCITER REAR COVER WITH PACKING	4400x 3400x 3100	4978

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
29	537	EXCITER BED PLATE ACCESSORIES & RACK ASSLY.	3900x 1250x 1150	1741
30	539	SEAL OIL STORAGE TANK	3700x 1400x 1260	1532
31	540	PW PUMP AND FILTER UNIT	3450x 2750x 2815	5294
32	541	MEASURING INSTRUMENT RACK	1550x 910x 1715	831
33	542	SEAL OIL MOTOR PUMP UNIT	3320x 1740x 1340	3035
34	543	SEAL OIL UNIT	3100x 3000x 3400	7890
35	544	SEAL OIL VALVE RACK	2700x 1140x 2440	1935
36	545	GAS UNIT	1980x 1640x 2420	1205
37	547	CO2 VAPOURISER	1520x 840x 840	250
38	549	EXCITER BED PLATE ACCESSORIES(NON TEST BED)	5800x 1140x 1240	2925
39	550	EXCITER ACCESSORIES	2200x 1100x 1100	1111
40	551	END SHIELD UPPER HALF (EE)	4700x 1500x 2420	9353
41	556	P.W.TANK PIPE LINES	3000x 600x 500	454
42	557	SPECIAL TOOLS AND TACKLES	800X700X300	87
43	558	EMBEDMENTS	800x 800x 300	928
44	559	SEALING FOR TRANSPORT	3950x 2420x 150	869
45	561	SEAL RING	700x 700x 200	80
46	562	CONNECTION PIECE ASSEMBLY	1600x 1050x 400	862
47	563	GENERATOR ACCESSORIES	1700x 1200x 250	140
48	564	COOLER AIR VENT ASSEMBLY	8300x 150x 100	51
49	565	H2 DISTRIBUTOR	3480x 1540x 440	333
50	566	CO2 DISTRIBUTOR	4860x 1240x 440	353
51	567	N2 DISTRIBUTOR	1400x 1240x 440	143
52	568	TG SYSTEM INTEGRAL PIPING(HANGER & SUPPORTS)	6200x 1500x 1200	3410
53	569	TG SYSTEM INTEGRAL PIPING(FITTINGS)	3500x 1700x 1000	2576
54	570	TG SYSTEM INTEGRAL PIPING(STRAIGHT PIPES)	7000x 1000x 1300	5560
55	571	TG SYSTEM INTEGRAL PIPING(STRAIGHT PIPES)	6600x 1500x 2000	9380
56	572	TG SYSTEM INTEGRAL PIPING(FLANGES)	3500x 1700x 300	2576
57	573	TG SYSTEM INTEGRAL PIPING(HANGER & SUPPORTS)	2500x 1200x 1000	1555
58	574	TG SYSTEM INTEGRAL PIPING(VALVES)	2750x 1400x 1400	3799

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
59	575	TG SYSTEM INTEGRAL PIPING(INSTRUMENTS)	1000x 940x 900	177
60	576	TG SYSTEM INTEGRAL PIPING(FASTENERS & SEALINGS)	1000x 1000x 500	630
61	577	EXCTR. BED PLATE ACCESSORIES(NON TEST BED ITEMS)	1000x 800x 800	775
62	578	RESINS	1200x 600x 600	100
63	580	EMBEDMENTS FOR PORTAL CRANE	1400x 1000x 400	1651
64	581	ALKALYSER UNIT	1150x 780x 1900	267
65	582	PLATFORM FOR P W TANK	5000x 1000x 500	852
66	583	TG SYSTEM INTEGRAL PIPING(STRAIGHT PIPES)	7000x 400x 300	230
67	584	RR WHEEL AIR GUIDE COVER	2800x 1500x 2000	1572
68	585	CONSUMABLES	800x 400x 200	55
			SUB TOTAL(B)	**566309**

HARIDWAR SUPPLY

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
C	CONDENSER			
1	78001	HOT WELL(FRONT HALF)	7680x 3280x 1800	7855
2	78002	HOTWELL (REAR HALF)	5680x 3280x 1870	6300
3	78004	FRONT / REAR BOTTOM PLATE	8760x 2050x 720	4736
4	78005	FRONT/REAR BOTTOM PLATE	8760x 2050x 720	4736
5	78006	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
6	78007	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
7	78008	MIDDLE BOTTOM PLATE-I	8760x 3000x 720	5052
8	78009	MIDDLE BOTTOM PLATE-II	8760x 2340x 720	5024
9	78010	BOTTOM PLATE LOOSE ITEMS	2400x 850x 100	750
10	78012	CONDENSER SUPPORT	2280x 2000x 740	5265
11	78013	CONDENSER SUPPORT	3060x 2080x 960	5265
12	78014	CONDENSER SUPPORT	3000x 2110x 1000	6400
13	78018	CONDENSER SUPPORT	1100x 800x 650	4552
14	78019	CONDENSER SUPPORT	1920x 1000x 660	6100
15	78020	FRONT WATER CHAMBER (GS)	7044x 4469x 540	10000
16	78022	FRONT WATER BOX (GS)	7645x 4460x 2640	28700
17	78023	FRONT WATER CHAMBER (TS)	7044x 4460x 540	10000
18	78025	FRONT WATER BOX (TS)	7645x 4460x 2640	28700
19	78026	REAR WATER CHAMBER (GS)	7044x 4469x 540	10000
20	78028	REAR WATER BOX (GS)	6655x 4460x 2495	21560
21	78029	REAR WATER CHAMBER (TS)	7044x 4469x 540	10000
22	78031	REAR WATER BOX (TS)	6655x 4460x 2495	21560
23	78032	SIDE WALL (TUR.SIDE)	7070x 2400x 120	14488
24	78038	SIDE WALL TUR.SIDE(LOOSE ITEM)	7050x 300x 230	880
25	78040	SIDE WALL (GEN.SIDE)	7070x 2400x 120	14488
26	78046	SIDE WALL GEN.SIDE(LOOSE IT	7050x 300x 230	880
27	78048	SHELL INTERNAL STIFFENING RODS	3616x 825x 500	4393
28	78049	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
29	78050	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
30	78051	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
31	78052	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
32	78053	SHELL INTERNAL STIFFENING RODS	3616x 800x 500	4393
33	78054	SHELL INTERNAL STIFFENING RODS	2550x 750x 500	4424

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
34	78055	SHELL INTERNAL STIFFENING RODS	2550x 500x 500	2328
35	78056	SHELL INTERNAL STIFFENING RODS	3840x 500x 500	3591
36	78057	SHELL INTERNAL DETAILS	1800x 550x 550	1100
37	78058	AIR EXTRACTION PIPE	6550x 1030x 750	2200
38	78059	TUBE SUPPORT PLATE	6490x 4225x 224	8620
39	78060	TUBE SUPPORT PLATE	6490x 4225x 224	8620
40	78061	TUBE SUPPORT PLATE	6490x 4225x 224	8620
41	78062	TUBE SUPPORT PLATE	6490x 4225x 224	8620
42	78063	TUBE SUPPORT PLATE	6490x 4225x 224	8620
43	78064	TUBE SUPPORT PLATE	6490x 4225x 224	8620
44	78065	TUBE SUPPORT PLATE	6490x 4225x 224	8620
45	78066	TUBE SUPPORT PLATE	6490x 4225x 224	8620
46	78069	SHELL INTERNAL DETILS	1500x 800x 450	6320
47	78070	SHELL INTERNAL DETAILS	6300x 900x 600	4430
48	78071	SHELL INTERNAL DETAILS	1300x 1200x 600	3196
49	78075	LOWER DOME WALL (TUR.SIDE)	13350x 4030x 550	10775
50	78076	LOWER DOME WALL (TUR.SIDE)	10200x 1600x 113	4306
51	78077	LOWER DOME WALL (TUR.SIDE)	4900x 700x 360	1090
52	78103	LOWER DOME WALL (GEN. SIDE)	13350x 4030x 930	11171
53	78104	LOWER DOME WALL (GEN.SIDE)	10200x 1600x 1073	4002
54	78105	LOWER DOME WALL(GEN.SIDE)LOOSE	4900x 1400x 900	1170
55	78109	LOWER DOME WALL (FWB SIDE)	9052x 4266x 1000	7710
56	78110	LOWER DOME WALL (FWB SIDE)	7808x 2192x 865	3280
57	78111	LOWER DOME WALL (FWB SIDE)	1650x 1100x 1100	837
58	78115	LOWER DOME WALL (RWB.SIDE)	7805x 2182x 510	3650
59	78116	LOWER DOME WALL (RWB SIDE)	9052x 4158x 1525	9845
60	78117	LOWER DOME WALL (RWB SIDE)	1800x 1800x 1500	942
61	78121	DOME INTERNAL STIFFENING	1840x 1350x 1535	3988
62	78122	DOME INTERNAL STIFFENING	2176x 1500x 1285	4919
63	78123	DOME INTERNAL STIFFENING	2766x 1500x 1120	6370
64	78124	DOME INTERNAL STIFFENING	5250x 2270x 220	981
65	78125	DOME INTERNAL STIFFENING	1470x 750x 500	2880
66	78126	DOME INTERNAL STIFFENING	5250x 2270x 220	981
67	78129	LP HEATER NO-1 SUPPORT ARRANGE	2250x 1700x 1070	3425

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
68	78130	LP HEATER SUPPORT ARRANGEMENT	7125x 1125x 580	3665
69	78132	UPPER DOME WALL (TURBINE SIDE)	8700x 1600x 296	2628
70	78133	UPPER DOME WALL(GEN SIDE)	8700x 1600x 296	2628
71	78136	UPPER DOME WALL (FWB SIDE)	7180x 3000x 300	5410
72	78137	UPPER DOME WALL (FWB SIDE)	3600x 550x 200	692
73	78139	UPPER DOME WALL (RWB SIDE)	7180x 3000x 450	5754
74	78140	UPPER DOME WALL (RWB SIDE)	3600x 550x 200	692
75	78142	W/BOX HINGE ARRANGEMENT	2450x 1650x 400	3710
76	78143	W/BOX HINGE ARRANGEMENT	500x 500x 250	60
77	78144	W/BOX HINGE ARRANGEMENT	2500x 600x 750	1630
78	78149	W/BOX HINGE ARRANGEMENT	800x 660x 300	300
79	78151	W/BOX HINGE ARRANGEMENT	1670x1040x480	914
80	78154	STEAM THROW DEVICE	2400x 1250x 1100	2356
81	78155	STEAM THROW DEVICE	2400x 1250x 1100	2356
82	78157	CONDENSER LOOSE ITEMS	4250x 1050x 1150	1212
83	78158	CONDENSER LOOSE ITEMS	800x 600x 500	103
84	78159	LOOSE ITEMS	1150x 1150x 1000	2737
85	78160	LOOSE ITEMS (TOOLS & TACKLES)	300x 350x 500	45
86	78161	CONDENSER LOOSE ITEMS	550x 550x 150	146
87	78166	CONDENSER STAND PIPES NO.1,2	3500x 600x 600	184
88	78167	LOOSE ITEMS CONDENSER STAND	3100x 250x 250	383
89	78175	CONDENSER INSTRUMENTATION	1500x 1300x 700	733
90	78176	CONDENSER INSTRUMENTATION	1550x 600x 600	242
91	78301	GLAND STEAM CONDENSER	1750x 1200x 1700	1610
92	78304	LOOSE ITEMS OF GSC	700x 300x 200	60
93	78305	LOOSE ITEMS OF GSC (FRAGILE)	600x 500x 350	35
94	78315	LP HEATER 1	13000x 2100x2000	21100
95	78316	STAND PIPES OF LPH-1	2800x 350x 350	150
96	78317	LOOSE ITEMS OF LPH NO.1	500x 400x 400	135
97	78318	LOOSE ITEMS OF LP HEATER NO.1	700x 400x 400	75
98	78319	LOOSE ITEMS OF LPH -1(NFRAGILE	2100x 500x 400	170
99	78320	TROLLEY FOR LP HEATER NO.1	1350x 800x 200	664
100	78401	TURBINE OIL COOLER	5850x 1700x 2300	13830
101	78402	TURBINE OIL COOLER	5850x 1700x 2300	13830
102	78406	LOOSE ITEMS OF TOC	800x 800x 500	130

SL	PKG.NO	DESCRIPTION	PKG.SIZE(MM)	GR.WT IN KG.
103	78417	PRIMARY WATER COOLER	4300x 1350x 1350	2220
104	78418	PRIMARY WATER COOLER	4300x 1350x 1350	2220
105	78420	LOSE ITEMS OF PWC	400x 300x 300	38
106	78424	HYDROGEN COOLER	4600x 1450x 800	2665
107	78425	HYDROGEN COOLER	4600x 1450x 800	2665
108	78426	HYDROGEN COOLER	4600x 1450x 800	2665
109	78427	HYDROGEN COOLER	4600x 1450x 800	2665
110	78428	LOOSE ITEMS (HYDROGEN COOLERS)	1300x 1000x 600	2140
111	78431	EXCITER AIR COOLER	3780x 920x 830	1980
112	78432	EXCITER AIR COOLER	3780x 920x 830	1980
113	78436	CONTROL FLUID COOLER	3300x 850x 1030	1506
114	78437	CONTROL FLUID COOLER	3300x 850x 1030	1506
115	78438	LOOSE ITEMS(CFC)	600x 600x 500	103
			SUB TOTAL (C)	**563346**
D	**ACG**			
1	12001	STARTER CABINET FOR DC SEAL MOTOR	1230x 1060x 2550	450
2	12002	GENERATOR INSTRUMENTATION CABINET	1230x 1060x 2550	550
3	12003	LOOSE ITEMS	600x 600x 400	60
4	12004	LOOSE ITEMS	1000x 800x 600	60
5	12005	STARTER CABINET FOR DC JACKING MOTOR	1230x 1060x 2550	550
6	12006	STARTER CABINET FOR DC EMERGENCY OIL MOTOR	1230x 1060x 2550	550
			SUB TOTAL (D)	**2220**
			HARIDWAR SUPPLY - TOTAL (A+B+C+D)	**2078474**

BHOPAL SUPPLY

S.N	DESCRIPTION	QTY	SIZE (MM)	Unit Wt (Kg.)	Total Wt (Kg.)
A.	**RE JOINTS**				
1	REJ OUTLET (PB Type)	1	3750(W)X4450(H)	23090	23090
2	REJ INLET (PB Type)	1	3550(W)X4150(H)	24010	24010
				SUB TOTAL (A)	**47100**
B.	**FLASH TANKS**				
1	H.P. Flash Tank	1	3000(D)X5300(L)	8060	8060
2	L.P. Flash Tank	1	2500(D)X5200(L)	6405	6405
3	Steam Drain Flash Tank	1	2200(D)X3450(L)	3700	3700
4	Unit Flash Tank	1	1200(D)X3000(L)	1630	1630
5	F.W.H.S.V.D Flash Tank	1	1200(D)X3450(L)	1711	1711
				SUB TOTAL (B)	**21506**
C.	**MISC TANKS**				
1	DMCW Tank, 10 Cu.m.	2	7150 (L) x 2000 (D) x 12 Tk	6000	12000
2	Clean Oil Tank, 60 Cu. m	1	5.0 (L) x 4.5 (w) x 3 (H)	10200	10200
3	Dirty Oil Tank , 60 Cu. m	1	5.0 (L) x 4.5 (w) x 3 (H)	10200	10200
4	Oil Unloading Vessel, 01 Cu. m	1	2 (L) x 1.0 (w) x 0.5 (H)	584	584
				SUB TOTAL (C)	**32984**
D.	**BF VALVES**				
1	DIA. 2200	8	3800 X 3200 X 800	11530	92240
2	DIA. 700	4	1600 X 1100 X 400	1310	5240
3	DIA. 500	6	1300 X 800 X 350	645	3870
4	DIA. 400	2	1100 X 600 X 300	430	860
5	DIA. 400	26	1100 X 600 X 300	390	10140
6	DIA. 400	6	1100 X 600 X 300	390	2340
				SUB TOTAL (D)	**114690**
E.	**MOTORS**				
1	BFP	1	4300Lx4500Wx2400H	23500	23500
2	CEP	3	2050Lx1600Wx2550H	5400	16200
3	Boxes for Loose Items	6	2500Lx1000Wx1000H	1000	6000
				SUB TOTAL (E)	**45700**
BHOPAL SUPPLY - TOTAL (A+B+C+D+E)					**261980**

HYDERABAD SUPPLY

S.No	Description	Total Qty	Unit WT(in Kg)	Total Weight(in Kg)
A.	**BOOSTER PUMPS**			
1	BOOSTER PUMPS (MD+TDA+TDB)	3	5710	17130
2	B.P. SKIDS	3	1000	3000
3	LOOSE ITEMS			115
			SUB TOTAL (A)	**20245**
B.	**BOILER FEED PUMPS**			
1	BOILER FEED PUMP(MD+TDA+TDB)	3	11500	34500
2	GRILLAGE ASSLY. (BP+MOTOR)	1	3710	3710
3	GRILLAGE ASSY. (BPF+HC)	1	3800	3800
4	BFP SKIDS	3	1000	3000
5	HYDRAULIC COUPLING	1	15000	15000
6	R.C. VALVES	3	900	2700
7	CONICAL TYPE SUCTION STRAINER	3	1200	3600
8	BASKET TYPE SUCTION STRAINER	3	2350	7050
9	PORTABLE OIL CENRIFUSE	1	1000	1000
10	LOCAL GUAGE BOARD	3	1000	3000
11	CONNECTING COUPLING (BFP AND HC)	1	80	80
12	CONNECTING COUPLING (MOTOR AND HC)	1	357	357
13	CONNECTING COUPLING (BP AND MOTOR)	1	31	31
14	LOCAL INSTRUMENT RACK	1	200	200
15	LOCAL GUAGE BOARD	3	1050	3150
16	LOCAL GUAGE BOARD	3	850	2550
17	HYDRAULIC COUPLING WORKING OIL	1	8820	8820
18	LOOSE ITEMS			9800
			SUB TOTAL (B)	**102348**
C.	**CONDENSATE EXTRACTION PUMP**			
1	CONDENSATE EXTRACTION PUMP(A, B, C)	3	6220	18660
2	CEP CANISTERS ASSLY	3	2910	8730
3	SUCTION STRAINER SIMPLEX	3	1500	4500
4	CONNECTING COUPLING FOR CEP	3	50	150
5	LOCAL INSTRUMENT RACK	1	250	250
6	LOCAL GUAGE BOARD	1	400	400

S.No	Description	Total Qty	Unit WT(in Kg)	Total Weight(in Kg)
7	LOCAL GUAGE BOARD	1	1000	1000
8	LOOSE ITEMS			4350
			SUB TOTAL (C)	**38040**
D.	**DRAIN COOLER**			
1	DRAIN COOLER ASSLY	1	5400	5400
2	LOOSE ITEMS			143
			SUB TOTAL (D)	**5543**
E.	**DEAERATOR**			
1	DEAERATOR STORAGE TANK SECTION -I	1	30280	30280
2	DEAERATOR STORAGE TANK SECTION -II	1	25388	25388
3	DEAERATOR STORAGE TANK SECTION -III	1	31897	31897
4	HEADER ASSLY	1	28532	28532
5	LOOSE ITEMS			23130
			SUB TOTAL (E)	**139227**
F.	**LP HEATER**			
1	L.P. HEATER 2	1	26000	26000
2	L.P. HEATER 3	1	18000	18000
3	LOOSE ITEMS			1784
			SUB TOTAL (F)	**45784**
G.	**HP HEATER**			
1	H.P.HEATER 5A	1	44500	44500
2	H.P.HEATERS 6A	1	54000	54000
3	H.P.HEATERS 5B	1	44500	44500
4	H.P.HEATERS 6B	1	54000	54000
5	LOOSE ITEMS			5186
			SUB TOTAL (G)	**202186**
H.	**DRIVE TURBINE**			
1	TWIN OIL COOLER(BFP AND DT)	2	5700	11400
2	DC STARTER CUIBICAL	2	2000	4000
3	ASSEMBLED DRIVE TURBINE	2	14560	29120
4	GEAR BOX	2	1000	2000
5	LUBE OIL CONSOLE ASSEMBLY 1	2	9011	18022
6	LUBE OIL CONSOLE ASSEMBLY 2	2	65818	131636
7	EMERGENCY OIL PUMP	2	1700	3400
8	THERMAL INSULATION	2	800	1600

S.No	Description	Total Qty	Unit WT(in Kg)	Total Weight(in Kg)
9	JACKING OIL PUMP	2	175	350
10	TURBINE OIL PURIFICATION UNIT	2	1500	3000
11	OIL ACCUMULATOR	2	30	60
12	CHARGING KIT	2	10	20
13	CENTRIFUGAL EXAUST FAN	4	150	600
14	TRANSFER OIL PUMP	2	350	700
15	SERO PRIME-46 OIL	2	21000	42000
16	ACCOUSTICS ENCLOSURE	2	3000	6000
17	URBINE BLADED ROTOR	1		0
18	LOOSE ITEMS			41126
			SUB TOTAL (H)	**295034**
HYDERABAD SUPPLY - TOTAL (A+B+C+D+E+F+G+H)				**848407**

HARIDWAR BOI SUPPLY

SN	ITEM ID	ITEM DESCRIPTION	QTY	UNIT	WT Gross (KG)
(A)	**Generator & Auxilaries**				
1	BG001	Empty H2 Cylinder	123	Nos.	10835.0
2	BG002	Empty CO2 Cylinder	62	Nos.	
3	BG003	Empty N2 Cylinder	12	Nos.	
4	BG004	Portable Gas Analyzer	1	No.	
5	BG005	Moisture Measuring Equipment	1	Set	16.0
6	BG007	Vapour Exhauster	2	Nos.	80.0
7	BG009	Hydrogen Gas Analyzer Cabinet	2	Nos.	
8	BG011	Refrigeration Gas Dryer	2	Nos.	2000.0
9	BG018	Starting Resistor for DC Seal Oil Motor	1	No.	250.0
10	BG019	Sound Absorbing Lining for Exciter Cover & Coupling Cover	1	Set	1500.0
11	BG021	Grounding Brush Monitor	1	Set	
12	BG023	Continuous On-line Partial Discharge Monitoring System	1	Set	39.0
13	BG066	Generator End Winding Vibration Monitoring Equip.	1	Set	
14	BG080	Stroboscope	1	No.	
15	BG082	Hydraulic Unit Assembly (Common for both units)	1	Set	
			SUB TOTAL (A)		**14720.0**
(B)	**Condenser & Heat Exchanger**				
1	BH001	Welded Austenitic S.S. Tubes GR.304 (For Condenser)	1	Set	300000.0
2	BH010	Condenser Air Evacuation Package (Vacuum Pump)	2	Nos.	8556.0
3	BH012	Air Exhauster with Motor (GSC Air Exhauster)	2	Nos.	300.0
4	BH013	Front Water Box Handling Arrangement	1	Set	3000.0
			SUB TOTAL (B)		**311856.0**
(C)	**Turbine & Auxilaries**				
1	BT001	Lifting Beam (Common for both units)	1	No.	6200.0
2	BT002	Jacking oil pumps	1	Set	2630.0
3	BT003	AOP & EOP	1	Set	1000.0
4	BT004	Duplex Filter (Lub. Oil)	1	No.	620.0

SN	ITEM ID	ITEM DESCRIPTION	QTY	UNIT	WT Gross (KG)
5	BT005	Duplex Filter (Jacking Oil)	1	No.	163.0
6	BT006	Butterfly Valves	1	Set	80.0
7	BT007	Three Way Temp. Control Valve	1	Set	615.0
8	BT008	Double Three way valves	1	Set	230.0
9	BT009	NRV with Aluminum Flap	1	Set	35.0
10	BT010	Pressure Limit Valve	2	No.	
11	BT011	Oil Purification Unit (Oil Centrifuge)	1	No.	
12	BT012	Oil Vapour Exhauster	2	Nos.	180.0
13	BT013	Lead Diaphragm	4	Nos.	108.0
14	BT014	Spray Nozzles	1	Set	1.5
15	BT015	Dirt Catchers	1	No.	27.0
16	BT016	Damper	1	Set	125.0
17	BT017	Variable load spring Cages	1	Set	1370.0
18	BT018	Flexible Bends	1	Set	
19	BT019	Vacuum Breaker Valve Assy. Along with solinoid valve	1	No.	
20	BT023	Turbine Oil	1	Ltr	98070.0
21	BT024	Dry Air Preservation system	1	No.	
22	BT025	Oil Purification System (Ctrl	1	No.	
23	BT027	Turbine Integral Piping	1	Set	62658.0
24	BT028	H&S For Turbine Integral Piping	1	Set	15321.0
25	BT029	Flow Nozzles for PG Test	1	Set	
26	BT031	Through Port Gate Valve	1	Set	300.0
27	BT032	Globle Valve	2	Nos.	500.0
28	BT033	Spring Loaded NRV	1	Set	200.0
29	BT035	Control Fluid Pump	2	Nos.	500.0
30	BT036	Control Fluid Vapour Exhauster	2	Nos.	
31	BT037	Control Fluid Purification Unit	1	No.	
32	BT038	Control Fluid Tank (SS)	1	No.	
33	BT039	On Line Control Fluid Heater	1	No.	
34	BT040	Remote Trip Solenoid Valve	1	No.	
35	BT043	Control Fluid (FRF)	1	Lot	
36	BT044	Gear Pumps	1	Set	
37	BT046	LP Bypass Stop & Control Valve with EHA and Water Injection Valve	1	Set	500.0

SN	ITEM ID	ITEM DESCRIPTION	QTY	UNIT	WT Gross (KG)
38	BT067	Hydraulic Accumulators along with Filling and Gauging device	1	Set	500.0
39	BT068	Power Cables for 24 V Solenoid Valves	1	Set	
40	BT075	Seal Steam Supply & Leakage Steam Control Valve With Pneumatic Actuator	1	Set	
41	BT081	HPT Steam Evacuation Valve	1	No.	
42	BT093	TG Deck Embedment	1	Set	
				SUB TOTAL (C)	**191933.5**
				HARIDWAR BOI SUPPLY - TOTAL (A+B+C)	**518509.5**

PEM BOI

S. No	PACKAGE	WT Gross (KG)
1	AIR RELEASE VALVE	600.0
2	AIR TRAPS	500.0
3	ALUMINIUM SHEET	62500.0
4	CHAIN PULLEY BLOCK	6000.0
5	CONTROL VALVES	
6	ELECTRIC HOIST	3000.0
7	FLOW ELEMENTS	6000.0
8	LUBE OIL TRANSFER PUMPS	500.0
9	ME BELLOWS	34500.0
10	MISC. PUMPS: HORIZONTAL	60000.0
11	PLATE HEAT EXCHANGERS	3000.0
12	PORTABLE OIL PURIFICATION SYSTEM	500.0
13	PRESSURE GAUGE	
14	TEMPERATURE GAUGES	
15	DIFF. PRESSURE SWITCH	
16	ROTAMETER	
17	SELF CLEANING STRAINER	
18	STEAM TRAPS	100.0
19	SUMP PUMPS/ SUBMERSIBLE PUMPS	2000.0
20	TEMPERATURE ELEMENT	
21	THERMAL INSULATION	265000.0
22	VALVES: ANGLE VALVE	500.0
23	VALVES: BALL VALVES	700.0
24	VALVES: BF VALVES (STEAM SERVICE)	11000.0
25	VALVES: BF VALVES (WATER SERVICE)	4000.0
26	VALVES: CI/GATE/GLOBE/NRV	3000.0
27	VALVES: Dual Plate check valve	3600.0
28	VALVES: FS / FSS GATE/GLOBE/NRV	2000.0
29	VALVES: GM VALVES	800.0
30	VALVES: STEEL GATE/GLOBE/NRV	800.0
31	VIS FOR BFP FOUNDATION	6432.5
32	VIS FOR TG FOUNDATION	45039.5
PEM BOI - TOTAL		**522072.0**

NOTE:

1. The list is tentative and has been given to enable the contractor to study the nature of work to be done in this contract. There may be variation in size, weight etc. and no claim, whatsoever, will be entertained on account of this by BHEL.
2. Some of the packages may be sent in parts to suit the site condition / transportation, the same is to be assembled at site without any extra cost, likewise the package may be assembled together and send as a single assembly. Contractor may have to dismantle and erect or erect as single assembly as per the instruction of BHEL engineers without any extra cost.

WEIGHT DETAILS

S.N.	EQUIPMENT / PACKAGE	GR.WT (IN KG.)	APPROX. WT. (IN MT)
1	STEAM TURBINE	946599	947
2	GENERATOR	566309	566
3	CONDENSOR	563346	563
4	ACG	2220	2
5	RE JOINTS	47100	47
6	FLASH TANKS	21506	22
7	MISC TANKS	32984	33
8	BUTTERFLY VALVES	114690	115
9	MOTORS	45700	46
10	BOOSTER PUMPS	20245	20
11	BOILER FEED PUMPS	102348	102
12	CONDENSATE EXTRACTION PUMPS	38040	38
13	DRAIN COOLER	5543	6
14	DEAERATOR	139227	139
15	LP HEATERS	45784	46
16	HP HEATERS	202186	202
17	DRIVE TURBINE	295034	295
18	HARIDWAR BOI	518509.5	519
19	PEM BOI	522072	522
TOTAL (FOR UNIT - 9)		**4229442.5**	**4229**

NOTE:

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.

PROPOSED PAINTING SCHEME FOR TG AREA

S N	AREA / DESCRIPTION	COLOUR	IS SPECIFICATION
1	A) HANGER SUPPORTS, B) PLATFORMS C) STAIR SIDE CHANNEL D) TG STRUCTURE, E) ELECTRIC HOIST & CHAIN PULLEY BLOCK STRUCTURE, F) FLOOR BEAMS. G) GALLERIES H) MANUAL DOORS	SMOKE GREY	SYNTHETIC ENAMEL AS PER IS:2932
2	A) FLOOR GRILLS, B) HANGERS, HANGER RODS C) SUSPENSION RODS, D) STAIR CASE STEP TREADS.	BLACK	SYNTHETIC ENAMEL AS PER IS:2932
3	A) TG LUB OIL PIPING	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
4	A) COOLING WATER PIPING B) AUX COOLING WATER PIPING C) LP PIPING DRAINS D) CONDENSATE PIPING	SEA GREEN	SYNTHETIC ENAMEL AS PER IS:2932
5	A) HAND RAILS AND POSTS B) CHUTE PIPE C) LADDER D) ELECTRICAL AND MECHANICAL HOISTS E) MONORAIL BEAMS	GOLDEN YELLOW	SYNTHETIC ENAMEL AS PER IS:2932
6	TOE GUARD PLATE	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
7	A) SILENCERS FOR SAFETY VALVES B) INSTRUMENT TAPPING POINTS ON STEAM LINES	HEAT RESISTENT ALUMINIUM	IS13183 Gr-I
8	STEAM PIPING (BAND - EACH 5MTR)	POST OFFICE RED	SYNTHETIC ENAMEL AS PER IS:2932
9	EQUIPMENT(PUMPS, OIL COOLERS, EXHAUST FANS, HT & LT MOTORS, BFP HYD COUPLING, VALVES, ACTUATORS ETC) AND PANELS.	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2932
10	PANELS (TOUCH UP PAINTING)	EXISTING MFG UNIT COLOUR	SYNTHETIC ENAMEL AS PER IS:2933
11	A) CONDENSER AIR EVACUATION PIPING B) INSTRUMENT AIR PIPING C) SERVICE AIR PIPING	SKY BLUE	SYNTHETIC ENAMEL AS PER IS:2932
12	FIRE FIGHTING	FIRE RED	SYNTHETIC ENAMEL AS PER IS:2932
13	LP TURBINE	BOTTLE GREEN	SYNTHETIC ENAMEL AS PER IS:2932
14	GENERATOR	ORANGE	SYNTHETIC ENAMEL AS PER IS:2932

15	EXCITER	ORANGE	SYNTHETIC ENAMEL AS PER IS:2932
16	TG LUB OIL TANK AND PIPING	GOLDEN BROWN	SYNTHETIC ENAMEL AS PER IS:2932
17	CONDENSER	BOTTLE GREEN	SYNTHETIC ENAMEL AS PER IS:2932
18	LEGEND IN BLOCK LETTER OVER GOLDEN YELLOW BACKGROUND	BLACK	SYNTHETIC ENAMEL AS PER 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 up to 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.

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. BHEL has arrangement with above suppliers for supervision services and the supervision charges for the same will be borne by BHEL. However, the contractor shall ensure readiness of equipment for grouting in all respect before such a service is requisitioned and the duration is not prolonged unduly. Any overstay required due to contractor shall be charged to the contractor with BHEL's departmental charges. 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 – COMMON REQUIREMENTS

13.1
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.

13.2
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.

13.3
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.

13.4
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.

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

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

13.7
All racks or assembled units like Governing Rack, LP Bypass Rack & HP Bypass system, 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.

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.

The scope of work for TG integral and miscellaneous piping covered under this specification shall include but not be limited to the following systems-

(a) Condenser air evacuation system
(b) Condenser cooling water system
(c) Cycle make-up system
(d) Control fluid system
(e) Gland steam sealing system
(f) Steam evacuation line (HPT exhaust) from CRH piping system
(g) Equipment cooling water system
(h) Lube oil system
(i) Central oil storage and purification system
(j) Exhaust hood spray system
(k) Gland sealing (of valves and pumps) system.
(l) Generator integral piping

Indicative list of schemes of piping and their approximate weights are provided relevant Appendix.

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 258 MT, will be delivered to site on a special wagon consisting of 8 bogies (four on either side) with facilities to swivel. These two sets of bogies are connected by a carrier beam, which carries the load of the stator. In the event of non availability of special wagon the stator may be transported by road using special trailer.
The contractor shall have to lift the generator stator from the above transport arrangement outside the machine hall.

16.1.2

The generator stator shall be lifted and placed by the contractor with the help of portal gantry crane/strand jack (as per the availability), as per the scheme envisaged by BHEL on to the generator foundation. For this purpose, the portal crane/strand jack system will be provided by BHEL free of hire charges to the contractor. However, the transportation from store/ storage yard / shed, assembly, erection, testing and commissioning of this portal crane/strand jack system before the stator lifting and transporting, dismantling, cleaning, shifting/ packing back to store/ storage yard/ shed after its use will be the responsibility of the contractor.

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

16.2 HANDLING OF HEAVIER EQUIPMENTS

Contractor shall provide all required suitable cranes and trailers for loading of materials during collection of from BHEL/ client's stores/ storage yard, transportation to site of work and at work site including unloading at site of works for all equipments and consignments including heavy and voluminous equipments/ components/ consignments like HP turbine module, IP turbine module, LP turbine inner–outer casing, LP turbine inner casing, LP rotor, generator rotor, brushless exciter, HP heaters, deaerator/ FST sections etc.

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

16.3 DEAERATOR INSTALLATION

16.3.1

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.

16.3.2

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.

16.3.4

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

(a) Vacuum pumps.
(b) Butterfly valves.
(c) Control fluid room.
(d) Central lube oil system room
(e) Other equipment covered under TG package

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 Boiler Feed Pumps, CEP, Vacuum Pumps, Booster Pump, 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, Deaerator, FST, Suction Strainers / Filter elements of CEP, BFP, Booster Pump, 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, Deaerator and FST as per requirement. Contractor shall carry out disassembly and reassembly of vulnerable components like deaerator 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

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 **per Unit**.

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 $8\text{-}10^0$ 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 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 penetrameter/ 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.

21.3
Contractor shall carry out installation, commissioning, testing and dismantling of the 360 ton portal gantry crane, if provided by BHEL. Contractor's scope shall also include to & fro transportation of the portal gantry crane between BHEL stores and site of work and shall provide T&P including crane etc required for assembly and dismantling of above portal gantry crane.

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, deaerator/FST sections 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 deaerator/ FST 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 & portal gantry cranes. It may be specifically noted that the EOT crane/ gantry crane shall be shared by many other agencies working within the TG hall. The contractor shall have to extend the services of the EOT crane operation to all such other agencies as instructed by BHEL; the operation cost (for crew) will be shared proportionately amongst the beneficiary agencies on mutually agreed terms and rate.

Portal gantry crane will be issued in parts/ components and are to be assembled at site by the contractor as per the instructions of BHEL engineers/ erection manual. The scope includes receipt of the materials from BHEL stores, transportation to site, servicing of the components/ drives / pulleys etc,, checking and lubricating wire ropes , pre assembly and assembly of

components, preparation of foundation, erection of crane on the foundation, grouting of crane base plates, cabling, pre-commissioning and commissioning of drives, load testing , checking of over-load protection , regular maintenance etc. a qualified / experienced operator is to be provided by the contractor. After erection of the generator stator, the contractor has to dismantle the crane in sequence as instructed by BHEL and apply preservatives / touch-up paints, wherever required and return the same to store in good condition. Necessary consumables, tools and plants including gas welding m/c etc. are to be provided by the contractor. There is no separate rate for the above and quoted rates shall be inclusive of this.

The required loads will be provided by BHEL free of charges for load testing of portal cranes.

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

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. Deaerator, feed water storage tank
3. Other equipments including bois, though not listed above but required for completion
4. ST-TG auxiliaries including, but not limited, to heat exchangers, pumps, tanks and vessels and other equipments
5. 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 aluminium sheets. All relevant specifications and procedures with regards to beading, sealing etc for alunimium 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 alloyed resin machinery enamel 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.