

TENDER SPECIFICATION No.

Tender Specification Nos	Unit No
BHE/PW/PUR/NST-BAL STG U -3/1567	Unit # 3
BHE/PW/PUR/NST-BAL STG U -4/1568	Unit # 4
BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5

RECEIPT OF MATERIALS FROM BHEL / CUSTOMER STORES / STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION TO SITE OF WORK, ERECTION, TESTING, ASSISTANCES FOR COMMISSIONING, INSULATION, FINAL PAINTING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER AND ASSOCIATED AUXILIARIES ETC INCLUDING BOUGHT OUT ITEMS OF 5X270 MW THERMAL POWER PLANT INDIA BULLS NASIK PHASE I UNIT 3, 4 & 5.

AT
SPECIAL ECONOMIC ZONE
RATTANINDIA NASHIK POWER LTD
(Formerly known as Indiabulls RealTech Ltd)
SINNAR
DISTRICT- NASIK,
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

Tender Specification Nos	Unit No
BHE/PW/PUR/NST-BAL STG U -3/1567	Unit # 3
BHE/PW/PUR/NST-BAL STG U -4/1568	Unit # 4
BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5

RECEIPT OF MATERIALS FROM BHEL / CUSTOMER STORES / STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION TO SITE OF WORK, ERECTION, TESTING, ASSISTANCES FOR COMMISSIONING, INSULATION, FINAL PAINTING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER AND ASSOCIATED AUXILIARIES ETC INCLUDING BOUGHT OUT ITEMS OF 5X270 MW THERMAL POWER PLANT INDIA BULLS NASIK PHASE I UNIT 3, 4 & 5.

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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. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 .

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited
AGM (Purchase)
Place: Nagpur
Date:

1567-
1568-

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



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	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Tender Specification Nos</td> <td style="text-align: center;">Unit No.</td> </tr> <tr> <td>BHE/PW/PUR/NST-BAL STG U -3/1567</td> <td style="text-align: center;">Unit # 3</td> </tr> <tr> <td>BHE/PW/PUR/NST-BAL STG U -4/1568</td> <td style="text-align: center;">Unit # 4</td> </tr> <tr> <td>BHE/PW/PUR/NST-BAL STG U -5/1569</td> <td style="text-align: center;">Unit # 5</td> </tr> </table>	Tender Specification Nos	Unit No.	BHE/PW/PUR/NST-BAL STG U -3/1567	Unit # 3	BHE/PW/PUR/NST-BAL STG U -4/1568	Unit # 4	BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5
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BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5									
ii	Broad Scope of job	RECEIPT OF MATERIALS FROM BHEL / CUSTOMER STORES / STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION TO SITE OF WORK, ERECTION, TESTING, ASSISTANCES FOR COMMISSIONING, INSULATION, FINAL PAINTING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER AND ASSOCIATED AUXILIARIES ETC INCLUDING BOUGHT OUT ITEMS OF 5X270 MW THERMAL POWER PLANT INDIA BULLS NASIK PHASE I UNIT 3, 4 & 5.								
iii	DETAILS OF TENDER DOCUMENT									
a	Volume-IA	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"><i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i></td> <td style="text-align: center;"><i>Applicable</i></td> </tr> </table>	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i>	<i>Applicable</i>						
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b	Volume-IB	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"><i>Special Conditions of Contract (SCC)</i></td> <td style="text-align: center;"><i>Applicable</i></td> </tr> </table>	<i>Special Conditions of Contract (SCC)</i>	<i>Applicable</i>						
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c	Volume-IC	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"><i>General Conditions of Contract (GCC)</i></td> <td style="text-align: center;"><i>Applicable</i></td> </tr> </table>	<i>General Conditions of Contract (GCC)</i>	<i>Applicable</i>						
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d	Volume-ID	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"><i>Forms and Procedures</i></td> <td style="text-align: center;">-</td> </tr> </table>	<i>Forms and Procedures</i>	-						
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e	Volume-II	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"><i>Price Schedule (Absolute value)</i></td> <td style="text-align: center;"><i>Applicable</i></td> </tr> </table>	<i>Price Schedule (Absolute value)</i>	<i>Applicable</i>						
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iv	Issue of Tender Documents	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;"> <ol style="list-style-type: none"> 1. <u>Sale from BHEL PS Regional office at :</u> Start : 11/12/2015 , Closes: 28/12/2015 , Time : 16.00 Hrs 2. From BHEL website (www.bhel.com) Tender documents will be available for downloading from website till due date of submission </td> <td style="text-align: center; vertical-align: middle;"> <i>Applicable/ Not applicable</i> </td> </tr> </table>	<ol style="list-style-type: none"> 1. <u>Sale from BHEL PS Regional office at :</u> Start : 11/12/2015 , Closes: 28/12/2015 , Time : 16.00 Hrs 2. From BHEL website (www.bhel.com) Tender documents will be available for downloading from website till due date of submission 	<i>Applicable/ Not applicable</i>						
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v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 29/12/2015, Time 15.00 Hrs Place : <u>BHEL PS Regional office at :Nagpur</u> Tenders being submitted through representative shall be submitted at dispatch section of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: <ul style="list-style-type: none"> • Shubhangi Tembhone / Engineer (Purchase) • Shivkesh Meena / 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, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender	Applicable
vii	EMD AMOUNT	Rs 2,00,000/- (Rupees Two Lakhs Only)	Applicable
viii	COST OF TENDER	Rs 2000/-.	Applicable
ix	LAST DATE FOR SEEKING CLARIFICATION	Five days before the due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)	Date :	Not applicable.
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	-	Not Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) and not in the newspapers . Bidders to keep themselves updated with all such information	

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

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

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

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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	
	<p>ENVELOPE – I superscribed as : PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:-</p>	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	<p>Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above.</p> <p>Note:</p> <p>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.</p> <p>b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.</p> <p style="margin-left: 40px;">i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL</p> <p style="margin-left: 40px;">ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender</p>	
iii.	<p>Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria.</p> <p>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.</p>	
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.	

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PART-I B	
	<p>ENVELOPE – II superscribed as: PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:-</p>
i.	<p>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</p> <p>2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)</p>

PART-II	
	<p>PRICE BID consisting of the following shall be enclosed</p> <p>ENVELOPE-III superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING</p>
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	
	<p>ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:</p> <p>CONTAINING THE FOLLOWING:</p>
i	<ul style="list-style-type: none"> 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.

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

9.0 Assessment of Capacity of Bidders:

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

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

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

i). Total number of Packages

Total number of Packages in hand = P

Where

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

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

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

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

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

- a) $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ 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 = P_T (i.e $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
- 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 ' T_T ' for total similar Packages ' P_T ' for all Regions (i.e $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
- c) Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}, \dots, S_{1-N}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (i.e $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-N}$). Similarly S_2 for package P_2 for period T_2 , S_3 for package P_3 for period T_3 , etc for the tendered

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scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages 'P_T' for all Regions (i.e 'S_T'= S₁+ S₂+ S₃+ S₄+ S₅+... S_N.)

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

Aggregate of Performance scores for all similar packages in all the Regions

=

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
		(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No of similar packages for all Regions = P _T ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance 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) = T _T
3	Monthly performance scores for the corresponding period (as in Row 2)	S _{1-1,} S _{1-2,} S _{1-3,} S _{1-4,} ... S _{1-T1}	S _{2-1,} S _{2-2,} S _{2-3,} S _{2-4,} ... S _{2-T2}	S _{3-1,} S _{3-2,} S _{3-3,} S _{3-4,} ... S _{3-T3}	S _{4-1,} S _{4-2,} S _{4-3,} S _{4-4,} ... S _{4-T4}	S _{5-1,} S _{5-2,} S _{5-3,} S _{5-4,} ... S _{5-T5}	S _{N-1,} S _{N-2,} S _{N-3,} S _{N-4,} ... S _{N-TN}	-----
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅	...	S _N	Sum (Σ) of columns (iii) to (ix) = S _T

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

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$

(where P is calculated as per clause 9.1)

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)

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Table-1

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

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

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

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

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

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

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

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

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

- i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries
- ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)
- iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.

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

- f) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work
- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer; else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**
- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized 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.

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- 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.

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- 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
- 23.16 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.
- 23.17 The bidder may have to produce original document for verification if so decided by BHEL.
- 24.0 Order of Precedence
In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:
- a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
 - b. Notice Inviting Tender (NIT)
 - c. Price Bid
 - d. Technical Conditions of Contract (TCC)—Volume-1A
 - e. Special Conditions of Contract (SCC) —Volume-1B
 - f. General Conditions of Contract (GCC) —Volume-1C
 - g. Forms and Procedures —Volume-1D

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

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

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

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ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	RECEIPT OF MATERIALS FROM BHEL / CUSTOMER STORES / STORAGE YARD, HANDLING AT STORES/STORAGE YARD, SITE OF WORK, TRANSPORTATION TO SITE OF WORK, ERECTION, TESTING, ASSISTANCES FOR COMMISSIONING, INSULATION, FINAL PAINTING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, TURBO-GENERATOR, CONDENSER AND ASSOCIATED AUXILIARIES ETC INCLUDING BOUGHT OUT ITEMS OF 5X270 MW THERMAL POWER PLANT INDIA BULLS NASIK PHASE I UNIT 3, 4 & 5.		
TENDER NO	BHE/PW/PUR/NST-BAL STG U -3/1567	Unit # 3	
	BHE/PW/PUR/NST-BAL STG U -4/1568	Unit # 4	
	BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5	

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	<u>Technical</u>	APPLICABLE	
	<p><u>Technical PQR applicable for Unit 3, 4 & 5</u></p> <p>B.1 Executed Erection Testing & Commissioning (E T & C) of STG of one unit of 100 MW or higher. OR</p> <p>B.2 Executed Erection Testing & Commissioning (E T & C) of GTG of one unit of 190 MW or higher OR</p> <p>B.3 Executed Erection Testing & Commissioning (E T & C) of Atleast One Boiler (With Rotating Machines upto synchronization) of one unit of above 400 MW or higher, under direct order of BHEL subject to:-</p> <p>a) Experience of (Executed) E T & C of STG of atleast 60 MW OR</p> <p>b) Entering into a technical tie up with an agency who has experience of (Executed) E T & C of STG of 60 MW or above</p>	APPLICABLE	

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C-1	Financial TURNOVER (Applicable for) Unit 4 & 5 Bidders must have achieved an average annual financial turnover (Audited) of Rs 105 Lakhs or more over last three Financial Years (FY) i.e., 2012-13, 2013-14 & 2014-15.	APPLICABLE	
	Financial TURNOVER applicable for Unit 3 Bidders must have achieved an average annual financial turnover (Audited) of Rs 80 Lakhs or more over last three Financial Years (FY) i.e., 2012-13, 2013-14 & 2014-15.	APPLICABLE	
C-2	NETWORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive	APPLICABLE	
C-3	PROFIT Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1' above based on latest Audited Accounts.	APPLICABLE	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	APPLICABLE	By BHEL
E	Approval of Customer (if applicable) Note: Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	APPLICABLE	BY BHEL
F	Price Bid Opening Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
G	Technical Tie up criteria (if applicable)	APPLICABLE FOR B.3	
<p><u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u></p> <ol style="list-style-type: none"> 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. 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. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant. 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) 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 'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :- <ol style="list-style-type: none"> Bidder should have executed similar work of any one of the following: <ol style="list-style-type: none"> One (1) work of value not less than Rs XXX <li align="center">OR Two (2) works of not less than Rs YYY <li align="center">OR 			

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	<p>c. Three (3) works of not less than Rs ZZZ (Value XXX, YYY, ZZZ shall be as indicated by BHEL</p> <p>2. 'Similar' work for criteria 5 above means</p> <p>a. Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works</p> <p>b. Electrical works in respect of 'ELECTRICAL'</p> <p>c. CI works in respect of 'CI' Works</p> <p>d. Material Handling and/or Management works in respect of 'MM' works</p> <p>7. 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.</p> <p>8. '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.</p> <p>9. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:</p> <p>1. Term 'Commissioning' indicated in PQR refers to 'assistance to commissioning' / 'commissioning'</p> <p>2. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP</p> <p>3. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG</p> <p>4. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping</p> <p>5. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping</p> <p>6. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears</p> <p>7. "Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.</p> <p>8. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works</p> <p>9. 'Readiness for coal Filling" in respect of Bunker Structure Work.</p> <p>10. Boiler means HRSG or WHRB or any other types of Steam Generator.</p> <p>11. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines.</p> <p>12. 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.</p> <p>13. 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.</p> <p>14. 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.</p> <p>15. In case the tendered scope is not a Pulverized Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR.</p> <p>16. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.</p> <p>17. <u>Explanatory Notes for PQR 'B.3'</u></p> <p>a. Prime bidder and Tie-up Partner shall meet their respective technical Pre qualifying Criteria.</p> <p>b. Prime bidder shall meet all other Pre-Qualifying Criteria of the Tender.</p> <p>c. Prime Bidder shall be responsible for overall execution of the Contract.</p> <p>d. Tie-up partner shall provide Technical Supervision and support to the Prime Bidder for execution of job.</p> <p>e. Tie-up Partner shall submit Security Deposit (SD) equivalent to 2 % of Total contract</p>
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	<p>value in addition to the SD to be submitted by the Prime Bidder for the Contract Value.</p> <ul style="list-style-type: none">f. Prime bidder and the Tie-up partner are required to enter into a Tie-up Agreement with a validity period of Six months initially (During submission of tender). Thereafter both the agencies shall extend the validity of the agreement for the entire contract period, if the work is awarded.g. In case Tie-up partner backs out, another Tie-up partner meeting the QR shall be engaged by the Prime Bidder.h. In case Prime bidder backs out, the whole contract shall be considered cancelled and short closed
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BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

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ANNEXURE - 2

CHECK LIST

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

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

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

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

DATE :

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

ANNEXURE-3

IMPORTANT INFORMATION

Sealed Tenders shall be submitted at following address to AGM /Purchase BHEL PSWR NAGPUR:

BHEL PSWR, SRIMOHINI COMPLEX, 345 KINGSWAY, NAGPUR 440001, INDIA

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

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

Engineer Purchase, Email id: shubh@bhelpswr.co.in, Ph: +91 – 712 – 3048742

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

- 1. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -> List of Banned Firms)**
- 2. Refer Chapter XII of Volume IB Special Conditions of Contract regarding Suspension of Business Dealings: The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/pdf/Suspension-of-Business-Dealings-with-Supplier-issued-Sept13_abridged.pdf**
- 3. All Statutory Requirements as applicable for this project shall be complied with.**
- 4. BHEL Fraud Prevention Policy, "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."**
- 5. Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'**

.....
“In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract”

6. Please take note of following Revised Tender Clauses:

- i. Notice Inviting Tender: Sl No 9
- ii. General conditions of Contract: Clause 2.12, 2.14, 2.17, Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5
- iii. Special Conditions of Contract: Clause No 4.2.1.7

7. Following Notes are added to Form F- 15 of Volume I D ‘Forms & procedures’

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

8. Project Related Important Information:

- i. Presently Nasik is a SEZ Project
- ii. The TG works in Unit # 3, 4 & 5 at 5x270 MW NASIK THERMAL POWER PROJECT Phase was under execution. The works from earlier agency were withdrawn on “as is where is” basis. The scope of work under this tender specification also include works left over by the earlier agency on “as is where is” basis.
- iii. Since the project is to be commissioned on best effort schedule, Erection & Commissioning work shall be taken on multiple fronts.
- iv. Project is to be commissioned on best effort schedule. Synchronisation & Full Loading of the unit shall be completed by 12, 14 & 14 months for Unit 3, 4 & 5 respectively with best effort schedule.
- v. Unit # 3 Condenser & Turbine erection is partly completed. Unit 4 Condenser Pre-assembly of 2/3 no bottom plate with hotwell and spring assembly is only completed. Other work is yet to be started. However in Unit # 5, TG work yet to be started. Erection was yet to be started in Unit # 5.
- vi. Electrical inspector clearance (Generator, BFP& CEP motors etc.) for Unit 3, 4 & 5 is also in the scope of contractor.
- vii. The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information and acquaint himself with the prevailing conditions viz. statutory, mandatory, obligatory, partly completion work etc. that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder.
- viii. Apart from above information, the bidder should go through all the conditions of the tender prior to bidding.

9. Modality of Tendering and Ordering Philosophy

- i) This is a combined tender for E & C of 3 units of 270 MW STG package (Unit 3, 4 & 5)
- ii) All the 3 Units are identified by separate tender specification Nos as below:

Tender Specification Nos	Unit No
BHE/PW/PUR/NST-BAL STG U -3/1567	Unit # 3
BHE/PW/PUR/NST-BAL STG U -4/1568	Unit # 4
BHE/PW/PUR/NST-BAL STG U -5/1569	Unit # 5

- iii) All the 3 (three) Unit 3, Unit 4 & Unit 5 shall be awarded to separate agencies.
- iv) Tender specification (Volume I) is common for all the 3 (three) units.
- v) Lumpsum Price is invited in the price bid. Two price bids are issued under this tender as below:
1. One Common Price bid for Unit 4 and Unit 5
 2. Separate Price bid for Unit 3.
- vi) Common Price bid for Unit 4 & Unit 5 shall be opened first.
- vii) Award of Unit 5 and Unit 4:
1. Bidders are required to submit their Lumpsum Price for E T & C of **only one unit** (Unit # 5) of 270 MW Balance STG Package in common price bid specification for Unit 4 & Unit 5 (Volume II Price bid-1568-1569).
 2. L-1 bidder as per common price bid for Unit 4 & 5 shall be considered for award of Unit 5.
 3. For award of Unit 4, next bidder in the order of their price competitiveness (i.e L-2, then L-3 and hence forth) shall be given an option to match the L-1 awarded Lumpsum of Unit 5.
- viii) Award of Unit 3
1. Separate price bid for Unit # 3 shall be invited. **This price bid shall be opened on a later date after eliminating the agencies who have been awarded the job of Unit 5 & 4.** In case unit 4 is not awarded on price matching philosophy then price bid of unit 3 shall be opened after eliminating Unit 5 bidder.

10. PRICE VARIATION CLAUSE

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

Clause No. 2.17.9 of Vol IC GCC is revised as below:-

PVC shall be applicable only during the extended period of contract (if any) after the schedule completion date for the portion of work delayed / backlog for the reasons not attributable to Contractor. However total quantum of Price Variation amount payable/recoverable shall be regulated as follows:

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

Clause No. 2.17.5 of is modified as below:-

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

11. Broad Terms & Conditions of Reverse Auction

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

- 11.1. Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).
- 11.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 11.3. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- 11.4. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit 'online sealed bid' in the Reverse Auction. Non-submission of 'online sealed bid' by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 11.5. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- 11.6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 11.7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 11.8. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
- 11.9. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight

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charges, Insurance, Service Tax for Services and loading factors (for noncompliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

- 11.10. Reverse auction will be conducted on scheduled date & time.
- 11.11. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
- 11.12. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
- 11.13. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL s standard practice.
- 11.14. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the "Business Rules of Reverse Auction , which will be communicated before the Reverse Auction.
- 11.15. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
- 11.16. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
- 11.17. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

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1568-
1569

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC) CONTENTS


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2	Scope of Works	Chapter-II	1
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4	Tentative list of T & Ps & MMEs to be deployed by Contractor	Chapter-IV	2
5	T&Ps to be deployed by BHEL free of hire charges on sharing basis	Chapter-V	1
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7	Terms of Payment	Chapter-VII	21
8	Taxes and other Duties	Chapter-VIII	2
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11	Annexures		
	Tentative list of packages, weight details, dimensions etc of equipment/ system	Annexure I	30
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1	General	Chapter-XI	4
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10	Acid cleaning/alkali flushing/steam blowing/oil flushing	Chapter-XX	2
11	Tools and tackles, measuring and monitoring devices	Chapter-XXI	2
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13	Lining and Insulation	Chapter-XXIII	2
14	Final painting	Chapter-XXIV	3

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

1.0	Project Information
1.1	<p>INTRODUCTION</p> <p>RATTANINDIA NASHIK POWER LTD (Formerly known as Indiabulls RealTech Ltd) is setting up a coal based Thermal Power Plant at Sinnar- Special Economic Zone, Nasik district, Maharashtra. The project site is located on the State Highway 23, approximately 33 Km. from Nasik city. The nearest National Highway is NH 50.</p> <p>Nearest Railway Station : Nasik Road at 35 Kms from site on Mumbai Howrah rail section of Western- Central Railway passing through Dadar, Kalyan, Igatpuri.</p> <p>Nearest Highway : NH-50 (Nasik - Pune) Nearest Airport : Mumbai 230 KM</p> <p>CLIMATE</p> <p>Nashik District is located between 18.33 degree and 20.53 degree North latitude and between 73.16 degree and 75.16 degree East Longitude at Northwest part of the Maharashtra state, at 565 meters above mean sea level. Though average rainfall of the District is between 2600 and 3000 mm. Most of the rainfall is received from June to September. The maximum temperature in summer is 42.5 degree centigrade and minimum temperature in winter is less than 5.0 degree centigrade. Relative humidity ranges from 43% to 62%.</p>
	 <p>Map not to Scale</p> <ul style="list-style-type: none"> ● NH Between ● Imp. Cities in NH ● Nearby Cities NH No. — NH — Nearby NH — NH National Highway <p>Copyright © Compare Infobase Pvt.Ltd.2003-04</p>

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

1.2	<p><u>OTHER INFORMATIONS:-</u></p> <p>1. Owner : RATTANINDIA NASHIK POWER LTD(Formerly known as Indiabulls Real Tech Ltd)</p> <p>Project Title : 5x270 MW NASIK THERMAL POWER PROJECT PHASE I,</p>
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The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

2.0 SCOPE OF WORK

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

The TG works in Unit # 3, 4 & 5 at 5x270 MW NASIK THERMAL POWER PROJECT Phase I was under execution by other agency. The works from this agency are withdrawn on "as is where is" basis. The scope of work under this tender specification also include works leftover by the earlier agency on "as is where is" basis.

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 & Turbo Generators along with associated equipment.
2. Condensate system comprising of Surface condenser, Gland steam Condenser, Vacuum Pumps for each Steam Turbine Unit.
3. Regenerative cycle auxiliaries comprising of 2x100 % CEP, 3 LP Heaters, 3x50 % MDBFP, 2 HP Heaters along with associated piping for each Steam Turbine.
4. Hot well make up Pump and associated piping & control valves.
5. 2 Nos Central Lube oil storage & transfer system.
6. Thermal insulation & cladding of piping & equipments.
7. BFV's RE joints and debris filter.
8. Condenser On load Tube cleaning system.
9. Special embedment and foundation bolts, O & M platform required for BHEL supplied equipment.
10. Special grouts for grouting for TG.
11. H2 & CO2 cylinder racks.
12. First filling & top up of H2, CO2, lube oil, lubricants and consumable till commissioning.
13. Generator Hydrogen gas purity analyzer including all accessories like piping, valves, flanges etc.
14. Contractor to carry out installation of impulse pipes, fittings, thermowells /thermo couples etc required for successful completion of Performance Guarantee test.
15. Scrap cutting, Surface preparation and Final Painting of all applicable items including erected items by other agency. Majority of the materials are either erected or available at site. These materials are supplied from manufacturing units 3-4 years back. Contractor should inspect the conditions of materials / equipments before bidding. For painting refer Chapter XXIV of TCC.

Few works have already been completed in Unit # 3. The items which have already been erected in Unit # 3 by other agency are also shown in Annexure I (Weight Details). However related work of these items like alignment, welding, NDT, checks & commissioning etc. if required, is in the scope of work. No separate payment has been envisaged for such work. Payment shall be governed as per Terms of Payment (Chapter VII).

Unit 4 Condenser Pre-assembly of 2/3 no bottom plate with hotwell and spring assembly is only completed. Other work is yet to be started.

However in Unit # 5, TG work yet to be started.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	PART I ESTABLISHMENT			
3.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Fire fighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	FOR LIVING PURPOSES OF THE BIDDER			
a	Open space for labour colony (as per availability)	Yes		Space will be provided free of cost.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	Existing agency of earlier packages have labour colony constructed for their worker. Bidder may visit the site and may tie up / have arrangement for labour colony. BHEL will not be responsible for any consequences regarding the tie up in this regard. However as above, space shall be provided if required.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/BHEL

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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		In case of inadequate supply / non-availability of construction water from customer, contractor shall have to arrange construction water at his own expenses.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	<u>Water supply for bidder's office, stores, canteen etc</u>			FREE
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	<u>Water supply for Living Purpose</u>			
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	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/BHEL

SI.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	

SI. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	3.9.0 ERECTION FACILITIES			
3.9.1	Engineering works for construction:			
a	Providing the erection drawings for all the equipments covered under this scope	Yes		
b	Drawings for construction methods	Yes		
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	In consultation with BHEL
d	Shipping lists etc for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: Facilities in the scope of Contractor/BHEL

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV: Tentative list of T&Ps and MMEs to be deployed by Contractor

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

For Each Unit

S.N.	DESCRIPTION	CAPACITY	QUANTITY
1	TYRE MOUNTED HYDRAULIC CRANES	14 MT	2 NOs
2	TRAILER WITH HORSE	30 TON	1 NO
3	TRAILER 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 SOURCE 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 MOTOR OPERATED PUMPS)	100 MT	04 NOS.
	B) - JACKS (WITH MOTOR OPERATED PUMPS)	50 MT	04 NOS.
	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :		
	A) - JACKS (HAVING BROAD BASE ONE INCH LIFT)	100 MT	04 NOS.
	B) - JACKS (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	63 MT	04 NOS.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – IV: Tentative list of T&Ps and MMEs to be deployed by Contractor

	C) - LONG HIGH PRESSURE HOSES (FOR GENERATOR ALIGNMENT)		08 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
30	SLIPPERS FOR UNLOADING OF GENERATOR STATOR		AS PER REQUIREMENT

B: MEASURING AND MONITORING DEVICES (MMD):

To be finalized at site as per requirement.

NOTE:

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

SN	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	EOT CRANE IN TG HALL	2 Nos.	FOR HANDLING AND ERECTION WITHIN TG HALL ON SHARING BASIS AS AVAILABLE AND SUBJECT TO THEIR ACCESSIBILITY AND APPROACHABILITY.
02	Strand Jack system with accessories	1 No. for each unit.	FOR GENERATOR STATOR HANDLING & LIFTING ONLY

NOTE:

1. **Operator** for EOT crane will be provided **by the contractor**.
2. EOT crane will be used on sharing basis by other agencies working within the TG hall under the instruction of BHEL. The contractor shall extend the services of his operator to such other agencies as well on mutually agreed mode of cost sharing.
3. Above T&P will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use.
4. Contractor shall provide all necessary tools & tackles, crane, trailers etc for transportation of strand jack components/parts from BHEL stores/ storage yard, assembly/erection site, assistance in testing & commissioning, dismantling after completion of works and returning to BHEL stores/storage yard as per instruction of BHEL engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

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". However for Unit # 3 commencement of contract period shall be mutually decided in consultation with BHEL construction manager. Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period.

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

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

S N.	Milestones	UNIT - 3	UNIT - 4	UNIT - 5
1	Start of work on as is where is basis	0 months	0 months	0 months
2	Start Condenser Erection	Already started.	0 months	0 months
3	LPT Box up	6 months	8 months	8 months
4	Oil flushing completion	8 months	10 months	10 months
5	Turbine & Generator complete box up	9 months	11 months	11 months
6	TG on Barring gear	10 months	12 months	12 months
7	Synchronization with coal firing	12 months	14 months	14 months
8	Full Load	12 months	14 months	14 months
9	Trial run operation completion	14 months	16 months	16 months
10	Punch point completion.	16 months	18 months	18 months

The milestone of Synchronization with coal firing and Full Load is to be achieved based on above schedule with best effort.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

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 contract period for completion of entire work under scope shall be **16 months (Sixteen Months), 18 months (Eighteen Months), 18 months (Eighteen Months)** respectively for Unit # 3, 4 & 5 from the start of contract period 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.

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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:

Terms of Payment (Unit # 3)

S No.	Activity/Work Description	% Allocated
I) PRO RATA PAYMENTS (85%)		
1	CONDENSER	8
1.01	PREPARATION OF FOUNDATION	0
1.02	PLACEMENT, ALIGNMENT, ASSEMBLY AND WELDING OF BOTTOM PLATE SEGMENTS, HOTWELL, NDT AND SPRING ELEMENTS PLACEMENT & GROUTING	5
a	Placement of bottom Plates	0
b	Alignment & Welding of bottom plate	0
c	NDT of bottom plate	1
d	Assembly of Hot Well	0
e	Placement of spring elements	2
f	Grouting of springs	2
g	Welding of hotwell with bottom plate	0
1.03	ASSEMBLY AND POSITIONING OF WATER CHAMBER, WATER BOX, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY	12
a	Assembly of front water chamber	2
b	Assembly of rear water chamber	2
c	Assembly & welding of side plates	2
d	NDT of side plates	2
e	Erection of Water boxes (Font Side & Right Side)	3
f	ERECTION, COMMISSIONING & LOAD TESTING OF HING ASSY	1
1.04	ASSY. ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.	3
a	Assembly & alignment of TSP	0
b	Welding of TSP & baffle plates	0
c	NDT of TSP & baffle plates	0
d	Assembly & welding of air evacuation pipes	3
1.05	ASSEMBLY, WELDING & NDT OF DOME WALLS AND DOME STIFNERS, EXTRACTION PIPING AND STEAM THROW DEVICE LPH-1 SUPPORT ETC.	15
a	Assembly & welding of dome walls	7
b	NDT of dome walls	3

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c	Assembly & welding of dome wall stiffners	5
1.06	INSERTION,EXPANSION,CUTTING ETC OF CONDENSER TUBES	0
a	Insertion of tubes	0
b	Expansion & cutting of tubes	0
1.07	HYDRO TEST STEAM AND WATER SIDE	25
a	Water fill test of steam side	8
b	Hydro test of water side	8
c	Condenser flood test after neck welding and supporting piping	9
1.08	WELDING OF CONDENSER NECK JOINT AND NDT'S COMPLETION OF BALANCE WORKS	25
	Total	85
2	STEAM TURBINE	20
2.01	PREPARATION OF FOUNDATION PLACEMENT,ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS	0
a	PREPARATION OF FOUNDATION	0
b	PLACEMENT,ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS	0
2.08	PLACEMENT OF HP TURBINE,LOWERING OF HP ROTOR ON BEARING AND CHECKING OF CLEARANCES, COUPLING, HP TURBINE SWING CHECKS ETC	5
a	PLACEMENT OF HP TURBINE ON BEARING PEDESTAL	0
b	ALLIGNMENT OF HP TURBINE, ROLL CHECK, BUMP CHECK ETC.	5
2.06	PLACEMENT AND ALIGNMENT OF IP TURBINE & ROLL CHECK, BUMP CHECK ETC	10
a	PLACEMENT OF IP TURBINE	3
b	ALLIGNMENT OF IP TURBINE	4
c	ROLL CHECK, BUMP CHECK ETC. OF IP TURBINE	3
2.02	PLACEMENT AND ALIGNMENT OF LP OUTER CASSING BOTTOM PORTION AND CENTRE GUIDE KEYS	5

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a	PLACEMENT OF END WALLS & CENTRE GUIDE BOLTS	2
b	WELDING OF GUIDE BOLTS	1
c	PLACEMENT OF LONGITUDINAL GIRDER & WELDING	1
d	ERECTION & WELDING OF GUSSET BLOCK	1
2.03	PLACEMENT OF LP ROTOR AND ALIGNMENT WITH INNER CASING AND CHECKING OF BLADE CLEARANCES	10
a	PLACEMENT & ALLIGNMENT OF INNER OUTER CASING BOTTOM HALF	3
b	PLACEMENT OF LP ROTOR	3
c	ALIGNMENT WITH INNER CASING INCLUDING BLADE CLEARANCE, CHECKING & ALLIGNMENT	4
2.04	ASSEMBLY, ALIGNMENT & WELDING OF LP OUTER CASING UPPER HALF	10
a	PLACEMENT OF LP OUTER CASING, ALLIGNMENT INCLUDING FIT UP	4
b	WELDING OF LP OUTER CASING INCLUDING DPT / NDT	4
c	Assy of ATM relief valve & leak test	2
2.07	BOXING UP OF LP INNER-INNER & INNER-OUTER AND ROLL CHECK	5
a	BOXING OF LPT INNER- INNER, INNER-OUTER CASING TOP HALF	3
b	ROLL CHECK OF LPT	2
2.09	ALIGNMENT OF ALL ROTORS INCLUDING REAMING, HONING AND FIXING OF COUPLING BOLTS	11
a	ALLIGNMENT OF HP-IP, IP-LP TURBINES	5
b	REAMING & HONING OF HP-IP-IP-LP COUPLINGS	2
c	COMBINED SWING CHECK OF HP-IP, IP-LP AND CORRECTION TO THE REQUIRED VALUE.	4
2.11	INSTALLATION OF ESV,IV, CV, LPBP VALVES,CRH NRV, MS STRAINERS (INTERNALS),HRH STRAINERS (INTERNALS)	9
a	INSTALLATION & ALLIGNMENT OF ESV INCLUDING BREACH NUT AND TIGHTENING TO REQUIRED VALUE	2
b	INSTALLATION & ALLIGNMENT OF IV, CV	2
c	INSTALLATION & ALLIGNMENT OF LPBP	2
d	INSTALLATION & ALLIGNMENT OF CRH NRV	1

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e	INSTALLATION & ALLIGNMENT OF MS STRAINERS INCLUDING INTERNALS	1
f	INSTALLATION & ALLIGNMENT OF HRH STRAINERS INCLUDING INTERNALS	1
2.12	ERECTION,ALIGNMENT AND WELDING OF CROSS AROUND PIPING	5
a	ERECTION & ALIGNMENT OF CROSS AROUND PIPING INCLUDING BELLOWS	2
b	WELDING & NDT OF CROSS AROUND PIPING & BELLOWS	3
2.13	FINAL BOX-UP OF LP TURBINE	7
a	Erection & welding of extraction pipes with belows inside the condenser.	3
b	CHECKING OF BEARING CLERANCES AND CORRECTION SHIM THICKNESS	2
c	FINAL BOX UP OF LP TURBINE	2
2.10	ASSEMBLY OF GOVERNING SYSTEM/EQUIPMENT	5
a	Placement & alignment of govering equipments(servo motors)	3
b	Commissioning of governing system	2
2.14	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION	3
a	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION	2
b	Checking of Radial & Axial keys dimension, machining to correct size and placement	1
	Total	85
3	GENERATOR	17
3.01	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES	5
3.02	LIFTING, LEVELLING AND ALIGNMENT OF STATOR including assistance in erection and dismantling of strand jack arrangement	23
a	PLACEMENT OF STATOR	17
b	ALIGNMENT OF STATOR	6
3.03	FIXING OF END SHIELDS ON TO FOUNDATION BEAMS	6
3.04	ROTOR INSERTION	6

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3.05	BOXING UP OF GENERATOR AND ASSEMBLY OF HYDROGEN SEALS	11
3.06	ALIGNMENT OF GENERATOR ROTOR, LP TURBINE ROTOR, RUN OUT CHECKS AND REAMING ,HONING OF COUPLING HOLES AND FIXING OF COUPLING BOLTS	9
3.07	ERECTION OF EXCITATION EQUIPMENTS & ALIGNMENT OF GEN-EXCITER ROTORS INCLUDING SWING CHECK AND COMPLETION OF BALANCE WORKS	10
a	PLACEMENT OF EXCITOR	3
b	CHECKING OF BEARING CLEARANCE AND CORRECTIONS IF ANY	3
c	ALIGNMENT WITH GENERATOR, SWING CHECK & COUPLING	4
3.08	INSTALATION OF ENCLOSURES OF EXCITER WITH ALL AUXILIARIES INCLUDING COOLERS.	5
3.09	STATOR BASE PLATE GROUTING & SWING CHECK AT EXCITER END	3
3.1	FINAL SETTING CLEARANCES OF GEN ROTOR AS PER DRAWING & FINAL CRO OF GEN ROTOR COUPLINGS	2
3.11	FINAL GAS TIGHTNESS TEST OF STATOR WITH COMPLETE SYSTEM	5
a	GENERATOR ATT	3
b	FINAL GAS FILLING	2
	Total	85
4	PUMP AND AUXILIARIES	15
4.01	ERECTION / TESTING AND COMMISSINING OF MAIN OIL PUMP, JOP, EOP, AOP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES.	24
a	ERECTION / TESTING AND COMMISSINING OF MAIN OIL PUMP ALONG WITH ALL AUXILLIARIES.	4
b	ERECTION & ALIGNMENT OF MAIN OIL TANK	5
c	ERECTION OF COOLERS & OIL FILTERS	3
d	ERECTION / TESTING AND COMMISSINING OF JOP ALONG WITH ALL AUXILLIARIES.	2
e	ERECTION / TESTING AND COMMISSINING OF EOP ALONG WITH ALL AUXILLIARIES.	2
f	ERECTION / TESTING AND COMMISSINING OF AOP ALONG WITH ALL AUXILLIARIES.	3

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g	ERECTION / TESTING AND COMMISSINING OF CENTRALISED LUBE OIL PURIFICATION SYSTEM ALONG WITH ALL AUXILLIARIES.	5
4.02	ERECTION & TESTING AND COMMISSIONING OF THREE MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	36
A	ERECTION & TESTING AND COMMISSIONING OF 1ST MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	12
a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	1
b	PLACEMENT OF BFP HYFRAULIC UNIT AND BOOSTER PUMP	1
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2
d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	2
B	ERECTION & TESTING AND COMMISSIONING OF 2ND MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	12
a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	1
b	PLACEMENT OF BFP HYFRAULIC UNIT AND BOOSTER PUMP	1
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2
d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	2
C	ERECTION & TESTING AND COMMISSIONING OF 3RD MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	12
a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	1
b	PLACEMENT OF BFP HYFRAULIC UNIT AND BOOSTER PUMP	1
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2

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d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	2
4.03	ERECTION & TESTING ,GROUTING ETC. OF DMCW (BOILER & TG) PUMPS	15
A	ERECTION & TESTING ,GROUTING ETC. OF DMCW - BOILER PUMPS	6
a	PLACEMENT OF DMCW MOTOR & PUMPS	2
b	ALIGNMENT OF MOTOR WITH PUMPS	2
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	3
B	ERECTION & TESTING ,GROUTING ETC. OF DMCW- TG PUMPS	6
a	PLACEMENT OF DMCW MOTOR & PUMPS	1
b	ALIGNMENT OF MOTOR WITH PUMPS	1
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	2
4.04	ERECTION & TESTING ,GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS	10
A	ERECTION & TESTING ,GROUTING ETC. OF 1ST CONDENSATE EXTRACTION PUMP	5
a	PREPARATION OF FOUNDATION	1
b	CHECKING & ERECTION OF CANISTER	1
c	PLACEMENT OF PUMP	1
d	ASSEMBLY OF CEP BEARING INCLUDING CONNECTION OF COOLING WATER PIPING	1
e	COMMISSIONING OF PUMP	1
B	ERECTION & TESTING ,GROUTING ETC. OF 2ND CONDENSATE EXTRACTION PUMP	5
a	PREPARATION OF FOUNDATION	1
b	CHECKING & ERECTION OF CANISTER	1
c	PLACEMENT OF PUMP	1
d	ASSEMBLY OF CEP BEARING INCLUDING CONNECTION OF COOLING WATER PIPING	1
e	COMMISSIONING OF PUMP	1

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	Total	85
5	HEATERS	5
5.01	ERECTION, TESTING & COMMISSIONING OF HP & LP HEATERS	45
A	ERECTION, TESTING & COMMISSIONING OF HP HEATER - 5	9
a	PLACEMENT OF HEATER	3
b	ALIGNMENT & GROUTING OF HEATER	2
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
B	ERECTION, TESTING & COMMISSIONING OF HP HEATER - 6	9
a	PLACEMENT OF HEATER	3
b	ALIGNMENT & GROUTING OF HEATER	2
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
C	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 1	9
a	PLACEMENT OF HEATER	3
b	ALIGNMENT & GROUTING OF HEATER	2
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
D	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 2	9
a	PLACEMENT OF HEATER	3
b	ALIGNMENT & GROUTING OF HEATER	2
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
E	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 3	9
a	PLACEMENT OF HEATER	3
b	ALIGNMENT & GROUTING OF HEATER	2
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2

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5.02	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLER	40
a	PLACEMENT & GROUTING OF GLAND STEAM CONDENSER	25
b	PLACEMENT & GROUTING OF DRAIN COOLER	15
	Total	85
6	MISCELLANEOUS ITEMS	20
6.01	DEBRIS FILTERS, RE JOINTS, ME BELLOWS, DIRTY, CLEAN OIL TANKS, CO2/H2 CYLINDERS RACKS ETC.	20
a	DEBRIS FILTERS	2
b	RE JOINTS	5
c	ME BELLOWS	2
d	DIRTY & CLEAN OIL TANKS, OIL UNLOADING VESSEL, CENTRAL LUBE OIL PURIFICATION SYSTEM	2
f	CO2/H2 CYLINDERS RACKS	1
g	DMCW OVER HEAD TANK WITH LOOSE ITEMS (01 SET)	1
h	SEAL OIL UNIT	2
i	LIQUID DETECTOR RACK & H2 DRIERS	2
j	OTHERS	3
6.02	ACW PUMPS (3 Nos.), RELATED ITEM	10
a	PLACEMENT OF ACW MOTOR & PUMPS	3
b	ALIGNMENT OF MOTOR WITH PUMPS	3
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	1
e	Placement, alignment AND COMMISSIONING OF HOTWELL Pumps AND BOILER FILL PUMPS	1
6.03	ERECTION, TESTING & COMMISSIONING OF HPSU AND LPBP GOVERINING SYSTEM SKID, CONTROL FLUID TANK, C.F COOLERS, C.F PUMPS, PURIFICATION UNIT ETC.	9
a	ERECTION & ALIGNMENT OF CONTROL FLUID TANK	3
b	ERECTION, TESTING & COMMISSIONING OF C.F COOLERS	1
c	ERECTION, TESTING & COMMISSIONING OF C.F PUMPS	1
d	ERECTION, TESTING & COMMISSIONING OF PURIFICATION UNIT ETC.	1

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e	PLACEMENT AND POSITIOING OF HPSU AND LPBP GOVERINING SYSTEM SKID ETC.	3
6.04	ERECTION, TESTING & COMMISSIONING OF FLASH TANKS & FLASH VESSELS	8
6.05	ERECTION, TESTING & COMMISSIONING OF PLATE HEAT EXCHANGER PACKAGES	10
6.06	ERECTION, TESTING & COMMISSIONING OF CONDENSER ON LOAD TUBE CLEANING PACKAGE	12
6.07	ERECTION, TESTING & COMMISSIONING OF SELF CLEANING STRAINER PACKAGES	8
6.08	Other BOI items	8
	Total	85
7	INTEGRAL PIPING	16
7.01	LUBE OIL PIPING (LUBE OIL, JACKING OIL ETC.)	10
7.02	CONDENSATE SPRAY PIPING	6
7.03	SEAL STEAM PIPING	10
7.04	CONTROL/ GOVERNNG OIL PIPING	12
7.05	LP BYPASS VALVE GOVERNING SYSTEM	6
7.06	TURBINE DRAINAGE PIPING	12
7.07	COOLING WATER PIPING	6
7.08	SEAL OIL SYSTEM PIPING	12
7.09	GENERATOR GAS SYSTEM PIPING	6
7.1	LP TURBINE EXTRACTION TO CONDENSER	5
	Total	85
II) STAGE/MILESTONE PAYMENTS (15%)		
1	TG Oil Flushing completion	1
2	Barring Gear	1
3	Rolling and Synchronisation	3
4	Full Load	2
5	Trial Operation of Unit	2
6	Painting (including arrow marking, nomenclature, etc)	2
7	Area cleaning, temporary structures cutting/removal and return of scrap	1
8	Punch List points/pending points liquidation	1
9	Material Reconciliation	1

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10	Completion of Contractual Obligations	1
	Total	15

Terms of Payment (Unit # 4 & 5)

S No.	Activity/Work Description	% Allocated
I) PRO RATA PAYMENTS (85%)		
1	CONDENSER	20
1.01	PREPARATION OF FOUNDATION	2
1.02	PLACEMENT, ALIGNMENT, ASSEMBLY AND WELDING OF BOTTOM PLATE SEGMENTS, HOTWELL, NDT AND SPRING ELEMENTS PLACEMENT & GROUTING	10
a	Placement of bottom Plates	2
b	Alignment & Welding of bottom plate	2
c	NDT of bottom plate	1
d	Assembly of Hot Well	2
e	Placement of spring elements	1
f	Grouting of springs	1
g	Welding of hotwell with bottom plate	1
1.03	ASSEMBLY AND POSITIONING OF WATER CHAMBER, WATER BOX, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY	12
a	Assembly of front water chamber	2
b	Assembly of rear water chamber	2
c	Assembly & welding of side plates	2
d	NDT of side plates	2
e	Erection of Water boxes (Font Side & Right Side)	3
f	ERECTION, COMMISSIONING & LOAD TESTING OF HING ASSY	1
1.04	ASSY. ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.	13
a	Assembly & alignment of TSP	5
b	Welding of TSP & baffle plates	3
c	NDT of TSP & baffle plates	3
d	Assembly & welding of air evacuation pipes	2

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1.05	ASSEMBLY,WELDING & NDT OF DOME WALLS AND DOME STIFNERS, EXTRACTION PIPING AND STEAM THROW DEVICE LPH-1 SUPPORT ETC.	12
a	Assembly & welding of dome walls	6
b	NDT of dome walls	3
c	Assembly & welding of dome wall stiffners	3
1.06	INSERTION,EXPANSION,CUTTING ETC OF CONDENSER TUBES	15
a	Insertion of tubes	9
b	Expansion & cutting of tubes	6
1.07	HYDRO TEST STEAM AND WATER SIDE	11
a	Water fill test of steam side	4
b	Hydro test of water side	4
c	Condenser flood test after neck welding and supporting piping	3
1.08	WELDING OF CONDENSER NECK JOINT AND NDT'S COMPLETION OF BALANCE WORKS	10
	Total	85
2	STEAM TURBINE	18
2.01	PREPARATION OF FOUNDATION PLACEMENT,ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS	7
a	PREPARATION OF FOUNDATION	2
b	PLACEMENT,ALIGNMENT AND GROUTING OF BASE PLATES OF LPC AND BEARING PEDESTALS	5
2.08	PLACEMENT OF HP TURBINE,LOWERING OF HP ROTOR ON BEARING AND CHECKING OF CLEARANCES, COUPLING, HP TURBINE SWING CHECKS ETC	5
a	PLACEMENT OF HP TURBINE ON BEARING PEDESTAL	2
b	ALLIGNMENT OF HP TURBINE, ROLL CHECK, BUMP CHECK ETC.	3
2.06	PLACEMENT AND ALIGNMENT OF IP TURBINE & ROLL CHECK, BUMP CHECK ETC	7
a	PLACEMENT OF IP TURBINE	2
b	ALLIGNMENT OF IP TURBINE	2

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c	ROLL CHECK, BUMP CHECK ETC. OF IP TURBINE	3
2.02	PLACEMENT AND ALIGNMENT OF LP OUTER CASING BOTTOM PORTION AND CENTRE GUIDE KEYS	5
a	PLACEMENT OF END WALLS & CENTRE GUIDE BOLTS	2
b	WELDING OF GUIDE BOLTS	1
c	PLACEMENT OF LONGITUDINAL GIRDER & WELDING	1
d	ERECTION & WELDING OF GUSSET BLOCK	1
2.03	PLACEMENT OF LP ROTOR AND ALIGNMENT WITH INNER CASING AND CHECKING OF BLADE CLEARANCES	9
a	PLACEMENT & ALLIGNMENT OF INNER OUTER CASING BOTTOM HALF	3
b	PLACEMENT OF LP ROTOR	3
c	ALIGNMENT WITH INNER CASING INCLUDING BLADE CLEARANCE, CHECKING & ALLIGNMENT	3
2.04	ASSEMBLY, ALIGNMENT & WELDING OF LP OUTER CASING UPPER HALF	9
a	PLACEMENT OF LP OUTER CASING, ALLIGNMENT INCLUDING FIT UP	4
b	WELDING OF LP OUTER CASING INCLUDING DPT / NDT	4
c	Assy of ATM relief valve & leak test	1
2.07	BOXING UP OF LP INNER-INNER & INNER-OUTER AND ROLL CHECK	5
a	BOXING OF LPT INNER- INNER, INNER-OUTER CASING TOP HALF	3
b	ROLL CHECK OF LPT	2
2.09	ALIGNMENT OF ALL ROTORS INCLUDING REAMING, HONING AND FIXING OF COUPLING BOLTS	9
a	ALLIGNMENT OF HP-IP, IP-LP TURBINES	4
b	REAMING & HONING OF HP-IP-IP-LP COUPLINGS	2
c	COMBINED SWING CHECK OF HP-IP, IP-LP AND CORRECTION TO THE REQUIRED VALUE.	3
2.11	INSTALLATION OF ESV,IV, CV, LPBP VALVES,CRH NRV, MS STRAINERS (INTERNALS),HRH STRAINERS (INTERNALS)	9

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a	INSTALLATION & ALLIGNMENT OF ESV INCLUDING BREACH NUT AND TIGHTENING TO REQUIRED VALUE	2
b	INSTALLATION & ALLIGNMENT OF IV, CV	2
c	INSTALLATION & ALLIGNMENT OF LPBP	2
d	INSTALLATION & ALLIGNMENT OF CRH NRV	1
e	INSTALLATION & ALLIGNMENT OF MS STRAINERS INCLUDING INTERNALS	1
f	INSTALLATION & ALLIGNMENT OF HRH STRAINERS INCLUDING INTERNALS	1
2.12	ERECTION,ALIGNMENT AND WELDING OF CROSS AROUND PIPING	5
a	ERECTION & ALIGNMENT OF CROSS AROUND PIPING INCLUDING BELLOWS	2
b	WELDING & NDT OF CROSS AROUND PIPING & BELLOWS	3
2.13	FINAL BOX-UP OF LP TURBINE	5
a	Erection & welding of extraction pipes with belows inside the condenser.	2
b	CHECKING OF BEARING CLERANCES AND CORRECTION SHIM THICKNESS	1
c	FINAL BOX UP OF LP TURBINE	2
2.10	ASSEMBLY OFGOVERNING SYSTEM/EQUIPMENT	5
a	Placement & alignment of govering equipments(servo motors)	3
b	Commissioning of governing system	2
2.14	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION	5
a	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION	3
b	Checking of Radial & Axial keys dimension, machining to correct size and placement	2
	Total	85
3	GENERATOR	15
3.01	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES	5
3.02	LIFTING, LEVELLING AND ALIGNMENT OF STATOR including assistance in erection and dismantling of strand jack arrangement	23

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a	PLACEMENT OF STATOR	17
b	ALIGNMENT OF STATOR	6
3.03	FIXING OF END SHIELDS ON TO FOUNDATION BEAMS	6
3.04	ROTOR INSERTION	6
3.05	BOXING UP OF GENERATOR AND ASSEMBLY OF HYDROGEN SEALS	11
3.06	ALIGNMENT OF GENERATOR ROTOR, LP TURBINE ROTOR, RUN OUT CHECKS AND REAMING ,HONING OF COUPLING HOLES AND FIXING OF COUPLING BOLTS	9
3.07	ERECTION OF EXCITATION EQUIPMENTS & ALIGNMENT OF GEN-EXCITER ROTORS INCLUDING SWING CHECK AND COMPLETION OF BALANCE WORKS	10
a	PLACEMENT OF EXCITOR	3
b	CHECKING OF BEARING CLEARANCE AND CORRECTIONS IF ANY	3
c	ALIGNMENT WITH GENERATOR, SWING CHECK & COUPLING	4
3.08	INSTALATION OF ENCLOSURES OF EXCITER WITH ALL AUXILIARIES INCLUDING COOLERS.	5
3.09	STATOR BASE PLATE GROUTING & SWING CHECK AT EXCITER END	3
3.1	FINAL SETTING CLEARANCES OF GEN ROTOR AS PER DRAWING & FINAL CRO OF GEN ROTOR COUPLINGS	2
3.11	FINAL GAS TIGHTNESS TEST OF STATOR WITH COMPLETE SYSTEM	5
a	GENERATOR ATT	3
b	FINAL GAS FILLING	2
	Total	85
4	PUMP AND AUXILIARIES	13
4.01	ERECTION / TESTING AND COMMISSINING OF MAIN OIL PUMP, JOP, EOP, AOP, CENTRALISED LUBE OIL PURIFICATION SYSTEM , ALONG WITH ALL AUXILLIARIES.	18
a	ERECTION / TESTING AND COMMISSINING OF MAIN OIL PUMP ALONG WITH ALL AUXILLIARIES.	3
b	ERECTION & ALIGNMENT OF MAIN OIL TANK	4
c	ERECTION OF COOLERS & OIL FILTERS	2

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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d	ERECTION / TESTING AND COMMISSINING OF JOP ALONG WITH ALL AUXILLIARIES.	1
e	ERECTION / TESTING AND COMMISSINING OF EOP ALONG WITH ALL AUXILLIARIES.	1
f	ERECTION / TESTING AND COMMISSINING OF AOP ALONG WITH ALL AUXILLIARIES.	2
g	ERECTION / TESTING AND COMMISSINING OF CENTRALISED LUBE OIL PURIFICATION SYSTEM ALONG WITH ALL AUXILLIARIES.	5
4.02	ERECTION & TESTING AND COMMISSIONING OF THREE MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	45
A	ERECTION & TESTING AND COMMISSIONING OF 1ST MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	15
a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	2
b	PLACEMENT OF BFP HYFRAULIC UNIT AND BOOSTER PUMP	2
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2
d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	3
B	ERECTION & TESTING AND COMMISSIONING OF 2ND MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	15
a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	2
b	PLACEMENT OF BFP HYFRAULIC UNIT AND BOOSTER PUMP	2
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2
d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	3
C	ERECTION & TESTING AND COMMISSIONING OF 3RD MOTOR DRIVEN BFP, WITH ALL AUXILLIARIES	15

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

a	PREPARATION OF FOUNDATIONS FOR BOOSTER PUMP, MAIN MOTOR, HYDRAULIC UNIT & BFP,	2
b	PLACEMENT OF BFP HYDRAULIC UNIT AND BOOSTER PUMP	2
c	ALIGNMENT OF BFP WITH HYDRAULIC COUPLING AND BOOSTER PUMP	2
d	PLACEMENT OF COOLERS OF BFP AND HYDRAULIC UNIT AND COMPLETION OF PIPING	2
e	COMPLETION OF OIL FLUSHING	2
f	TRIAL RUN OF MOTOR & HYDRAULIC UNIT	2
g	COMMISSIONING OF BFP WITH HYDRAULIC UNIT AND BOOSTER PUMP	3
4.03	ERECTION & TESTING ,GROUTING ETC. OF DMCW (BOILER & TG) PUMPS	12
A	ERECTION & TESTING ,GROUTING ETC. OF DMCW - BOILER PUMPS	6
a	PLACEMENT OF DMCW MOTOR & PUMPS	1
b	ALIGNMENT OF MOTOR WITH PUMPS	1
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	2
B	ERECTION & TESTING ,GROUTING ETC. OF DMCW- TG PUMPS	6
a	PLACEMENT OF DMCW MOTOR & PUMPS	1
b	ALIGNMENT OF MOTOR WITH PUMPS	1
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	2
4.04	ERECTION & TESTING ,GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS	10
A	ERECTION & TESTING ,GROUTING ETC. OF 1ST CONDENSATE EXTRACTION PUMP	5
a	PREPARATION OF FOUNDATION	1
b	CHECKING & ERECTION OF CANISTER	1
c	PLACEMENT OF PUMP	1
d	ASSEMBLY OF CEP BEARING INCLUDING CONNECTION OF COOLING WATER PIPING	1
e	COMMISSIONING OF PUMP	1
B	ERECTION & TESTING ,GROUTING ETC. OF 2ND CONDENSATE EXTRACTION PUMP	5
a	PREPARATION OF FOUNDATION	1
b	CHECKING & ERECTION OF CANISTER	1

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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c	PLACEMENT OF PUMP	1
d	ASSEMBLY OF CEP BEARING INCLUDING CONNECTION OF COOLING WATER PIPING	1
e	COMMISSIONING OF PUMP	1
	Total	85
5	HEATERS	5
5.01	ERECTION, TESTING & COMMISSIONING OF HP & LP HEATERS	60
A	ERECTION, TESTING & COMMISSIONING OF HP HEATER - 5	12
a	PLACEMENT OF HEATER	5
b	ALIGNMENT & GROUTING OF HEATER	3
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
B	ERECTION, TESTING & COMMISSIONING OF HP HEATER - 6	12
a	PLACEMENT OF HEATER	5
b	ALIGNMENT & GROUTING OF HEATER	3
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
C	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 1	12
a	PLACEMENT OF HEATER	5
b	ALIGNMENT & GROUTING OF HEATER	3
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
D	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 2	12
a	PLACEMENT OF HEATER	5
b	ALIGNMENT & GROUTING OF HEATER	3
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
E	ERECTION, TESTING & COMMISSIONING OF LP HEATER - 3	12

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

a	PLACEMENT OF HEATER	5
b	ALIGNMENT & GROUTING OF HEATER	3
c	ERECTION & WELDING OF STAND PIPE & INSTRUMENTS	2
d	COMMISSIONING OF HEATER	2
5.02	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLER	25
a	PLACEMENT & GROUTING OF GLAND STEAM CONDENSER	15
b	PLACEMENT & GROUTING OF DRAIN COOLER	10
	Total	85
6	MISCELLANEOUS ITEMS	13
6.01	DEBRIS FILTERS, RE JOINTS, ME BELLOWS, DIRTY, CLEAN OIL TANKS, CO2/H2 CYLINDERS RACKS ETC.	20
a	DEBRIS FILTERS	2
b	RE JOINTS	5
c	ME BELLOWS	2
d	DIRTY & CLEAN OIL TANKS, OIL UNLOADING VESSEL, CENTRAL LUBE OIL PURIFICATION SYSTEM	2
f	CO2/H2 CYLINDERS RACKS	1
g	DMCW OVER HEAD TANK WITH LOOSE ITEMS (01 SET)	1
h	SEAL OIL UNIT	2
i	LIQUID DETECTOR RACK & H2 DRIERS	2
j	OTHERS	3
6.02	ACW PUMPS (3 Nos.), RELATED ITEM	10
a	PLACEMENT OF ACW MOTOR & PUMPS	3
b	ALIGNMENT OF MOTOR WITH PUMPS	3
c	GROUTING OF MOTOR & PUMPS	2
d	COMMISSIONING OF MOTOR ALONG WITH PUMPS	1
e	Placement, alignment AND COMMISSIONING OF HOTWELL Pumps AND BOILER FILL PUMPS	1
6.03	ERECTION, TESTING & COMMISSIONING OF HPSU AND LPBP GOVERINING SYSTEM SKID, CONTROL FLUID TANK, C.F COOLERS, C.F PUMPS, PURIFICATION UNIT ETC.	9
a	ERECTION & ALIGNMENT OF CONTROL FLUID TANK	3

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

b	ERECTION, TESTING & COMMISSIONING OF C.F COOLERS	1
c	ERECTION, TESTING & COMMISSIONING OF C.F PUMPS	1
d	ERECTION, TESTING & COMMISSIONING OF PURIFICATION UNIT ETC.	1
e	PLACEMENT AND POSITIOING OF HPSU AND LPBP GOVERINING SYSTEM SKID ETC.	3
6.04	ERECTION, TESTING & COMMISSIONING OF FLASH TANKS & FLASH VESSELS	8
6.05	ERECTION, TESTING & COMMISSIONING OF PLATE HEAT EXCHANGER PACKAGES	10
6.06	ERECTION, TESTING & COMMISSIONING OF CONDENSER ON LOAD TUBE CLEANING PACKAGE	12
6.07	ERECTION, TESTING & COMMISSIONING OF SELF CLEANING STRAINER PACKAGES	8
6.08	Other BOI items	8
	Total	85
7	INTEGRAL PIPING	16
7.01	LUBE OIL PIPING (LUBE OIL, JACKING OIL ETC.)	10
7.02	CONDENSATE SPRAY PIPING	6
7.03	SEAL STEAM PIPING	10
7.04	CONTROL/ GOVERNNG OIL PIPING	12
7.05	LP BYPASS VALVE GOVERNING SYSTEM	6
7.06	TURBINE DRAINAGE PIPING	12
7.07	COOLING WATER PIPING	6
7.08	SEAL OIL SYSTEM PIPING	12
7.09	GENERATOR GAS SYSTEM PIPING	6
7.1	LP TURBINE EXTRACTION TO CONDENSER	5
	Total	85
II) STAGE/MILESTONE PAYMENTS (15%)		
1	TG Oil Flushing completion	1
2	Barring Gear	1
3	Rolling and Synchronisation	3
4	Full Load	2

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

5	Trial Operation of Unit	2
6	Painting (including arrow marking, nomenclature, etc)	2
7	Area cleaning, temporary structures cutting/removal and return of scrap	1
8	Punch List points/pending points liquidation	1
9	Material Reconciliation	1
10	Completion of Contractual Obligations	1
	Total	15

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 05 dated 13/08/2015)

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

The Power project area of M/s RATTANINDIA NASHIK POWER LTD, 5x270MW, SINNAR DISTRICT- NASIK, MAHARASHTRA falls under "Special Economic Zone". The services provided with in Special Economic Zone (SEZ) which is fully consumed with in SEZ is exempted from Service Tax. For this purpose, the required form A-1 / Form A-2 will be obtained from M/s RATTANINDIA NASHIK POWER LTD (Formerly known as Indiabulls RealTech Ltd) and shall be provided to the contractor in due course.

Accordingly, all and any invoice raised by you in respect of the contract under reference shall state that "Services provided within the SEZ and accordingly no Service tax shall be charged by Service provider."

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'

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

~~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 including new levies/taxes/duty if any)~~

~~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 - For All types of works excepting works covered under sl no 8.2

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

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

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

8.4 BOCW Cess - For All types of works excepting works covered under sl no 8.2

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

8.5 GST: For All types of works excepting works covered under sl no 8.2

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: SPECIFIC INCLUSIONS

SPECIFIC INCLUSIONS

9.1

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

9.2

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.

9.3

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.

9.4

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

9.5

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.

9.6

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.

9.7

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

9.8

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: SPECIFIC INCLUSIONS

~~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.~~

9.9

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.

9.10

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

Refer chapter XXIV for painting application.

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 shall be arranged by the contractor at his cost.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X : SPECIFIC EXCLUSIONS

10.0 EXLUSIONS

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

- A) Measuring instruments, monitoring, relaying, protection and signaling equipments other than those supplied with the equipments by / on behalf of BHEL.
- B) Erection, testing and commissioning of electrical panels and starting resistors for DC JOP and DC EOP pumps
- C) Electrical testing of motors, turbo-generator. However erection of these items will be under the scope of this tender specification.
- D) Impulse piping and fittings from the tapping points of various equipments.
- E) Civil works.
- F) 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.
- G) Supply of chemicals and lube oil for pre-commissioning and commissioning activities.
- H) Some sub-delivery items and electrical components such as push-buttons, junction boxes etc.
- I) E&C work of cable trays, cables and earthing & All cable connections, except those specified as scope of work etc
- J) All electrical and control & instrumentation items except those specified elsewhere in these specifications.
- K) Pneumatic copper tubing and fittings thereof.
- L) All the welding, NDT, UT, PWHT of IBR joints
- M) Thermal insulation of Turbine (BT020)
- N) Erection & commissioning of HPBP System including piping & valves
- O) Supply of paints for final painting

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
Tentative list of Packages, Weight details, Dimensions etc. of
Equipment/System

Nasik Unit # 3

S N	Pkg No.	Description	Gross Weight	Unit	Package
			(In MT)		
1	503	BASE PLATE ASSEMBLY		BPL	Turbine
2	504	BASE PLATE ASSEMBLY		BPL	Turbine
3	505	BASE PLATE L.P.CASING		BPL	Turbine
4	507	LP OUTER CASING PARTS	8.085	BPL	Turbine
5	508	LP OUTER CASING PARTS	8.085	BPL	Turbine
6	509	LPC OUTER CASING PARTS	2.5	BPL	Turbine
7	510	LPC OUTER CASING PARTS	2.5	BPL	Turbine
8	511/1	COMPONENTS OF LP CASING UPPER PART	0.495	BPL	Turbine
9	511/2	L.P OUTER CASING PARTS	0.9	BPL	Turbine
10	519	HP-IP BREARING PEDESTAL ASSLY.		BPL	Turbine
11	520/1	HP/IP BRG.PED.PARTS	0.438	BPL	Turbine
12	520/2	HP/IP BRG.PED.PARTS	0.037	BPL	Turbine
13	521	AUXILIARIES OF LP TURBINE	2.1	BPL	Turbine
14	522	AUXILIARIES OF LP TURBINE	1.142	BPL	Turbine
15	523	AUXILIARIES OF LP TURBINE	1.142	BPL	Turbine
16	524	LP JOINT COVERING	1.041	BPL	Turbine
17	526	CAP(SPRING SUPPORT)	0.4	BPL	Turbine
18	527	CAP(SPRING SUPPORT)	0.4	BPL	Turbine
19	528	CAP (COMPEN.ASSY)	3.316	BPL	Turbine
20	529	CAP (COMPEN.ASSY)	3.512	BPL	Turbine
21	530	CAP(OBLIQUE REDUCER ASSLY)	0.59	BPL	Turbine
22	531	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
23	532	CAP (COMPEN.ASSY)	3.512	BPL	Turbine
24	534	CAP (MAN-HOLE ASSLY)	0.75	BPL	Turbine
25	535	CAP (MAN-HOLE ASSLY)	0.75	BPL	Turbine
26	536	CAP(MITRE BEND ASSY)	0.67	BPL	Turbine
27	537	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
28	538	CAP (PIPE ASSLY)	0.645	BPL	Turbine
29	539	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
30	541	LONGITUDINAL GIRDER (LEFT)	15.182	BPL	Turbine

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
Tentative list of Packages, Weight details, Dimensions etc. of
Equipment/System

31	542	LONGITUDINAL GIRDER (RIGHT)	15.182	BPL	Turbine
32	543	LP FRONT WALL (TS)	10.053	BPL	Turbine
33	544	LP FRONT WALL (GS)	10.053	BPL	Turbine
34	545/1	LP SHAFT SEALING FRONT	2.26	BPL	Turbine
35	545/2	LP SHAFT SEAL COMPENSATOR ASSLY.(TS)	1.456	BPL	Turbine
36	546/1	LP SHAFT SEALING (REAR)	2.26	BPL	Turbine
37	546/2	LP SHAFT SEAL COMPENSATOR ASSLY.(GS)	1.456	BPL	Turbine
38	550/1	LP CASING ASSEMBLY (FASTENERS)	2.653	BPL	Turbine
39	550/2	LP CASING ASSEMBLY (PARTS)	4.689	BPL	Turbine
40	550/3	LP CASING ASSEMBLY (PARTS)	0.34	BPL	Turbine
41	551	EXTRACTION PIPE LINE (LPC)	0.52	BPL	Turbine
42	552	EXTRACTION PIPE LINE (LPC)	0.67	BPL	Turbine
43	553	EXTRACTION PIPE LINE (LPC)	1.004	BPL	Turbine
44	554	EXTRACTION PIPE LINE (LPC)	0.65	BPL	Turbine
45	555	EXTRACTION PIPE LINE (LPC)	0.65	BPL	Turbine
46	556	EXTRACTION PIPE LINE (LPC)	0.575	BPL	Turbine
47	557	EXTRACTION PIPE LINE (LPC)	0.307	BPL	Turbine
48	558	EXTRACTION PIPE LINE (LPC)	0.689	BPL	Turbine
49	560	EXTRACTION PIPE LINE (LPC)	0.53	BPL	Turbine
50	561	EXTRACTION PIPE LINE(LPC)	0.366	BPL	Turbine
51	562	L.P. EXTRACTION PIPE SHEATHING	1.29	BPL	Turbine
52	563/1	INNER GUIDE PLATE OF DIFFUSER (TS)	2.118	BPL	Turbine
53	563/2	INNER GUIDE PLATE OF DIFFUSER (GS)	2.118	BPL	Turbine
54	564	DIFFUSER (TS)	3.64	BPL	Turbine
55	565	DIFFUSER (GS)	3.64	BPL	Turbine
56	566	AUXILIARIES OF I.P. TURBINE	0.39	BPL	Turbine
57	567	AUXILIARIES OF I.P. TURBINE	0.204	BPL	Turbine
58	568	AUXILIARIES OF I.P. TURBINE	0.204	BPL	Turbine
59	569	LP-GEN. PEDESTAL ASSEMBLY	10.2	BPL	Turbine
60	570	IP-LP PEDESTAL ASSEMBLY	14.6	BPL	Turbine

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61	574	LP INNER OUTER CASING (U/H)	21.75	BPL	Turbine
62	575/1	LP INNER OUTER CASING (L/H) & LP INNER INNER CASING (L/H)	30.907	BPL	Turbine
63	575/2	LP INNER CASING ASSY.FASTENERS	1.76	BPL	Turbine
64	576	LP INNER-INNER CASING (U/H) PARTIAL	11.722	BPL	Turbine
65	577	STEAM INLET PIPE (LPT)	0.84	BPL	Turbine
66	578	L.P. ROTOR	62.049	BPL	Turbine
67	579	BEARING PEDESTAL ARRANGT.PARTS	1.1	BPL	Turbine
68	581	STUD HEATING DEVICE AND BREECH NUT HEATING DEVICE.	0.315	BPL	Turbine
69	582	GROMMET SLINGS	0.28	BPL	Turbine
70	583	IP TURBINE	81.679	BPL	Turbine
71	584	HP TURBINE		BPL	Turbine
72	585	HP INLET ASSEMBLY	0.045	BPL	Turbine
73	586	H.P.EXHAUST ASSEMBLY	1.378	BPL	Turbine
74	587	HPT RELATED PARTS & EXPN MEASUREMENTS	0.19	BPL	Turbine
75	588/1	HP FRONT BEARING PEDESTAL		BPL	Turbine
76	588/2	HP FRONT BRG. PEDESTAL PARTS	0.844	BPL	Turbine
77	589	I.P TURBINE PARTS	0.285	BPL	Turbine
78	591	RATING, COLLABORATION AND MONOGRAM PLATES	0.05	BPL	Turbine
79	593	OIL FLUSHING AND PRESSURE TEST DEVICE	0.13	BPL	Turbine
80	594	SUPPORT FOR IV VALVE	0.41	BPL	Turbine
81	600	STEAM BLOWING & HYD. TEST DEV.	2.73	BPL	Turbine
82	602	TOOLS AND PACKING DEVICES	0.684	BPL	Turbine
83	606	ASSEMBLY DEVICE FOR VALVES	0.213	BPL	Turbine
84	609/1	ESV & CV CASING WITH VALVES	9.8	BPL	Turbine

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85	609/2	ESV & CV CASING WITH VALVES	9.8	BPL	Turbine
86	610/1	IV & CV CASING WITH VALVES.	21.5	BPL	Turbine
87	610/2	IV & CV CASING WITH VALVES.	21.5	BPL	Turbine
88	610/3	PARTS OF IV & CV CASING	0.1	BPL	Turbine
89	610/4	PARTS OF IV & CV CASING	0.1	BPL	Turbine
90	700	INJECTOR FOR SUC. PIPE NB350	1.029	BPL	Turbine
91	702	MAIN OIL TANK & NOZZLE ARRGT. ASSY.	9.1	BPL	Turbine
92	703	MAIN OIL TANK & NOZZLE ARRANGE MENT	0.55	BPL	Turbine
93	704	OIL STRIPPER	0.133	BPL	Turbine
94	705	OIL STRAINERS	0.568	BPL	Turbine
95	708	VARIABLE ORIFICES THROTTLE VAL VES & FLUSHING PARTS	0.115	BPL	Turbine
96	709	HOUSING FOR MS STRAINER	2.2	BPL	Turbine
97	710	HOUSING FOR M.S STRAINER	2.2	BPL	Turbine
98	711	STEAM STRAINER ASSEMBLY DEVICE MS & HRH	0.652	BPL	Turbine
99	714	HOUSING FOR HRH STEAM STRAINER	3.5	BPL	Turbine
100	715	HOUSING FOR HRH STEAM STRAINER	3.5	BPL	Turbine
101	716	STEAM STRAINER (MS)	0.374	BPL	Turbine
102	717	STEAM SRAINER (HRH)	0.485	BPL	Turbine
103	718/1	BLANKING ARRANGEMENT FOR MS STRAINER HOUSING	0.907	BPL	Turbine
104	718/2	BLANKING ARRANGEMENT FOR HRH STEAM STRAINER HOUSING	2.038	BPL	Turbine
105	718/3	MS BLANKING DEVICE	0.08	BPL	Turbine
106	718/4	HRH BLANKING DEVICE	0.15	BPL	Turbine
107	719	STEAM STRAINER HOUSING GASKETS	0.05	BPL	Turbine
108	720	COMPENSATOR	0.05	BPL	Turbine

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8					
10 9	725	LEAKAGE OIL TANK	0.515	BPL	Turbine
11 0	728	WASTE OIL TANK	0.515	BPL	Turbine
11 1	729	INJECTOR FOR SUC. PIPE NB 400	0.922	BPL	Turbine
11 2	521/16 - 521/47	AUXILIARIES OF LP TURBINE	0.55	BPL	Turbine
11 3	1	SHAFT LIFTING DEVICE	0.1	BPL	Turbine
			467.413		
1	201	FOUNDATION ITEMS OF GENERATOR	4.656	HWR	Generator
2	202	FOUNDATION ITEMS OF GENERATOR	3.374	HWR	Generator
3	203	CONSUMABLES FOR FOUNDATION	0.015	HWR	Generator
4	204	GENERATOR STATOR	220	HWR	Generator
5	205	GENERATOR ROTOR	47.742	HWR	Generator
6	206	END SHIELD (TE) LOWER HALF	6.02	HWR	Generator
7	207	END SHIELD (EE) LOWER HALF	6.02	HWR	Generator
8	209	H.V.BUSHING	0.59	HWR	Generator
9	209/1	LOOSE ITEMS OF WOUND STATOR	1.01	HWR	Generator
10	213	GENERATOR ACCESSORIES	1.546	HWR	Generator
11	214	GENERATOR ACCESSORIES (TERMINAL BUSHING BOX)	4.075	HWR	Generator
12	215	GAS BAFFLE RING,INSERT COVER ETC.	4.364	HWR	Generator
13	216	BEARING SHELLS	0.953	HWR	Generator
14	217	END SHIELD (EE) UPPER HALF	5.62	HWR	Generator
15	218	END SHIELD (TE) UPPER HALF	5.62	HWR	Generator
16	219	SEAL RINGS	0.073	HWR	Generator
17	220	DEVICE FOR ROTOR INSERTION INTO STATOR	1.036	HWR	Generator
18	221	ERECTION DEVICES	0.997	HWR	Generator
19	222	WIRE ROPES	0.201	HWR	Generator

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20	223	DRY AIR BLOWER	0.19	HWR	Generator
21	224	TERMINAL CONNECTORS	0.506	HWR	Generator
22	226	CONSUMABLES	0.03	HWR	Generator
23	230	BRUSHLESS EXCITER SET	22.386	HWR	Generator
24	231	EXCITER FRONT COVER	4.122	HWR	Generator
25	231/1	RR WHL.COVER & SEALING WALL DE FOR EXCITER	0.97	HWR	Generator
26	232	EXCITER REAR COVER	3.909	HWR	Generator
27	233	EXCITER BED PLATE ACCESSORIES	3.212	HWR	Generator
28	234	EXCITER ACCESSORIES	0.35	HWR	Generator
29	236	COOLER RACK ASSEMBLY FOR EXCITER	1.551	HWR	Generator
30	250	SEAL OIL UNIT	9.325	HWR	Generator
31	251	SEAL OIL STORAGE TANK	1.46	HWR	Generator
32	252	GAS UNIT	1.15	HWR	Generator
33	253	HYDROGEN DISTRIBUTOR	0.333	HWR	Generator
34	254	CO2 DISTRIBUTOR	0.247	HWR	Generator
35	256	LIQUID DETECTOR RACK	0.45	HWR	Generator
36	258	LOOSE VALVES	0.959	HWR	Generator
37	260	CO2 VAPOURISER	0.225	HWR	Generator
38	78431	EXCITER AIR COOLER	0.892	HWR	Generator
39	78432	EXCITER AIR COOLER	0.892	HWR	Generator
			367.071		
1	78001	HOTWELL		BPL	Condenser
2	78004	BOTTOM PLATE(FRONT/REAR PART)		BPL	Condenser
3	78005	BOTTOM PLATE(FRONT/REAR PART)		BPL	Condenser
4	78006	BOTTOM PLATE(MIDDLE PART) BOTTOM PLATE(MIDDLE PART)		BPL	Condenser
5	78010	LOOSE ITEMS(BOTTOM PLATE)		BPL	Condenser
6	78012	SPRING ELEMENT (COND.SUPPORT)		BPL	Condenser
7	78013	SPRING ELEMENT (COND.SUPPORT)		BPL	Condenser
8	78014	SPRING ELEMENT (COND. SUPPORT)		BPL	Condenser
9	78015	SPRING ELEMENT (COND. SUPPORT)		BPL	Condenser

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10	78018	LOOSE ITEM (COND. SUPPORT)	4.775	BPL	Condenser
11	78020	FRONT WATER CHAMBER (GEN.SIDE)		BPL	Condenser
12	78022	FRONT WATER BOX (GEN SIDE)	14.26	BPL	Condenser
13	78023	FRONT WATER CHAMBER (TUR.SIDE)		BPL	Condenser
14	78025	FRONT WATER BOX (TUR SIDE)	14.255	BPL	Condenser
15	78026	REAR WATER CHAMBER (GEN.SIDE)		BPL	Condenser
16	78028	REAR WATER BOX (GEN SIDE)	9.33	BPL	Condenser
17	78029	REAR WATER CHAMBER (TUR.SIDE)		BPL	Condenser
18	78031	REAR WATER BOX (TUR SIDE)	9.33	BPL	Condenser
19	78032	SIDE WALL(TUR.END)		BPL	Condenser
20	78033	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
21	78034	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
22	78035	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
23	78036	SIDE WALL (TUR SIDE REAR)	1.808	BPL	Condenser
24	78038	LOOSE ITEMS(SIDE WALL-TUR.END)		BPL	Condenser
25	78039	SIDE WALL-TUR.END STIFFENER	0.242	BPL	Condenser
26	78040-44	SIDE WALL(GEN.END)		BPL	Condenser
27	78046-47	LOOSE ITEMS(SIDE WALL-GEN.END)		BPL	Condenser
28	78048	RODS (SHELL INTERNALS)		BPL	Condenser
29	78049	RODS (SHELL INTERNALS)		BPL	Condenser
30	78050	RODS (SHELL INTERNALS)		BPL	Condenser
31	78051	RODS (SHELL INTERNALS)		BPL	Condenser
32	78055	RODS (SHELL INTERNALS)		BPL	Condenser
33	78056	RODS (SHELL INTERNALS)		BPL	Condenser
34	78058	AIR EXTRACTION PIPING	1.2	BPL	Condenser
35	78059	SUPPORT TUBE PLATES(SHELL INT ERNALS)		BPL	Condenser

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36	78060	SUPPORT TUBE PLATES(SHELL INTERNALS)		BPL	Condenser
37	78061	SUPPORT TUBE PLATES(SHELL INTERNALS)		BPL	Condenser
38	78062	SUPPORT TUBE PLATES(SHELL INTERNALS)		BPL	Condenser
39	78063	SUPPORT TUBE PLATE(SHELL INTERNALS)		BPL	Condenser
40	78064	SUPPORT TUBE PLATES(SHELL INTERNALS)		BPL	Condenser
41	78065	SUPPORT TUBE PLATES(SHELL INTERNALS)		BPL	Condenser
42	78069	LOOSE ITEMS (SHELL INTERNALS)		BPL	Condenser
43	78070	LOOSE ITEMS (SHELL INTERNALS)		BPL	Condenser
44	78071	LOOSE ITEMS (SHELL INTERNALS)		BPL	Condenser
45	78075	LOWER DOME WALL (TUR.SIDE) LOWER PART		BPL	Condenser
46	78076	LOWER DOME WALL (TUR.SIDE) UPPER PART	0.7	BPL	Condenser
47	78078	LOOSE ITEMS (LOWER DOME WALL -TUR. SIDE)		BPL	Condenser
48	78103	LOWER DOME WALL (GEN.SIDE) LOWER PART		BPL	Condenser
49	78104	LOWER DOME WALL (GEN.END) UPPER PART	0.7	BPL	Condenser
50	78106	LOOSE ITEMS (LOWER DOME WALL -GEN. SIDE)		BPL	Condenser
51	78109	LOWER DOME WALL (FWB SIDE) LOWER PART		BPL	Condenser
52	78110	LOWER DOME WALL (FWB SIDE) UPPER PART		BPL	Condenser
53	78112	LOOSE ITEMS (LOWER DOME WALL	0.55	BPL	Condenser
54	78115	LOWER DOME WALL (RWB SIDE)		BPL	Condenser
55	78116	LOOSE ITEMS (LOWER DOME WALL RWB SIDE)	0.215	BPL	Condenser
56	78118	LOOSE ITEMS (LOWER DOME WALL RWB SIDE)	0.215	BPL	Condenser
57	78121	PIPES(DOME INTERNAL STIFFENING		BPL	Condenser

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58	78122	PIPES(DOME INTERNAL STIFFENING		BPL	Condenser
59	78123	PIPES(DOME INTERNAL STIFFENING		BPL	Condenser
60	78124	PIPES(DOME INTERNAL STIFFENING		BPL	Condenser
61	78125	PIPES(DOME INTERNAL STIFFENING	0.382	BPL	Condenser
62	78126	PIPES(DOME INTERNAL STIFFENING	0.382	BPL	Condenser
63	78127	PIPES(DOME INTERNAL STIFFENING	4.3	BPL	Condenser
64	78128	DOME INTERNAL STIFFENING	4.295	BPL	Condenser
65	78132	UPPER DOME WALL(TUR. SIDE)		BPL	Condenser
66	78133	UPPER DOME WALL(GEN. SIDE)		BPL	Condenser
67	78136	UPPER DOME WALL(FWB SIDE)	3.635	BPL	Condenser
68	78137	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE		BPL	Condenser
69	78138	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE		BPL	Condenser
70	78139	UPPER DOME WALL(RWB SIDE)	3.27	BPL	Condenser
71	78142	LOOSE ITEMS (W/B HINGE ARRGT.)	2.6	BPL	Condenser
72	78143	LOOSE ITEMS (W/B HINGE ARRGT.)	2.135	BPL	Condenser
73	78150	FRAME (W/BOX HINGE ARRGT)	0.65	BPL	Condenser
74	78151	FRAME (W/BOX HINGE ARRGT)	0.65	BPL	Condenser
75	78154	STEAM THROW DEVICE	1.041	BPL	Condenser
76	78155	STEAM THROW DEVICE	1.041	BPL	Condenser
77	78157	LOOSE ITEMS (CONDENSER)	0.6	BPL	Condenser
78	78158	LOOSE ITEMS (CONDENSER)	0.38	BPL	Condenser
79	78159	LOOSE ITEMS (CONDENSER)	0.275	BPL	Condenser
80	78160	FASTENERS (CONDENSER)	1.45	BPL	Condenser
81	78161	LOOSE ITEMS (CONDENSER)	0.006	BPL	Condenser
82	78162	LOOSE ITEMS (CONDENSER)	0.2	BPL	Condenser
83	78163	TOOLS & TACKLES (CONDENSER)	0.6	BPL	Condenser

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84	78166	STAND PIPE NO.1 (CONDENSER)	0.06	BPL	Condenser
85	78167	LOOSE ITEMS (STAND PIPE)	0.3	BPL	Condenser
86	78169	STAND PIPE NO.2 (CONDENSER)	0.062	BPL	Condenser
87	78175	CONDENSER INSTRUMENTATION	0.67	BPL	Condenser
88	78176	CONDENSER INSTRUMENTATION	0.145	BPL	Condenser
89	78177	CONDENSER INSTRUMENTATION	0.074	BPL	Condenser
90	76501	GLAND STEAM CONDENSER	0.825	BPL	Condenser
91	76502	STAND PIPE/LOOSE ITEM (GSC)	0.2	BPL	Condenser
92	76504	LOOSE ITEMS OF GSC (FRAGILE)	0.1	BPL	Condenser
93	76505	LOOSE ITEMS GSC(NON FRAGILE)	0.32	BPL	Condenser
94	76401	DRAIN COOLER	3.5	BPL	Condenser
95	76402	LOOSE ITEMS (DRAIN COOLER)	0.101	BPL	Condenser
96	76402	LOOSE ITEMS (DRAIN COOLER)	0.024	BPL	Condenser
97	76402	LOOSE ITEMS (DRAIN COOLER)	0.006	BPL	Condenser
98	76101	LP HEATER NO.1		BPL	Condenser
99	76102	LP HEATER NO.1&STAND PIPES	0.15	BPL	Condenser
100	76102	LP HEATER NO.1 STAND PIPE	0.05	BPL	Condenser
101	76102	LPH1 PANAL MOUNTED INSTRUMENT	0.065	BPL	Condenser
102	76102	LOOSE ITEMS LP HEATER NO. 1	0.15	BPL	Condenser
103	76201	LP HEATER NO.2		BPL	Condenser
104	76202	LP HEATER NO.2&STAND PIPES(LOOSE ITEMS)	0.14	BPL	Condenser
105	76202	LP HEATER NO.2, INSTRUMENTS	0.13	BPL	Condenser
106	76202	LP HEATER NO.2, STAND PIPES	0.1	BPL	Condenser

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10 7	76202	LOOSE ITEMS, LP HEATER NO.2	0.2	BPL	Condenser
10 8	76301	LP HEATER NO.3		BPL	Condenser
10 9	76302	LP HEATER NO.3&STAND PIPES(LOOSE ITEMS)	0.14	BPL	Condenser
11 0	76302	LP HEATER NO. 3, INSTRUMENTS	0.25	BPL	Condenser
11 1	76302	LP HEATER NO. 3, STAND PIPES	0.1	BPL	Condenser
11 2	76302	LP HEATER NO. 3,INSTRUMENTS	0.125	BPL	Condenser
11 3	79101	TUBRINE OIL COOLER	8.2	BPL	Condenser
11 4	79201	TUBRINE OIL COOLER	8.2	BPL	Condenser
11 5	79102	LOOSE ITEMS (TOC)	0.08	BPL	Condenser
11 6	79202	LOOSE ITEMS (TOC)	0.06	BPL	Condenser
11 7	11101	HP Heater No. 5		BPL	Condenser
11 8	11102-109	LOOSE ITEMS		BPL	Condenser
11 9	11201	HP Heater No. 6		BPL	Condenser
12 0	11202-209	LOOSE ITEMS		BPL	Condenser
12 1	12101-12109	Inlet assembly R.E. Joints	17.2	BPL	Condenser
12 2	12201-12209	Outlet Assembly R.E. Joints	15.2	BPL	Condenser
12 3	15017-15046	Butterfly valves for Condenser inlet & Outlet	7.45	BPL	Condenser
			154.569		
1		BFP skid (Pump assly. + Base plate+Tubing+seal coolers)		HYD	BFP
2		Booster Pump Skid(Pump assly. + Base plate+ Tubing)		HYD	BFP
3		Hydraulic Coupling assly. and accessories		HYD	BFP
4		Hydraulic Coupling working oil cooler.	4.425	HYD	BFP

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5		Hydraulic Coupling lube oil cooler .	2.325	HYD	BFP
6		Hydraulic Coupling loose items	2.13	HYD	BFP
7		Suction Strainer for BP	2.4	HYD	BFP
8		BFP Recirculation Valve	1.05	HYD	BFP
9		Suction strainer for BFP	1.38	HYD	BFP
10		Local Gauge Board racks with instruments	1.95	HYD	BFP
11		Loose items with piping etc.	2.449	HYD	BFP
12		Motor tubing	45	HYD	BFP
13		Condensate Extraction Pump Assembly	12.3	HYD	CEP
14		Canister	5.4	HYD	CEP
15		CEP Foundation Ring	1.16	HYD	CEP
16		CEP suction Strainer	2.7	HYD	CEP
17		Motor Stool	1.09	HYD	CEP
18		Local Gauge Board Rack	0.3	HYD	CEP
19		Loose items	0.42	HYD	CEP
20		CEP Motors	12	HYD	CEP
21	13101	HP Drain Flash Tank	4.6	BPL	Misc
22	13201	LP Drain Flash Tank	3.4	BPL	Misc
23	13301	Unit Flash Tank	1	BPL	Misc
24	14101	Clean Oil Tank	10.2	BPL	Misc
25	14202	Dirty Oil Tank	10.2	BPL	Misc
26	14301	Oil Unloading Vessel	0.58	BPL	Misc
27	14401	DMCW O/H Tank	6.4	BPL	Misc
28		BPL / HWR BOI Items	300	BPL/HWR	BOI
29		PEM BOI items	60.95	BPL	BOI
			495.809		

List of Items under the head Bhopal, Hardwar & PEM BOIs (For Each Unit # 4 & 5)

BPL / HARDWAR BOIs

S N	ITEM ID	ITEM DESC	QTY SET	REMARKS
1	BG001	EMPTY H2 CYLINDER	131NO	
2	BG002	EMPTY CO2 CYLINDER	63NO	
3	BG005	MOISTURE MEASURING SYSTEM	1ST	

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4	BG007	VAPOUR EXHAUSTER	2NO	
5	BG008	MOTORISED TEMPERATURE CONTROL VALVE FOR COLD GAS	1ST	
6	BG009	H2 GAS ANALYSER CABINET	1NO	
7	BG011	REFRIGERATION GAS DRYER	2no	
8	BG018	STARTING RESISTOR FOR DC S.O MOTOR	1NO	
9	BG020	SOUND ABSORBING COVER	1No	
10	BG080	STROBOSCOPE	1NO	
11	BG090	GENERATOR INTEGRAL PIPING	1ST	
12	BG091	HYDROGEN COOLERS PIPING	1ST	
13	BH001	WELDED AUSTENITIC S.S. TUBES GR.304 (FOR CONDENSOR)	1ST	
14	BH010	CONDENSOR AIR EVACUATION PACKAGE (VACUUM PUMP)	2NO	
15	BH012	AIR EXHAUSTER WITH MOTOR (GSC AIR EXHAUSTER)	2NO	
16	BT001	LIFTING BEAM	1NO	
17	BT002	JACKING OIL PUMPS	1ST	
18	BT003	AOP & EOP	1ST	
19	BT004	DUPLEX FILTER (LUB.OIL)	1NO	
20	BT005	DUPLEX FILTER (JACKING OIL)	1NO	
21	BT006	BUTTERFLY VALVES	1ST	
22	BT007	THREE WAY TEMP. CONTROL VALVE	1NO	
23	BT008	DOUBLE THREE WAY VALVES	1NO	
24	BT009	NRV WITH ALUMINIUM FLAP	2NO	
25	BT010	PRESSURE LIMIT VALVE	2NO	
26	BT011	OIL PURIFICATION UNIT (OIL CENTRIFUGE)	1NO	
27	BT012	OIL VAPOUR EXHAUSTER	2NO	
28	BT013	LEAD DIAPHRAGM	4NO	
29	BT014	SPRAY NOZZLES	1ST	
30	BT015	DIRT CATCHERS	1NO	
31	BT016	DAMPER	1ST	
32	BT017	VARIABLE LOAD SPRING CAGES	1ST	
33	BT023	TURBINE OIL	73M3	
34	BT025	OIL PURIFICATION SYSTEM (CENTRAL)	1NO	65 MT

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35	BT027	TURBINE INTEGRAL PIPING	1ST	
36	BT028	H & S FOR TURBINE INTEGRAL PIPING	1ST	
37	BT043	CONTROL FLUID (FRF)	1800Lt	
38	BT024	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE	1ST	
39	BT065	GEAR PUMP (LUB. OIL RECIRCULATION)	1NO	
40	BT074	VACUUM BREAKER VALVE WITH PNEUMATIC ACTUATOR	1NO	
41	BT075	SEAL STEAM SUPPLY & LEAKAGE STEAM CONTROL VALVE WITH PNEUMATIC ACTUATOR	1ST	
42	BT080	EHA FOR TURBINE VALVES ALONGWITH HPSU	1ST	
43	BT094	DC JACKING OIL & DC EMERGENCY OIL STARTER CABINETS	1NO	

PEM BOI

S N	Item	Qty	Weight (In MT)
1	Plate Heat Exchangers with associated components/ items, attachment, fittings etc.- Each of size- L-4500XW - 2000XH-3000 mm	3 sets.	12.75
2	Self Cleaning Strainers Each of size L-3000xW-1500xH-1500	2 Sets	3.7
3	Condenser On Load Tube Cleaning System (COLTS)- Each set comprising of	2Sets	26
	(i) Ball Injection Pipes.		
	(ii) Ball re-circulating skid		
	(iii) Ball Separator-/Ball collector strainer-		
	(iv) D.P. Measuring system		
	(v) Loose items		
4	Misc. Pumps		
1	ACW Pumps (Horizontal)	3 Sets	4.5

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2	DMCW Pumps (Horizontal) & Drive Motors	3 Sets	7.65
3	DM CW Booster Pumps (Horizontal)	2 Sets	2.7
4	HOTWELL MAKE UP PUMPS	2 sets	1.5
5	BOILER FILL PUMP	1 set	2.15
Total			60.95

Summary (For Unit # 3)		
S N	Description	Gross Weight (in MT)
1	Turbine	467.413
2	Generator	367.071
3	Condenser	154.569
4	Pumps & Aux	495.809
Total		1484.86 2

Nasik Unit # 3 (Already partly erected work by other agency)

S No	Pkg No.	Description	Gross Weight	Package	Remarks
			(In MT)		
2	503	BASE PLATE ASSEMBLY	4.5	Turbine	
3	504	BASE PLATE ASSEMBLY	2.56	Turbine	
4	505	BASE PLATE L.P.CASING	2.68	Turbine	
5	519	HP-IP BREARING PEDESTAL ASSLY.	13.275	Turbine	
6	584	HP TURBINE	56.1	Turbine	
7	588/1	HP FRONT BEARING PEDESTAL	11.939	Turbine	
8	78001	HOTWELL	6.913	Condenser	
9	78004	BOTTOM PLATE(FRONT/REAR PART)	6.793	Condenser	
10	78005	BOTTOM PLATE(FRONT/REAR PART)	6.793	Condenser	
11	78006	BOTTOM PLATE(MIDDLE PART) BOTTOM PLATE(MIDDLE PART)	8.296	Condenser	
12	78010	LOOSE ITEMS(BOTTOM PLATE)	0.271	Condenser	
13	78012	SPRING ELEMENT (COND.SUPPORT)	3.65	Condenser	

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14	78013	SPRING ELEMENT (COND.SUPPORT)	3.65	Condenser	
15	78014	SPRING ELEMENT (COND.SUPPORT)	3.65	Condenser	
16	78015	SPRING ELEMENT (COND.SUPPORT)	3.65	Condenser	
17	78020	FRONT WATER CHAMBER (GEN.SIDE)	5.839	Condenser	
18	78023	FRONT WATER CHAMBER (TUR.SIDE)	5.829	Condenser	
19	78026	REAR WATER CHAMBER (GEN.SIDE)	5.829	Condenser	
20	78029	REAR WATER CHAMBER (TUR.SIDE)	5.829	Condenser	
21	78032	SIDE WALL(TUR.END)	7.12	Condenser	
22	78038	LOOSE ITEMS(SIDE WALL-TUR.END)	0.782	Condenser	
23	78040	SIDE WALL(GEN.END)	7.12	Condenser	
24	78046	LOOSE ITEMS(SIDE WALL-GEN.END)	0.782	Condenser	
25	78048	RODS (SHELL INTERNALS)	4.78	Condenser	
26	78049	RODS (SHELL INTERNALS)	4.78	Condenser	
27	78050	RODS (SHELL INTERNALS)	4.78	Condenser	
28	78051	RODS (SHELL INTERNALS)	4.78	Condenser	
29	78055	RODS (SHELL INTERNALS)	0.6	Condenser	
30	78056	RODS (SHELL INTERNALS)	4.6	Condenser	
31	78059	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
32	78060	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
33	78061	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
34	78062	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
35	78063	SUPPORT TUBE PLATE(SHELL INTERNALS)	5.4	Condenser	
36	78064	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
37	78065	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	Condenser	
38	78069	LOOSE ITEMS (SHELL INTERNALS)	7.56	Condenser	

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39	78070	LOOSE ITEMS (SHELL INTERNALS)	0.35	Condenser	
40	78071	LOOSE ITEMS (SHELL INTERNALS)	4.655	Condenser	
41	78075	LOWER DOME WALL (TUR.SIDE) LOWER PART	8.767	Condenser	
42	78078	LOOSE ITEMS (LOWER DOME WALL -TUR. SIDE)	0.27	Condenser	
43	78103	LOWER DOME WALL (GEN.SIDE) LOWER PART	7.698	Condenser	
44	78106	LOOSE ITEMS (LOWER DOME WALL -GEN. SIDE)	0.27	Condenser	
45	78109	LOWER DOME WALL (FWB SIDE) LOWER PART	6.012	Condenser	
46	78110	LOWER DOME WALL (FWB SIDE) UPPER PART	1.444	Condenser	
47	78115	LOWER DOME WALL (RWB SIDE)	6.727	Condenser	
48	78116	DOME WALL (R.W/B SIDE)	1.427	Condenser	
49	78121	PIPES(DOME INTERNAL STIFFENING	0.726	Condenser	
50	78122	PIPES(DOME INTERNAL STIFFENING	0.726	Condenser	
51	78123	PIPES(DOME INTERNAL STIFFENING	0.726	Condenser	
52	78124	PIPES(DOME INTERNAL STIFFENING	0.726	Condenser	
53	78132	UPPER DOME WALL(TUR. SIDE)	1.083	Condenser	
54	78133	UPPER DOME WALL(GEN. SIDE)	1.083	Condenser	
55	78137	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE	0.475	Condenser	
56	78138	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE	0.41	Condenser	
57	78315	LP HEATER NO.1	11.8	Condenser	
58	78321	LP HEATER NO.2	9.95	Condenser	
59	78328	LP HEATER NO.3	9.875	Condenser	
60		BFP skid (Pump assly. + Base plate+Tubing+seal coolers)	17.31	BFP	
61		Booster Pump Skid(Pump assly. + Base plate+ Tubing)	7.533	BFP	
62		Hydraulic Coupling assly. and accessories	10.68	BFP	
64		HP Heater No. 5	44	Condenser	

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65		HP Heater No. 6	53.5	Condenser	
			451.753		
1	541	LONGITUDINAL GIRDER (LEFT)	15.182	Turbine	90% completed
2	542	LONGITUDINAL GIRDER (RIGHT)	15.182	Turbine	90% completed
3	569	LP-GEN. PEDESTAL ASSEMBLY	10.2	Turbine	70% completed
4	570	IP-LP PEDESTAL ASSEMBLY	14.6	Turbine	70% completed
5	78018	LOOSE ITEM (COND. SUPPORT)	4.775	Condenser	80% completed
6	78058	AIR EXTRACTION PIPING	1.2	Condenser	75% completed
7	78127	PIPES(DOME INTERNAL STIFFENING	4.3	Condenser	25 % completed
8	78128	DOME INTERNAL STIFFENING	4.295	Condenser	25 % completed
			69.734		
		Total	521.487		

Note: These above items have already been erected by other agency. However related work of these items like alignment, welding, grouting, NDT, Checks & commissioning etc. if required is in the scope of work.

Nasik
For Each Unit # 4 & 5

S N	Pkg No.	Description	Gross Weight	Unit	Package
			(In MT)		
1	503	BASE PLATE ASSEMBLY	4.5	BPL	Turbine
2	504	BASE PLATE ASSEMBLY	2.56	BPL	Turbine
3	505	BASE PLATE L.P.CASING	2.68	BPL	Turbine
4	507	LP OUTER CASING PARTS	8.085	BPL	Turbine
5	508	LP OUTER CASING PARTS	8.085	BPL	Turbine
6	509	LPC OUTER CASING PARTS	2.5	BPL	Turbine
7	510	LPC OUTER CASING PARTS	2.5	BPL	Turbine
8	511/1	COMPONENTS OF LP CASING UPPER PART	0.495	BPL	Turbine
9	511/2	L.P OUTER CASING PARTS	0.9	BPL	Turbine
10	519	HP-IP BREARING PEDESTAL ASSLY.	13.275	BPL	Turbine
11	520/1	HP/IP BRG.PED.PARTS	0.438	BPL	Turbine
12	520/2	HP/IP BRG.PED.PARTS	0.037	BPL	Turbine

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13	521	AUXILIARIES OF LP TURBINE	2.1	BPL	Turbine
14	522	AUXILIARIES OF LP TURBINE	1.142	BPL	Turbine
15	523	AUXILIARIES OF LP TURBINE	1.142	BPL	Turbine
16	524	LP JOINT COVERING	1.041	BPL	Turbine
17	526	CAP(SPRING SUPPORT)	0.4	BPL	Turbine
18	527	CAP(SPRING SUPPORT)	0.4	BPL	Turbine
19	528	CAP (COMPEN.ASSY)	3.316	BPL	Turbine
20	529	CAP (COMPEN.ASSY)	3.512	BPL	Turbine
21	530	CAP(OBLIQUE REDUCER ASSLY)	0.59	BPL	Turbine
22	531	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
23	532	CAP (COMPEN.ASSY)	3.512	BPL	Turbine
24	534	CAP (MAN-HOLE ASSLY)	0.75	BPL	Turbine
25	535	CAP (MAN-HOLE ASSLY)	0.75	BPL	Turbine
26	536	CAP(MITRE BEND ASSY)	0.67	BPL	Turbine
27	537	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
28	538	CAP (PIPE ASSLY)	0.645	BPL	Turbine
29	539	CAP (MITRE BEND ASSY)	0.67	BPL	Turbine
30	541	LONGITUDINAL GIRDER (LEFT)	15.182	BPL	Turbine
31	542	LONGITUDINAL GIRDER (RIGHT)	15.182	BPL	Turbine
32	543	LP FRONT WALL (TS)	10.053	BPL	Turbine
33	544	LP FRONT WALL (GS)	10.053	BPL	Turbine
34	545/1	LP SHAFT SEALING FRONT	2.26	BPL	Turbine
35	545/2	LP SHAFT SEAL COMPENSATOR ASSLY.(TS)	1.456	BPL	Turbine
36	546/1	LP SHAFT SEALING (REAR)	2.26	BPL	Turbine
37	546/2	LP SHAFT SEAL COMPENSATOR ASSLY.(GS)	1.456	BPL	Turbine
38	550/1	LP CASING ASSEMBLY (FASTENERS)	2.653	BPL	Turbine
39	550/2	LP CASING ASSEMBLY (PARTS)	4.689	BPL	Turbine
40	550/3	LP CASING ASSEMBLY (PARTS)	0.34	BPL	Turbine
41	551	EXTRACTION PIPE LINE (LPC)	0.52	BPL	Turbine
42	552	EXTRACTION PIPE LINE (LPC)	0.67	BPL	Turbine
43	553	EXTRACTION PIPE LINE (LPC)	1.004	BPL	Turbine
44	554	EXTRACTION PIPE LINE (LPC)	0.65	BPL	Turbine
45	555	EXTRACTION PIPE LINE (LPC)	0.65	BPL	Turbine
46	556	EXTRACTION PIPE LINE (LPC)	0.575	BPL	Turbine
47	557	EXTRACTION PIPE LINE (LPC)	0.307	BPL	Turbine
48	558	EXTRACTION PIPE LINE (LPC)	0.689	BPL	Turbine
49	560	EXTRACTION PIPE LINE (LPC)	0.53	BPL	Turbine

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50	561	EXTRACTION PIPE LINE(LPC)	0.366	BPL	Turbine
51	562	L.P. EXTRACTION PIPE SHEATHING	1.29	BPL	Turbine
52	563/1	INNER GUIDE PLATE OF DIFFUSER (TS)	2.118	BPL	Turbine
53	563/2	INNER GUIDE PLATE OF DIFFUSER (GS)	2.118	BPL	Turbine
54	564	DIFFUSER (TS)	3.64	BPL	Turbine
55	565	DIFFUSER (GS)	3.64	BPL	Turbine
56	566	AUXILIARIES OF I.P. TURBINE	0.39	BPL	Turbine
57	567	AUXILIARIES OF I.P. TURBINE	0.204	BPL	Turbine
58	568	AUXILIARIES OF I.P. TURBINE	0.204	BPL	Turbine
59	569	LP-GEN. PEDESTAL ASSEMBLY	10.2	BPL	Turbine
60	570	IP-LP PEDESTAL ASSEMBLY	14.6	BPL	Turbine
61	574	LP INNER OUTER CASING (U/H)	21.75	BPL	Turbine
62	575/1	LP INNER OUTER CASING (L/H) & LP INNER INNER CASING (L/H)	30.907	BPL	Turbine
63	575/2	LP INNER CASING ASSY.FASTENERS	1.76	BPL	Turbine
64	576	LP INNER-INNER CASING (U/H) PARTIAL	11.722	BPL	Turbine
65	577	STEAM INLET PIPE (LPT)	0.84	BPL	Turbine
66	578	L.P. ROTOR	62.049	BPL	Turbine
67	579	BEARING PEDESTAL ARRANGT.PARTS	1.1	BPL	Turbine
68	581	STUD HEATING DEVICE AND BREECH NUT HEATING DEVICE.	0.315	BPL	Turbine
69	582	GROMMET SLINGS	0.28	BPL	Turbine
70	583	IP TURBINE	81.679	BPL	Turbine
71	584	HP TURBINE	56.1	BPL	Turbine
72	585	HP INLET ASSEMBLY	0.045	BPL	Turbine
73	586	H.P.EXHAUST ASSEMBLY	1.378	BPL	Turbine
74	587	HPT RELATED PARTS & EXPN MEASUREMENTS	0.19	BPL	Turbine
75	588/1	HP FRONT BEARING PEDESTAL	11.939	BPL	Turbine
76	588/2	HP FRONT BRG. PEDESTAL PARTS	0.844	BPL	Turbine
77	589	I.P TURBINE PARTS	0.285	BPL	Turbine
78	591	RATING, COLLABORATION AND MONOGRAM PLATES	0.05	BPL	Turbine

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79	593	OIL FLUSHING AND PRESSURE TEST DEVICE	0.13	BPL	Turbine
80	594	SUPPORT FOR IV VALVE	0.41	BPL	Turbine
81	600	STEAM BLOWING & HYD. TEST DEV.	2.73	BPL	Turbine
82	602	TOOLS AND PACKING DEVICES	0.684	BPL	Turbine
83	606	ASSEMBLY DEVICE FOR VALVES	0.213	BPL	Turbine
84	609/1	ESV & CV CASING WITH VALVES	9.8	BPL	Turbine
85	609/2	ESV & CV CASING WITH VALVES	9.8	BPL	Turbine
86	610/1	IV & CV CASING WITH VALVES.	21.5	BPL	Turbine
87	610/2	IV & CV CASING WITH VALVES.	21.5	BPL	Turbine
88	610/3	PARTS OF IV & CV CASING	0.1	BPL	Turbine
89	610/4	PARTS OF IV & CV CASING	0.1	BPL	Turbine
90	700	INJECTOR FOR SUC. PIPE NB350	1.029	BPL	Turbine
91	702	MAIN OIL TANK & NOZZLE ARRGT. ASSY.	9.1	BPL	Turbine
92	703	MAIN OIL TANK & NOZZLE ARRANGE MENT	0.55	BPL	Turbine
93	704	OIL STRIPPER	0.133	BPL	Turbine
94	705	OIL STRAINERS	0.568	BPL	Turbine
95	708	VARIABLE ORIFICES THROTTLE VAL VES & FLUSHING PARTS	0.115	BPL	Turbine
96	709	HOUSING FOR MS STRAINER	2.2	BPL	Turbine
97	710	HOUSING FOR M.S STRAINER	2.2	BPL	Turbine
98	711	STEAM STRAINER ASSEMBLY DEVICE MS & HRH	0.652	BPL	Turbine
99	714	HOUSING FOR HRH STEAM STRAINER	3.5	BPL	Turbine
100	715	HOUSING FOR HRH STEAM STRAINER	3.5	BPL	Turbine
101	716	STEAM STRAINER (MS)	0.374	BPL	Turbine
102	717	STEAM SRAINER (HRH)	0.485	BPL	Turbine
103	718/1	BLANKING ARRANGEMENT FOR MS STRAINER HOUSING	0.907	BPL	Turbine
104	718/2	BLANKING ARRANGEMENT FOR HRH STEAM STRAINER HOUSING	2.038	BPL	Turbine
105	718/3	MS BLANKING DEVICE	0.08	BPL	Turbine
106	718/4	HRH BLANKING DEVICE	0.15	BPL	Turbine
107	719	STEAM STRAINER HOUSING GASKETS	0.05	BPL	Turbine
108	720	COMPENSATOR	0.05	BPL	Turbine

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109	725	LEAKAGE OIL TANK	0.515	BPL	Turbine
110	728	WASTE OIL TANK	0.515	BPL	Turbine
111	729	INJECTOR FOR SUC. PIPE NB 400	0.922	BPL	Turbine
112	521/16-521/47	AUXILIARIES OF LP TURBINE	0.55	BPL	Turbine
113	1	SHAFT LIFTING DEVICE	0.1	BPL	Turbine
			558.467		
1	201	FOUNDATION ITEMS OF GENERATOR	4.656	HWR	Generator
2	202	FOUNDATION ITEMS OF GENERATOR	3.374	HWR	Generator
3	203	CONSUMABLES FOR FOUNDATION	0.015	HWR	Generator
4	204	GENERATOR STATOR	220	HWR	Generator
5	205	GENERATOR ROTOR	47.742	HWR	Generator
6	206	END SHIELD (TE) LOWER HALF	6.02	HWR	Generator
7	207	END SHIELD (EE) LOWER HALF	6.02	HWR	Generator
8	209	H.V.BUSHING	0.59	HWR	Generator
9	209/1	LOOSE ITEMS OF WOUND STATOR	1.01	HWR	Generator
10	213	GENERATOR ACCESSORIES	1.546	HWR	Generator
11	214	GENERATOR ACCESSORIES (TERMINAL BUSHING BOX)	4.075	HWR	Generator
12	215	GAS BAFFLE RING,INSERT COVER ETC.	4.364	HWR	Generator
13	216	BEARING SHELLS	0.953	HWR	Generator
14	217	END SHIELD (EE) UPPER HALF	5.62	HWR	Generator
15	218	END SHIELD (TE) UPPER HALF	5.62	HWR	Generator
16	219	SEAL RINGS	0.073	HWR	Generator
17	220	DEVICE FOR ROTOR INSERTION INTO STATOR	1.036	HWR	Generator
18	221	ERECTION DEVICES	0.997	HWR	Generator
19	222	WIRE ROPES	0.201	HWR	Generator
20	223	DRY AIR BLOWER	0.19	HWR	Generator
21	224	TERMINAL CONNECTORS	0.506	HWR	Generator
22	226	CONSUMABLES	0.03	HWR	Generator
23	230	BRUSHLESS EXCITER SET	22.386	HWR	Generator
24	231	EXCITER FRONT COVER	4.122	HWR	Generator

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25	231/1	RR WHL.COVER & SEALING WALL DE FOR EXCITER	0.97	HWR	Generator
26	232	EXCITER REAR COVER	3.909	HWR	Generator
27	233	EXCITER BED PLATE ACCESSORIES	3.212	HWR	Generator
28	234	EXCITER ACCESSORIES	0.35	HWR	Generator
29	236	COOLER RACK ASSEMBLY FOR EXCITER	1.551	HWR	Generator
30	250	SEAL OIL UNIT	9.325	HWR	Generator
31	251	SEAL OIL STORAGE TANK	1.46	HWR	Generator
32	252	GAS UNIT	1.15	HWR	Generator
33	253	HYDROGEN DISTRIBUTOR	0.333	HWR	Generator
34	254	CO2 DISTRIBUTOR	0.247	HWR	Generator
35	256	LIQUID DETECTOR RACK	0.45	HWR	Generator
36	258	LOOSE VALVES	0.959	HWR	Generator
37	260	CO2 VAPOURISER	0.225	HWR	Generator
38	78431	EXCITER AIR COOLER	0.892	HWR	Generator
39	78432	EXCITER AIR COOLER	0.892	HWR	Generator
			367.071		
1	78001	HOTWELL	6.913	BPL	Condenser
2	78004	BOTTOM PLATE(FRONT/REAR PART)	6.793	BPL	Condenser
3	78005	BOTTOM PLATE(FRONT/REAR PART)	6.793	BPL	Condenser
4	78006	BOTTOM PLATE(MIDDLE PART) BOTTOM PLATE(MIDDLE PART)	8.296	BPL	Condenser
5	78010	LOOSE ITEMS(BOTTOM PLATE)	0.271	BPL	Condenser
6	78012	SPRING ELEMENT (COND.SUPPORT)	3.65	BPL	Condenser
7	78013	SPRING ELEMENT (COND.SUPPORT)	3.65	BPL	Condenser
8	78014	SPRING ELEMENT (COND. SUPPORT)	3.65	BPL	Condenser
9	78015	SPRING ELEMENT (COND. SUPPORT)	3.65	BPL	Condenser
10	78018	LOOSE ITEM (COND. SUPPORT)	4.775	BPL	Condenser
11	78020	FRONT WATER CHAMBER (GEN.SIDE)	5.839	BPL	Condenser
12	78022	FRONT WATER BOX (GEN SIDE)	14.26	BPL	Condenser

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13	78023	FRONT WATER CHAMBER (TUR.SIDE)	5.829	BPL	Condenser
14	78025	FRONT WATER BOX (TUR SIDE)	14.255	BPL	Condenser
15	78026	REAR WATER CHAMBER (GEN.SIDE)	5.829	BPL	Condenser
16	78028	REAR WATER BOX (GEN SIDE)	9.33	BPL	Condenser
17	78029	REAR WATER CHAMBER (TUR.SIDE)	5.829	BPL	Condenser
18	78031	REAR WATER BOX (TUR SIDE)	9.33	BPL	Condenser
19	78032	SIDE WALL(TUR.END)	1.105	BPL	Condenser
20	78033	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
21	78034	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
22	78035	SIDE WALL (TUR SIDE MIDDLE)	1.645	BPL	Condenser
23	78036	SIDE WALL (TUR SIDE REAR)	1.808	BPL	Condenser
24	78038	LOOSE ITEMS(SIDE WALL-TUR.END)	0.782	BPL	Condenser
25	78039	SIDE WALL-TUR.END STIFFENER	0.242	BPL	Condenser
26					
27	78040-44	SIDE WALL(GEN.END)	7.12	BPL	Condenser
28	78046-47	LOOSE ITEMS(SIDE WALL-GEN.END)	0.782	BPL	Condenser
29	78048	RODS (SHELL INTERNALS)	4.78	BPL	Condenser
30	78049	RODS (SHELL INTERNALS)	4.78	BPL	Condenser
31	78050	RODS (SHELL INTERNALS)	4.78	BPL	Condenser
32	78051	RODS (SHELL INTERNALS)	4.78	BPL	Condenser
33	78055	RODS (SHELL INTERNALS)	0.6	BPL	Condenser
34	78056	RODS (SHELL INTERNALS)	4.6	BPL	Condenser
35	78058	AIR EXTRACTION PIPING	1.2	BPL	Condenser
36	78059	SUPPORT TUBE PLATES(SHELL INT ERNALS)	5.4	BPL	Condenser
37	78060	SUPPORT TUBE PLATES(SHELL INT ERNALS)	5.4	BPL	Condenser
38	78061	SUPPORT TUBE PLATES(SHELL INT ERNALS)	5.4	BPL	Condenser
39	78062	SUPPORT TUBE PLATES(SHELL INT ERNALS)	5.4	BPL	Condenser
40	78063	SUPPORT TUBE PLATE(SHELL INT ERNALS)	5.4	BPL	Condenser
41	78064	SUPPORT TUBE PLATES(SHELL INT ERNALS)	5.4	BPL	Condenser

TECHNICAL CONDITIONS OF CONTRACT (TCC)
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Tentative list of Packages, Weight details, Dimensions etc. of
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42	78065	SUPPORT TUBE PLATES(SHELL INTERNALS)	5.4	BPL	Condenser
43	78069	LOOSE ITEMS (SHELL INTERNALS)	7.56	BPL	Condenser
44	78070	LOOSE ITEMS (SHELL INTERNALS)	0.35	BPL	Condenser
45	78071	LOOSE ITEMS (SHELL INTERNALS)	4.655	BPL	Condenser
46	78075	LOWER DOME WALL (TUR.SIDE) LOWER PART	8.767	BPL	Condenser
47	78076	LOWER DOME WALL (TUR.SIDE) UPPER PART	0.7	BPL	Condenser
48	78078	LOOSE ITEMS (LOWER DOME WALL -TUR. SIDE)	0.27	BPL	Condenser
49	78103	LOWER DOME WALL (GEN.SIDE) LOWER PART	7.698	BPL	Condenser
50	78104	LOWER DOME WALL (GEN.END) UPPER PART	0.7	BPL	Condenser
51	78106	LOOSE ITEMS (LOWER DOME WALL -GEN. SIDE)	0.27	BPL	Condenser
52	78109	LOWER DOME WALL (FWB SIDE) LOWER PART	6.012	BPL	Condenser
53	78110	LOWER DOME WALL (FWB SIDE) UPPER PART	1.444	BPL	Condenser
54	78112	LOOSE ITEMS (LOWER DOME WALL	0.55	BPL	Condenser
55	78115	LOWER DOME WALL (RWB SIDE)	6.727	BPL	Condenser
56	78116	DOME WALL (R.W/B SIDE)	1.427	BPL	Condenser
57	78118	LOOSE ITEMS (LOWER DOME WALL RWB SIDE)	0.215	BPL	Condenser
58	78121	PIPES(DOME INTERNAL STIFFENING	0.726	BPL	Condenser
59	78122	PIPES(DOME INTERNAL STIFFENING	0.726	BPL	Condenser
60	78123	PIPES(DOME INTERNAL STIFFENING	0.726	BPL	Condenser
61	78124	PIPES(DOME INTERNAL STIFFENING	0.726	BPL	Condenser
62	78125	PIPES(DOME INTERNAL STIFFENING	0.382	BPL	Condenser
63	78126	PIPES(DOME INTERNAL STIFFENING	0.382	BPL	Condenser

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64	78127	PIPES(DOME INTERNAL STIFFENING	4.3	BPL	Condenser
65	78128	DOME INTERNAL STIFFENING	4.295	BPL	Condenser
66	78132	UPPER DOME WALL(TUR. SIDE)	1.083	BPL	Condenser
67	78133	UPPER DOME WALL(GEN. SIDE)	1.083	BPL	Condenser
68	78136	UPPER DOME WALL(FWB SIDE)	3.635	BPL	Condenser
69	78137	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE	0.475	BPL	Condenser
70	78138	LOOSE ITEMS (UPPER DOME WALL -FWB SIDE	0.41	BPL	Condenser
71	78139	UPPER DOME WALL(RWB SIDE)	3.27	BPL	Condenser
72	78142	LOOSE ITEMS (W/B HINGE ARRGT.)	2.6	BPL	Condenser
73	78143	LOOSE ITEMS (W/B HINGE ARRGT.)	2.135	BPL	Condenser
74	78150	FRAME (W/BOX HINGE ARRGT)	0.65	BPL	Condenser
75	78151	FRAME (W/BOX HINGE ARRGT)	0.65	BPL	Condenser
76	78154	STEAM THROW DEVICE	1.041	BPL	Condenser
77	78155	STEAM THROW DEVICE	1.041	BPL	Condenser
78	78157	LOOSE ITEMS (CONDENSER)	0.6	BPL	Condenser
79	78158	LOOSE ITEMS (CONDENSER)	0.38	BPL	Condenser
80	78159	LOOSE ITEMS (CONDENSER)	0.275	BPL	Condenser
81	78160	FASTENERS (CONDENSER)	1.45	BPL	Condenser
82	78161	LOOSE ITEMS (CONDENSER)	0.006	BPL	Condenser
83	78162	LOOSE ITEMS (CONDENSER)	0.2	BPL	Condenser
84	78163	TOOLS & TACKLES (CONDENSER)	0.6	BPL	Condenser
85	78166	STAND PIPE NO.1 (CONDENSER)	0.06	BPL	Condenser
86	78167	LOOSE ITEMS (STAND PIPE)	0.3	BPL	Condenser
87	78169	STAND PIPE NO.2 (CONDENSER)	0.062	BPL	Condenser
88	78175	CONDENSER INSTRUMENTATION	0.67	BPL	Condenser
89	78176	CONDENSER INSTRUMENTATION	0.145	BPL	Condenser
90	78177	CONDENSER INSTRUMENTATION	0.074	BPL	Condenser
91	76501	GLAND STEAM CONDENSER	0.825	BPL	Condenser
92	76502	STAND PIPE/LOOSE ITEM (GSC)	0.2	BPL	Condenser
93	76504	LOOSE ITEMS OF GSC (FRAGILE)	0.1	BPL	Condenser
94	76505	LOOSE ITEMS GSC(NON FRAGILE)	0.32	BPL	Condenser
95	76401	DRAIN COOLER	3.5	BPL	Condenser
96	76402	LOOSE ITEMS (DRAIN COOLER)	0.101	BPL	Condenser

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97	76402	LOOSE ITEMS (DRAIN COOLER)	0.024	BPL	Condenser
98	76402	LOOSE ITEMS (DRAIN COOLER)	0.006	BPL	Condenser
99	76101	LP HEATER NO.1	11.8	BPL	Condenser
100	76102	LP HEATER NO.1&STAND PIPES	0.15	BPL	Condenser
101	76102	LP HEATER NO.1 STAND PIPE	0.05	BPL	Condenser
102	76102	LPH1 PANAL MOUNTED INSTRUMENT	0.065	BPL	Condenser
103	76102	LOOSE ITEMS LP HEATER NO. 1	0.15	BPL	Condenser
104	76201	LP HEATER NO.2	9.95	BPL	Condenser
105	76202	LP HEATER NO.2&STAND PIPES(LOOSE ITEMS)	0.14	BPL	Condenser
106	76202	LP HEATER NO.2, INSTRUMENTS	0.13	BPL	Condenser
107	76202	LP HEATER NO.2, STAND PIPES	0.1	BPL	Condenser
108	76202	LOOSE ITEMS, LP HEATER NO.2	0.2	BPL	Condenser
109	76301	LP HEATER NO.3	9.875	BPL	Condenser
110	76302	LP HEATER NO.3&STAND PIPES(LOOSE ITEMS)	0.14	BPL	Condenser
111	76302	LP HEATER NO. 3, INSTRUMENTS	0.25	BPL	Condenser
112	76302	LP HEATER NO. 3, STAND PIPES	0.1	BPL	Condenser
113	76302	LP HEATER NO. 3,INSTRUMENTS	0.125	BPL	Condenser
114	79101	TUBRINE OIL COOLER	8.2	BPL	Condenser
115	79201	TUBRINE OIL COOLER	8.2	BPL	Condenser
116	79102	LOOSE ITEMS (TOC)	0.08	BPL	Condenser
117	79202	LOOSE ITEMS (TOC)	0.06	BPL	Condenser
118	11101	HP Heater No. 5	44	BPL	Condenser
119	11102-109	LOOSE ITEMS		BPL	Condenser
120	11201	HP Heater No. 6	53.5	BPL	Condenser
121	11202-209	LOOSE ITEMS		BPL	Condenser
122	12101-12109	Inlet assembly R.E. Joints	17.2	BPL	Condenser
123	12201-12209	Outlet Assembly R.E. Joints	15.2	BPL	Condenser
124	15017-15046	Butterfly valves for Condenser inlet & Outlet	7.45	BPL	Condenser
			473.73		
1		BFP skid (Pump assly. + Base plate+Tubing+seal coolers)	17.31	HYD	BFP

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure-I

Tentative list of Packages, Weight details, Dimensions etc. of Equipment/System

2		Booster Pump Skid(Pump assly. + Base plate+ Tubing)	7.533	HYD	BFP
3		Hydraulic Coupling assly. and accessories	10.68	HYD	BFP
4		Hydraulic Coupling working oil cooler.	4.425	HYD	BFP
5		Hydraulic Coupling lube oil cooler .	2.325	HYD	BFP
6		Hydraulic Coupling loose items	2.13	HYD	BFP
7		Suction Strainer for BP	2.4	HYD	BFP
8		BFP Recirculation Valve	1.05	HYD	BFP
9		Suction strainer for BFP	1.38	HYD	BFP
10		Local Gauge Board racks with instruments	1.95	HYD	BFP
11		Loose items with piping etc.	2.449	HYD	BFP
12		Motor tubing	45	HYD	BFP
13		Condensate Extraction Pump Assembly	12.3	HYD	CEP
14		Canister	5.4	HYD	CEP
15		CEP Foundation Ring	1.16	HYD	CEP
16		CEP suction Strainer	2.7	HYD	CEP
17		Motor Stool	1.09	HYD	CEP
18		Local Gauge Board Rack	0.3	HYD	CEP
19		Loose items	0.42	HYD	CEP
20		CEP Motors	12	HYD	CEP
21	13101	HP Drain Flash Tank	4.6	BPL	Misc
22	13201	LP Drain Flash Tank	3.4	BPL	Misc
23	13301	Unit Flash Tank	1	BPL	Misc
24	14101	Clean Oil Tank	10.2	BPL	Misc
25	14202	Dirty Oil Tank	10.2	BPL	Misc
26	14301	Oil Unloading Vessel	0.58	BPL	Misc
27	14401	DMCW O/H Tank	6.4	BPL	Misc
28		BPL, HWR BOI Items	300	BPL / HWR	BOI
29		PEM BOI items	60.95	PEM	BOI
			531.332		

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Annexure-I
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List of Items under the head Bhopal, Hardwar & PEM BOIs (For Each Unit # 4 & 5)

BPL / HARDWAR BOIs

S N	ITEM ID	ITEM DESC	QTY SET	REMARKS
1	BG001	EMPTY H2 CYLINDER	131NO	
2	BG002	EMPTY CO2 CYLINDER	63NO	
3	BG005	MOISTURE MEASURING SYSTEM	1ST	
4	BG007	VAPOUR EXHAUSTER	2NO	
5	BG008	MOTORISED TEMPERATURE CONTROL VALVE FOR COLD GAS	1ST	
6	BG009	H2 GAS ANALYSER CABINET	1NO	
7	BG011	REFRIGERATION GAS DRYER	2no	
8	BG018	STARTING RESISTOR FOR DC S.O MOTOR	1NO	
9	BG020	SOUND ABSORBING COVER	1No	
10	BG080	STROBOSCOPE	1NO	
11	BG090	GENERATOR INTEGRAL PIPING	1ST	
12	BG091	HYDROGEN COOLERS PIPING	1ST	
13	BH001	WELDED AUSTENITIC S.S. TUBES GR.304 (FOR CONDENSOR)	1ST	
14	BH010	CONDENSOR AIR EVACUATION PACKAGE (VACUUM PUMP)	2NO	
15	BH012	AIR EXHAUSTER WITH MOTOR (GSC AIR EXHAUSTER)	2NO	
16	BT001	LIFTING BEAM	1NO	
17	BT002	JACKING OIL PUMPS	1ST	
18	BT003	AOP & EOP	1ST	
19	BT004	DUPLEX FILTER (LUB.OIL)	1NO	
20	BT005	DUPLEX FILTER (JACKING OIL)	1NO	
21	BT006	BUTTERFLY VALVES	1ST	
22	BT007	THREE WAY TEMP. CONTROL VALVE	1NO	
23	BT008	DOUBLE THREE WAY VALVES	1NO	
24	BT009	NRV WITH ALUMINIUM FLAP	2NO	
25	BT010	PRESSURE LIMIT VALVE	2NO	
26	BT011	OIL PURIFICATION UNIT (OIL CENTRIFUGE)	1NO	
27	BT012	OIL VAPOUR EXHAUSTER	2NO	
28	BT013	LEAD DIAPHRAGM	4NO	
29	BT014	SPRAY NOZZLES	1ST	

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30	BT015	DIRT CATCHERS	1NO	
31	BT016	DAMPER	1ST	
32	BT017	VARIABLE LOAD SPRING CAGES	1ST	
33	BT023	TURBINE OIL	73M3	
34	BT027	TURBINE INTEGRAL PIPING	1ST	65 MT
35	BT028	H & S FOR TURBINE INTEGRAL PIPING	1ST	
36	BT043	CONTROL FLUID (FRF)	1800Lt	
37	BT024	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE	1ST	
38	BT065	GEAR PUMP (LUB. OIL RECIRCULATION)	1NO	
39	BT074	VACUUM BREAKER VALVE WITH PNEUMATIC ACTUATOR	1NO	
40	BT075	SEAL STEAM SUPPLY & LEAKAGE STEAM CONTROL VALVE WITH PNEUMATIC ACTUATOR	1ST	
41	BT080	EHA FOR TURBINE VALVES ALONGWITH HPSU	1ST	
42	BT094	DC JACKING OIL & DC EMERGENCY OIL STARTER CABINETS	1NO	

PEM BOI

S N	Item	Qty	Weight (In MT)
1	Plate Heat Exchangers with associated components/ items, attachment, fittings etc.- Each of size- L-4500XW - 2000XH-3000 mm	3 sets.	12.75
2	Self Cleaning Strainers Each of size L-3000xW-1500xH-1500	2 Sets	3.7
3	Condenser On Load Tube Cleaning System (COLTS)- Each set comprising of	2Sets	26
	(i) Ball Injection Pipes.		
	(ii) Ball re-circulating skid		
	(iii) Ball Separator-/Ball collector strainer-		
	(iv) D.P. Measuring system		

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/NST-BAL STG U#3,4,5/1567-1568-1569

Technical Conditions of Contract

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TECHNICAL CONDITIONS OF CONTRACT (TCC)
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	(v) Loose items		
4	Misc. Pumps		
1	ACW Pumps (Horizontal)	3 Sets	4.5
2	DMCW Pumps (Horizontal) & Drive Motors	3 Sets	7.65
3	DM CW Booster Pumps (Horizontal)	2 Sets	2.7
4	HOTWELL MAKE UP PUMPS	2 sets	1.5
5	BOILER FILL PUMP	1 set	2.15
Total			60.95

Summary (For Each Unit # 4 and Unit # 5)		
S N	Description	Gross Weight (in MT)
1	Turbine	558.467
2	Generator	367.071
3	Condenser	473.73
4	Pumps & Aux	531.332
Total		1930.6

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.

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

Reference painting scheme is attached as separate Zip document.

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

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 carry out 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

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 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:

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

11.1 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

11.1.1

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

11.1.2

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

11.1.3

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

11.2 TEST TAPPING POINTS

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

11.2.1

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

11.2.2

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

11.2.3

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

11.3 GENERAL

11.3.1

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII CIVIL WORKS, FOUNDATION, GROUTING

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII CIVIL WORKS, FOUNDATION, GROUTING

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIII EQUIPMENT INSTALLATION

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. Oil for this purpose will be supplied by BHEL.

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, 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, 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIV PIPING INSTALLATION

14 PIPING INSTALLATION

14.1

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

14.2

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

14.3

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

14.4

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

14.5

All drains / vents / relief / escapes / safety valve piping to various tanks/ 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIV PIPING INSTALLATION

- (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 for 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XV CONDENSER INSTALLATION

15 CONDENSER INSTALLATION

15.1

The condenser will be dispatched in loose parts mainly comprising of bottom plates, dome walls, 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 is 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVI Generator , installation & Handling Heavier Equipments

16.1 GENERATOR INSTALLATION

16.1.1 GENERATOR STATOR

The Generator stator, weighing approximately 230 MT may be transported from Manufacturing Unit to site by special trailer. The contractor shall have to unload the generator stator from the Trailer at a suitable place outside Machine Hall. The Stator shall be moved from the place of unloading and placed within the reach of strand jack arrangements by the contractor in consultation with BHEL Engineer.

16.1.2

The generator stator shall be lifted and shifted to its designated place with the help of strand jack as per the scheme envisaged by BHEL. For this purpose, a separate agency shall be engaged by BHEL. The engaged agency shall provide Strand jack system with operator and carry out lifting & shifting of stator. The Contractor shall extend necessary help during this operation including manpower and T & P support.

The transportation of Strand Jack system from store to TG Hall , assistance for assembly, erection, assistance in testing and commissioning, dismantling, transporting back to store after its use will be the responsibility of the contractor.

The required loads for load testing of strand jacks will be provided by BHEL free of charges. To & Fro transportation, loading & unloading of load from BHEL / Customer store to site shall be carried out by contractor.

Grouting of foundation bolts of Strand & Jack system shall be carried out by TG Contractor. Foundation bolts shall be provided by BHEL / Strand Jack agency.

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, 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

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

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII PRE-COMMISSIONING TESTS, COMMISSIONING, POST COMMISSIONING

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), IP Valves, LP Bypass valves, CRHNRV and fittings.
- (f) Manual/mechanical cleaning of Oil tanks, 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, as per requirement. Contractor shall carry out disassembly and reassembly of vulnerable components like spray nozzles, gauges, instruments etc. as instructed by BHEL during this process.
- (h) Putting turbine on barring gear.
- (i) Rolling and synchronization.
- (j) Full load operation.
- (k) Trial operation
- (l) Assistance in PG Test.

The above activities/tests/trial runs may have to be repeated till satisfactory results / acceptable 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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII PRE-COMMISSIONING TESTS, COMMISSIONING, POST COMMISSIONING

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 (Inside & outside) by wire brush 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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVIII PRE-COMMISSIONING TESTS, COMMISSIONING, POST COMMISSIONING

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

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

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 8-10⁰ 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

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 penetrometer/ 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XX ACID CLEANING/ALKALI FLUSHING/STEAM BLOWING/OIL FLUSHING

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. **No separate payment shall be made.** 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. **The dismantled materials shall be dressed and returned to BHEL.**

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 should be carried out.

20.9

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XX ACID CLEANING/ALKALI FLUSHING/STEAM BLOWING/OIL FLUSHING

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXI TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

21 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

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.

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. **Test certificate** Contractor has to provide suitable cranes for material handling at BHEL/client's stores/storage yard. BHEL's crane will not be available for this purpose. Please refer relevant appendix for the list of T&P being provided by BHEL free of charges on sharing basis.

21.2

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

21.4

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

21.5

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

21.6

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

21.7

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXI TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXII PRESERVATIVE PAINTING

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 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 properly cleaned by wire brush 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.
- 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.
- 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIII LINING AND INSULATION

23 LINING AND INSULATION

23.1

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

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

23.2

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

23.3

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

23.4

All insulation and 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 aluminium sheets have to be adhered to.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIII LINING AND INSULATION

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 insulation

23.15

Wastage allowances for the material issued are envisaged as follows:

A	Wool mattresses	-	2%
B	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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIV FINAL PAINTING

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,

- a. shall be first painted with at least one coat of suitable primer which matches the shop primer paint used,
- b. after thoroughly cleaning all such parts of all dirt, rust, scales, greases, oils and other foreign materials by wire brushing, scraping and the same being inspected and approved by BHEL engineer.
- c. Afterwards, the above parts shall be finished with two coats of alloyed resin machinery enamel paints.

A. STEAM SIDE PAINTING

TWO COATS OF STEAM WASHABLE PAINTS SHALL BE APPLIED ON STEAM SIDE OF LP TURBINE AND **CONDENSER SHELL INTERNALS**, AS ADVISED BY BHEL. HOWEVER, ARRANGEMENTS FOR SURFACE PREPARATION AND PAINT APPLICATION, CONSUMABLES LIKE SURFACE CLEANING AGENTS, PAINT BRUSH, BRUSH CLEANSER, LABOUR AND NECESSARY TOOLS AND PLANTS ARE IN THE SCOPE OF CONTRACTOR.

ALL SITE WELD JOINTS FALLING IN STEAM SIDE SHALL **ALSO** BE PAINTED WITH TWO COATS OF STEAM WASHABLE PAINT.

B. WATER SIDE PAINTING

THE WATER BOXES SHALL BE PROPERLY CLEANED USING WIRE BRUSH

- a. TO REMOVE ALL TRACES OF PRIMER APPLIED AT THE WORKS.
- b. THEREAFTER TWO COATS OF PRIMING PAINT OR AS PER PAINTING SCHEME. 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.

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. **CARE SHALL BE TAKEN TO PLUG THE EXPANDED TUBE ENDS TO PREVENT ENTRY OF PAINT INTO THE TUBES. THE CONTRATOR SHALL ARRANGE FOR THE PLUGS IF NOT PROVIDED ALONGWITH THE TUBES.**

THE WATER SIDE PAINTING ON WATER BOXES, WATER CHAMBERS AND TUBE PLATES SHALL BE DONE PRIOR TO THE WATER SIDE HYDRAULIC TEST OF THE CONDENSER.

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIV FINAL PAINTING

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 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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIV FINAL PAINTING

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.