

TENDER SPECIFICATION

No. BHE/PW/PUR/NGNRI-STG/1593

RECEIPT / COLLECTION / LOADING / TRANSPORTATION OF MATERIALS FROM BHEL / CLINT'S STORES / STORAGE YARDS TO SITE OF WORK. ERECTION, TESTING, COMMISSIONING OF SURFACE CONDENSERS, STEAM TURBINES, TURBO BLOWERS, PUMPS & AUXILIARIES INCLUDING CONDENSATE EXTRACTION PUMPS, PIPINGS, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, ASSISTANCE FOR PG TEST ETC. AND HANDING OVER OF 3 x TURBO BLOWER SET

AT

NATIONAL MINERAL DEVELOPMENT CORPORATION (NMDC)
NMDC NAGARNAR,
DIST. JAGDALPUR, (CHHATISGARH)

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

CONTENTS			
Volume No	Description	No. of pages	Hosted in website bhel.com as files titled
NIL	Tender Specification Issue Details	3	(Part of Vol-I-1593)
NIL	Notice Inviting Tender	21	(Part of Vol-I-1593)
I-A	Technical Conditions of Contract	93	Vol-IA-1593
I-B	Special Conditions of Contract	205	Vol-IBCD- 1593
I-C	General Conditions of Contract		(Part of Vol-IBCD- 1593)
I-D	Forms & Procedures		(Part of Vol-IBCD- 1593)
II	Price Bid Specification	3	Vol-II-1593

Tender Specification Issue Details

T.S. No. BHE/PW/PUR/NGNRI-STG/1593

RECEIPT / COLLECTION / LOADING / TRANSPORTATION OF MATERIALS FROM BHEL / CLINT'S STORES / STORAGE YARDS TO SITE OF WORK. ERECTION, TESTING, COMMISSIONING OF SURFACE CONDENSERS, STEAM TURBINES, TURBO BLOWERS, PUMPS & AUXILIARIES INCLUDING CONDENSATE EXTRACTION PUMPS, PIPINGS, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, ASSISTANCE FOR PG TEST ETC. AND HANDING OVER OF 3 x TURBO BLOWER SET

AT

**NATIONAL MINERAL DEVELOPMENT CORPORATION (NMDC)
NMDC NAGARNAR,
DIST. JAGDALPUR, (CHHATISGARH)**

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. õ õ õ õ õ õ õ õ õ õ õ õ õ õ õ õ

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PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

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

1593

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	Tender Specification No. BHE/PW/PUR/NGNRI-STG/1593	
ii	Broad Scope of job	RECEIPT / COLLECTION / LOADING / TRANSPORTATION OF MATERIALS FROM BHEL / CLINT'S STORES / STORAGE YARDS TO SITE OF WORK. ERECTION, TESTING, COMMISSIONING OF SURFACE CONDENSERS, STEAM TURBINES, TURBO BLOWERS, PUMPS & AUXILIARIES INCLUDING CONDENSATE EXTRACTION PUMPS, PIPINGS, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, ASSISTANCE FOR PG TEST ETC. AND HANDING OVER OF 3 x TURBO BLOWER SET AT NATIONAL MINERAL DEVELOPMENT CORPORATION (NMDC) NMDC NAGARNAR, DIST. JAGDALPUR, (CHHATISGARH)	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	Applicable
b	Volume-IB	Special Conditions of Contract (SCC)	Applicable
c	Volume-IC	General Conditions of Contract (GCC)	Applicable
d	Volume-ID	Forms and Procedures	
e	Volume-II	Price Schedule (Absolute value).	Applicable
iv	Issue of Tender Documents	<p>1. <u>Sale from BHEL PS Regional office at :</u> Start : 25/01/2016 , Closes: 12/02/2016 , Time : 16.00 Hrs</p> <p>2. From BHEL website (www.bhel.com) Tender documents will be available for downloading from website till due date of submission</p>	Applicable/ Not applicable
v	DUE DATE & TIME	Date : 15/02/2016, Time 15.00 Hrs	Applicable

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 6 of 119

	OF OFFER SUBMISSION	Place : <u>BHEL PS Regional office at :Nagpur</u> Tenders being submitted through representative shall be submitted at dispatch section of of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: <ul style="list-style-type: none"> • Pratih Gee Varghese/Sr Engineer(Purchase • Shubhangi Tembhurne / Engineer (Purchase) 	
vi	OPENING OF TENDER	1 hours after the latest due date and time of Offer submission Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender	Applicable
vii	EMD AMOUNT	Rs 2,00,000/- (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.

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 7 of 119

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>i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL</p> <p>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.	

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 8 of 119

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.

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

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 10 of 119

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':

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

- i. In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number
- ii. For $R_{BHEL} = 60$, $P_{Max} = '1'$
- iii. For $R_{BHEL} \geq 80$, 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)

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 12 of 119

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.

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 13 of 119

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

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

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

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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.

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 15 of 119

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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.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	RECEIPT / COLLECTION / LOADING / TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK. ERECTION, TESTING, COMMISSIONING OF SURFACE CONDENSERS, STEAM TURBINES, TURBO BLOWERS, PUMPS & AUXILIARIES INCLUDING CONDENSATE EXTRACTION PUMPS, PIPINGS, APPLICATION OF THERMAL INSULATION, FINAL PAINTING, ASSISTANCE FOR PG TEST ETC. AND HANDING OVER OF 3 x TURBO BLOWER SET AT NATIONAL MINERAL DEVELOPMENT CORPORATION (NMDC) NMDC NAGARNAR, DIST. JAGDALPUR, (CHHATISGARH)
TENDER NO	BHE/PW/PUR/NGNRI-STG/1593

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>Bidder must have executed any one of the following in last seven years as on latest date of bid submission:</p> <p>B.1) Erection, Testing and Commissioning of atleast One Unit of STG (Steam Turbine & Generator) / GTG (Gas Turbine & Generator) job of any rating.</p> <p align="center">OR</p> <p>B.2) Erection, Testing and Commissioning of atleast One BOILER upto synchronization (with Rotating machinery) unit rating 30 MW or higher, under direct order of BHEL</p> <p align="center">OR</p> <p>B.3) One R&M job of Steam Turbines of capacity 50 MW or higher</p> <p align="center">OR</p> <p>B.4) Atleast three number capital overhauling work of STGs against BHEL direct orders. The rating of individual STG unit shall be atleast 190MW</p> <p align="center">OR</p> <p>B.5) Erection, Testing and Commissioning of atleast One Unit of 'Turbo Blower driven by Steam Turbine (upto successful completion of Surge</p>	APPLICABLE	

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 17 of 119

	Test)' (including erection & commissioning of steam turbine) of any rating.		
C-1	Financial TURNOVER (Applicable) Bidders must have achieved an average annual financial turnover (Audited) of Rs 75 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)		
<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 _____ OR _____ Two (2) works of not less than Rs YYY _____ OR _____ Three (3) works of not less than Rs ZZZ (Value XXX, YYY, ZZZ shall be as indicated by BHEL) _____ 'Similar' work for criteria 5 above means <ol style="list-style-type: none"> _____ Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope 			

<p>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> <ol style="list-style-type: none">1. Term 'Commissioning' indicated in PQR refers to 'assistance to commissioning' / 'commissioning'2. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP3. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG4. "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping5. "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping6. "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears7. "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.8. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works9. "Readiness for coal Filling" in respect of Bunker Structure Work. <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/POAWO 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>
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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.

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 19 of 119

Bidder's Response to BHEL TECHNICAL PQR (WHICHEVER IS APPLICABLE)

PQR No	Pre-Qualifying Requirement	Credentials (Detailed Work Order, Completion Certificate and TDS Certificates) based on which bidder is claiming PQR	Reference of the documents	Page No
B.1	Erection, Testing and Commissioning of atleast One Unit of STG (Steam Turbine & Generator) / GTG (Gas Turbine & Generator) job of any rating.			
B.2	Erection, Testing and Commissioning of atleast One BOILER upto synchronization (with Rotating machinery) unit rating 30 MW or higher, under direct order of BHEL			
B.3	One R&M job of Steam Turbines of capacity 50 MW or higher			
B.4	Atleast three number capital overhauling work of STGs against BHEL direct orders. The rating of individual STG unit shall be atleast 190MW			
B.5	Erection, Testing and Commissioning of atleast One Unit of 'Turbo Blower driven by Steam Turbine (upto successful completion of Surge Test)' (including erection & commissioning of steam turbine) of any rating.			

NOTE:

BIDDERS MUST CLEARLY INDICATE IN THE TABLE ABOVE, HOW THEY ARE SATISFYING TECHNICAL PQR ALONG WITH THE REFERENCE OF THE SUPPORTING DOCUMENTS AND THE PAGE NUMBER IN WHICH THE REFERRED DOCUMENTS ARE ANNEXED IN THE BID DOCUMENT.

BHEL WILL NOT CONSIDER ANY OTHER DOCUMENT OTHER THAN THOSE SPECIFIED BY THE BIDDERS IN THE TABLE ABOVE FOR EVALUATION OF TECHNICAL PQR. BIDDER MAY ATTACH SEPERATE SHEET IF NECESSARY

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Website : www.bhel.com

**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 20 of 119

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
15	Non Disclosure Certificate	Applicable/ Not Applicable	YES/NO

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**BHEL PSWR
Notice Inviting Tender**

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593

Page 21 of 119

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)**

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@bhelswr.co.in. Ph: +91 – 712 – 3048633

Sr Engineer Purchase, Email: pgv@bhelswr.co.in, Ph: +91 – 712 – 3048713

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

- 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](http://www.bhel.com/vender%20registration/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. 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:

- 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'.

9. Modality of Tendering and Ordering Philosophy

1. Subject job consist of E & C of Turbo-blower works of 3 Units. All the three units shall be awarded to one agency.
2. Work orders for all the three units shall be issued separately and three units shall be considered as separate contracts with separate contract period (8 months each), separate start dates and separate contract value (1/3rd of total contract value).
3. All the records of the contracts viz Measurement of work, progress monitoring, monthly review, performance evaluation etc shall be maintained for all the three units/contracts separately.
4. Accordingly various clauses of GCC viz SD, LD, PVC, ORC, Time Extension, retention amount, guarantee period, Quantity Variation, Final Bill etc shall be applicable separately for individual units/Contracts.

5. ORC shall be applicable for individual Units/Contracts separately. Considering award of three contracts separately, lower & upper limit of applicable ORC is reduced by 1/3rd for each Unit. Clause No 2.12.3 of GCC is amended as below:

“The amount of increase payable per month due to rate revisions is subject to a minimum of Rs 33,000 /- per month and a maximum of Rs 1,66,000 /- per month.”

10. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (V) of Vol I C GCC:

Clause No. 1.10.3 (V) of Vol IC GCC is revised as below:-

“Bank Guarantee issued by:

- a. Any of the BHEL consortium bank listed below :

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank
Citi Bank N.A.
Corporation Bank
Deutsche Bank
HDFC Bank Ltd.
The Hongkong and Shanghai Banking Corporation Ltd.
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

- b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that it is enforceable at Nagpur, Maharashtra
- c. Any private sector banks, with a clause in the text of Bank Guarantee that it is enforceable by being presented at any branch of the bank

Note: “Bank Guarantees issued by Co-operative Banks are not acceptable”.

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

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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 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.

1593

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC) CONTENTS

SL NO	DESCRIPTION	CHAPTER	NO. OF PAGES
VOLUME-IA	PART-I: CONTRACT SPECIFIC DETAILS		
1	PROJECT INFORMATION	CHAPTER-I	1
2	SCOPE OF WORKS	CHAPTER-II	2
3	FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL (SCOPE MATRIX)	CHAPTER-III	5
4	TENTATIVE LIST OF T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR	CHAPTER-IV	3
5	T&PS AND MMES TO BE DEPLOYED BY BHEL ON SHARING BASIS	CHAPTER-V	1
6	TIME SCHEDULE	CHAPTER-VI	2
7	TERMS OF PAYMENT	CHAPTER-VII	10
8	TAXES AND OTHER DUTIES	CHAPTER-VIII	3
9	SPECIFIC INCLUSION	CHAPTER-IX	1
10	SPECIFIC EXCLUSION	CHAPTER-X	1
11	TENRATIVE SCOPE OF EQUIPMENTS/ SYSTEMS AND ESTIMATED WEIGHTS OF VARIOUS SYSTEMS IN SCOPE OF WORK	CHAPTER-XI	33
12	ERECTION TESTING AND COMMISSIONING OF TURBO BLOWER- GENERAL REQUIREMENT	CHAPTER-XII	29

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

1.0 Project Information (3.0 MTPA Integrated steel plant of NMDC Limited at Nagarnar, Chattishgarh)			
1	Customer	:	Bharat Heavy Electricals Limited
2	Project Title	:	Erection and Commissioning of 3 x turbo blower set for Turbo-blower station for 3.0 MTPA Integrated steel plant of NMDC Limited at Nagarnar, Chattishgarh
3	Location	:	3.0 MTPA Integrated steel plant of NMDC Limited at Nagarnar, Jagdalpur, Chattishgarh
4	Address Detail	:	3.0 MTPA Integrated steel plant Project of NMDC Limited, Nagarnar, Jagdalpur, Chattishgarh
5	Nearest Railway Station	:	Jagdalpur Railway Station
6	Road Approach	:	Jagdalpur is well connected by road with the Raipur , Hyderabad , Visakhapatnam and Vizianagaram .
7	Nearest Air Port	:	Raipur Airport and Visakhapatnam Airport
8	Ambient Air Temperature (Average)	:	a) Maximum : 32 ⁰ C b) Minimum : 19 ⁰ C
9	Average Relative Humidity	:	42-86 %
10	Climatic Condition	:	Tropical Savanna Climate

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 SCOPE OF WORK OF THIS TENDER SPECIFICATION FOR COLLECTION OF MATERIALS FROM BHEL/ CLIENT'S STORES/ STORAGE YARD, TRANSPORTATION TO SITE OF WORK/PRE-ASSEMBLY YARD, ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING & TRIAL OPERATION, HANDING OVER OF STB PACKAGE INCLUDING INSULATION, FINAL PAINTING FOR STB PACKAGE 3X TURBO BLOWER SET (TURBINE- 29.611 MW) NMDC TURBO BLOWER PROJECT AT NAGARNAR, DISTRICT JAGDALPUR IN CHHATISSGARH STATE SHALL BE BROADLY AS UNDER:

- 1) COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE, ERECTION, TESTING & ASSISTANCE FOR COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBO BLOWER, INSULATION, FINAL PAINTING ETC. OF STB PACKAGE 3X TURBO BLOWER SET NMDC TURBO BLOWER PROJECT
- 2) CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENTS FOR SHIFTING OF HEAVIER CONSIGNMENTS WEIGHING BETWEEN 40-70 MT FROM STORE YARD TO ERECTION SITE AS PER THE INSTRUCTIONS OF BHEL.
- 3) PRE-ASSEMBLY/ASSEMBLY, PRE-ERECTION CHECKS AS PER REQUIREMENT.
- 4) ERECTION, ALIGNMENT, TESTING, COMMISSIONING OF EQUIPMENTS / SYSTEMS WITH ASSOCIATED AUXILIARIES AND STAGE INSPECTION BY STATUTORY AUTHORITIES LIKE BOILER INSPECTOR, FACTORY INSPECTOR ETC. COVERED UNDER THIS TENDER SPECIFICATION. ALL THE NECESSARY TESTS INCLUDING SUPPLY OF TESTING / MEASURING EQUIPMENTS & INSTRUMENTS SHALL BE CARRIED OUT AS PER REQUIREMENT UNDER THIS SCOPE OF TENDER SPECIFICATION. ALL ARRANGEMENTS FOR PERIODICAL SITE VISITS BY BOILER INSPECTOR TO SITE, FOR OBTAINING INSPECTION CERTIFICATE ETC, WILL HAVE TO BE MADE BY CONTRACTOR. STATUTORY FEE OF INSPECTOR IF ANY WILL HAVE TO BE BORNE BY CONTRACTOR.
- 5) CHIPPING/ BLUE-MATCHING OF CIVIL FOUNDATION, GROUTING OF EQUIPMENTS/ AUXILIARIES / PANELS WITH PORTLAND AND NON-SHRINK READY-MIX GROUTING CEMENT AS PER NORMAL ENGINEERING PRACTICE FOR SIMILAR EQUIPMENTS. CONTRACTOR SHALL ARRANGE ALL THE GROUT MATERIALS OF BHEL-APPROVED BRAND WITHIN THE QUOTED PRICE.
- 6) PRE-ASSEMBLY, STAGE INSPECTION AS PER REQUIREMENT OF BHEL / CUSTOMER / IBR AND OTHER STATUTORY AUTHORITIES, ERECTION, ALIGNMENT, HEAT TREATMENT, STRESS RELIEVING, WELDING, RADIOGRAPHY & OTHER NDT TESTS, FLUSHING/CHEMICAL CLEANING, HYDRAULIC TESTING, STEAM BLOWING OF PIPING.
- 7) ERECTION, COLD SETTING AND HOT SETTING OF PIPING SUPPORTS & HANGERS.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: SCOPE OF WORKS

- 8) APPLICATION OF THERMAL INSULATION & CLADDING OF APPLICABLE PIPING, VESSELS & EQUIPMENTS AS APPLICABLE.
- 9) 64" MITERED ELBOWS/ REDUCER (4 to 8 nos) SHALL BE MANUFACTURED AT SITE FROM THE BHEL SUPPLIED PIPES AND IS IN THE SCOPE OF ERECTION CONTRACTOR. THIS WILL INVOLVE CLEANING, CUTTING, WELDING & NDT) NO EXTRA WORK WILL BE GIVEN FOR THIS.
- 10) CHEQUERED PLATES AND STRUCTURAL STEEL WILL BE SUPPLIED FREE OF CHARGES BY BHEL/ CLIENT FOR COVERING VARIOUS OPENINGS IN THE TURBINE FLOOR. THE CONTRACTOR HAS TO CUT THESE TO REQUIRED SIZE AND FIX AT APPROPRIATE LOCATIONS INCLUDING RAISED SUPPORTS ETC TO FILL THE GAPS AROUND THE TURBO BLOWER SET FOUNDATIONS SHALL BE CARRIED BY CONTRACTOR. NO SEPARATE PAYMENT IS ENVISAGED FOR THIS ACTIVITY.
- 11) ALL GRADE/FLOOR LEVEL BOTTOM PIPE SUPPORTS ARE TO BE INSTALLED BY ANCHOR FASTENING THE BOTTOM PLATE/BASE PLATE. ANCHOR FASTENERS / HILTI BOLTS SUPPLY AND INSTALLATION IS IN ERECTION AGENCY/ CONTRACTOR SCOPE. HOWEVER THE SIZE OF ANCHOR FASTENERS/HILTI BOLTS WILL BE INDICATED IN THE RESPECTIVE SUPPORT DRAWINGS.
- 12) ERECTION OF ALL PERMANENT APPROACH/ACCESS PLATFORMS AND LADDERS FOR COLD BLAST SYSTEM INCLUDING PIPING AS PER PIPING LAYOUT WILL BE IN CONTRACTORS SCOPE.
- 13) STEAM PIPING, EXTRACTION PIPING, DRAIN LINE, OIL LINE, SERVICE AIR PIPING, COOLING AND SERVICE WATER LINES BETWEEN THE BHEL SUPPLIED EQUIPMENTS/ AUXILIARIES AND BATTERY LIMITS OF CUSTOMER IS IN THE SCOPE OF THIS TENDER SPECIFICATION.
- 14) ERECTION OF ELECTRICAL MOTORISED & CONTROL VALVES.
- 15) FINAL PAINTING OF ERECTED ITEMS.
- 16) ERECTION, PRE-COMMISSIONING & COMMISSIONING CHECKS/TESTS AND COMMISSIONING INCLUDING TRIAL RUN OPERATION OF APPLICABLE EQUIPMENTS AND AUXILIARIES.
- 17) TRIAL OPERATION OF TURBO BLOWER SETS, PROVIDING ASSISTANCE DURING PG TEST OF THE EQUIPMENTS AND HANDING OVER OF THE UNIT TO BHEL & CLIENT.
- 18) COMPLETION OF ALL FACILITIES/SYSTEMS
- 19) 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – II: SCOPE OF WORKS

20)MS PIPING IS APPROX 40 MT AND THE MATERIAL IS P11/ P22.

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	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	
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	ELECTRICITY			
3.2.1	Electricity For construction purposes of Voltage 415/440 V			FREE
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)

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	
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			FREE
a	Single point source	Yes		
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc			Contractor has to make his own arrangement
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	WATER SUPPLY			
3.3.1	For construction purposes:			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	
3.3.2	Water supply for bidder's office, stores, canteen etc.			
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	Water supply for Living Purpose			Contractor has to make his own arrangement
a	Making the water available at single point		Yes	

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	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4.0	LIGHTING			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6.0	COMPRESSED AIR wherever required for the work			
3.7.0	Demobilization of all the above facilities		YES	

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	
3.8.0	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	3.9.0 ERECTION FACILITIES			
3.9.1	Engineering works for construction:		Yes	For testing/commissioning purpose DM Water or CW Water or Supply/compressed Air shall be available at single point source At a distance of 500 M from site (Distance is only estimated, it may vary upto an extent depending on site condition) Hose pipe & Mess - required temporarily for Oil & water Flushing/commissioning purpose is to be arranged by the Contractor.

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	
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	+
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	+
g	Weekly erection schedules based on SL No. e		Yes	+
h	Daily erection / work plan based on SL No. g		Yes	+
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

SN	DESCRIPTION OF EQUIPMENT	CAPACITY	MINIMUM QUANTITY	REMARKS
01	Crane	40 / 75 MT	01	Contractor has to arrange this crane for short duration for handling/erection of heavy equipment as required and erection of Cold blast pipe line, and suction air filter etc as required at site (at no additional cost)
02	PICK AND CARRY CRANE	12 T	01	From start of contract period.
03	TRAILER	40-70 MT	As per requirement	For transportation of Heavy consignment
04	AIR COMPRESSOR (ELECTRIC)	140 CFM	01	TO BE DEPLOYED AT APPROPRIATE STAGE OF WORK AS PER INSTRUCTION OF BHEL ENGINEER
05	3 ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWING CONSTRUCTION POWER, FITTED WITH ENERGY METER	AS Required	As required	AS REQUIRED AND AS PER INSTRUCTION OF BHEL ENGINEER
06	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED	TO BE DEPLOYED PROGRESSIVELY AS PER INSTRUCTION OF BHEL ENGINEER
07	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS REQUIRED	AS REQUIRED	TO BE DEPLOYED FROM BEGINNING OF START OF ERECTION TILL COMPLETION
08	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS REQUIRED	01 SET EACH	TO BE DEPLOYED AT APPROPRIATE STAGE OF WORK AS PER INSTRUCTION OF BHEL ENGINEER
09	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS REQUIRED	AS REQUIRED	TO BE DEPLOYED PROGRESSIVELY AS PER INSTRUCTION OF BHEL ENGINEER
10	SLINGS, 'D'-SHACKLES, HYDRAULIC JACKS, ETC.	AS REQUIRED	AS REQUIRED	WITH TEST REPORTS
11	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE AND FILM VIEWER			-DO-

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

12	TIG WELDING SETS		-DO-
13	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS		-DO-
14	VACUUM CLEANER (INDUSTRIAL)		-DO-
15	PIPE CUTTING AND BEVELLING MACHINE		-DO-
16	PIPE BENDING M/C	(ELECTRIC/ ELECTRO- HYDRAULIC-UPTO 4" SIZE)	-DO-
17	STEP DOWN TRANSFORMER,	230V/24V	AS PER REQUIREMENT
18	CONDENSER TUBE EXPANDER SET	ADEQUATE CAPACITY	-DO-
19	ELECTRICALLY OPERATED WINCHES	ADEQUATE CAPACITY	-DO-
20	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES (FOR ST. TURBINE ROLL CHECKS ETC.)	ADEQUATE CAPACITY	-DO-
A	HYDRAULIC JACKS OF VARIOUS CAPACITIES FOR TURBO-BLOWER :		AS PER REQUIREMENT
B	JACKS	100 T	
21	JACKS	50 T	
A	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :		
B	JACKS	100 T	10 NOS (HAVING BROAD BASE ONE INCH LIFT)
22	JACKS	63 T	10 NOS (WITH 4-6 INCH LIFT)
23	TORQUE WRENCH	0 TO 200 N-M CAP.	AS PER REQUIREMENT
24	TORQE WRENCH -	UPTO 2000 N-M CAP.	AS PER REQUIREMENT
25	SLINGS FOR TURBINE MODULE		AS PER REQUIREMENT
26	SLINGS FOR BLOWER		AS PER REQUIREMENT
27	LONG FEELER GAUGE SET		AS PER REQUIREMENT
28	SPANNERS / EYE BOLTS (OF ALL SIZES)		AS PER REQUIREMENT
29	Hand Operated Hydraulic Test Pump of suitable capacity		AS PER REQUIREMENT
30	HYDRO TEST PUMP CAPACITY -250/450 KG/CM2		AS PER REQUIREMENT

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: Tentative list of T&Ps and MMEs to be deployed by Contractor

OTHER T & Ps AND MEASURING AND MONITORING DEVICES (MMD):

AS PER REQUIREMENT TO BE FINALIZED AT SITE, SHALL MEET THE REQUIREMENTS AS PER FIELD QUALITY PLAN AND OTHER ERECTION, TESTING RELATED ACTIVITIES.

NOTE:

1. THIS ABOVE LIST IS ONLY INDICATIVE AND NEITHER EXHAUSTIVE NOR LIMITING. QUANTITIES INDICATED ABOVE ARE ONLY THE MINIMUM REQUIRED. CONTRACTOR SHALL DEPLOY ALL NECESSARY T&P TO MEET THE SCHEDULES & AS PRESCRIBED BY BHEL ENGINEER AND REQUIRED FOR COMPLETION OF WORK.
2. IF T&P AS PRESCRIBED BY BHEL ENGINEER AND REQUIRED FOR COMPLETION OF WORK ARE NOT DEPLOYED IN SPECIFIED TIME BHEL WILL CHARGE TO CONTRACTOR AS PER GCC-REV 01.
3. IF WORK GETS DELAYED DUE TO NON AVAILABILITY OF T&P, BHEL RESERVES THE RIGHT TO GET THE WORK DONE AT THE RISK AND COST OF CONTRACTOR WITHOUT PREJUDICE TO RIGHTS OF BHEL AS IN GCC. OVERHEADS WILL BE CHARGED ON DIFFERENTIAL AMOUNT.
4. IN CASE OF NON COMPLIANCE IF ANY AS LISTED BELOW IN SL. NO. 4.1, THE CHARGES AS MENTIONED IN SL. NO. 5 SHALL BE DEDUCTED IN THE RUNNING BILLS OF THE RESPECTIVE MONTHS.
 - 4.1. LIST OF NON COMPLIANCE:
 - NON AVAILABILITY/NOT WORKING CONDITION OF THE PARTICULAR CRANE CUMULATIVELY FOR MORE THAN FIVE DAYS IN THE CALENDAR MONTH DURING THE PERIOD MENTIONED IN THE DEPLOYMENT PLAN.
 - NON AVAILABILITY/NOT WORKING CONDITION OF THE PARTICULAR CRANE FOR MORE THAN FIVE CONSECUTIVE WORKING DAYS IN THE MONTH DURING THE PERIOD MENTIONED IN THE DEPLOYMENT PLAN.
5. THE DEDUCTION SHALL BE AS GIVEN BELOW:

DEDUCTION FOR THE MONTH = OUTAGE BEYOND FIVE DAYS X (MONTHLY CRANE CHARGES/30)

NOTE: I) FOR CALCULATION NO. OF DAYS IN A CALENDAR MONTH IS TAKEN AS 30.

II) MONTHLY CRANE CHARGES AS DERIVED IN THE PRICE BID SECTION A.
6. THE MANUFACTURING YEAR OF ALL MAJOR T&PS DEPLOYED BY THE CONTRACTOR (75/40 MT CRANE, 12 MT CRANE) SHOULD NOT BE MORE THAN 10 YEARS AS ON THE DATE OF DEPLOYMENT. THE DOCUMENTARY PROOF TO BE SUBMITTED TO SITE INCHARGE.
7. CRANE LOG SHEET FOR EACH OF THE CRANE ON DAILY BASIS ARE TO BE CERTIFIED BY THE BHEL ENGINEER. CONTRACTOR SHALL SUBMIT THE MONTHLY RUNNING ACCOUNT BILLS ALONG WITH DULY CERTIFIED LOG SHEETS.
8. ANY OR PART OR ALL OF THE T & PS OF THE CONTRACTOR IDENTIFIED FOR THE TENDERED PACKAGE SHALL NOT BE ENGAGED FOR ANY WORKS OTHER THAN THAT OF THE WORKS INTENDED IN THIS TENDER.
9. DURING THE EXTENDED PERIOD OF THE CONTRACT, SERVICES OF T&Ps SHALL BE PROVIDED BY THE CONTRACTOR AS PER THE INSTRUCTION OF BHEL ENGINEER.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – V: T&Ps and MMEs to be deployed by BHEL on sharing basis

SN	DESCRIPTION AND CAPACITY OF T&P	REMARKS
01	EOT CRANE	FOR HANDLING AND ERECTION WITHIN TG HALL ON SHARING BASIS AS AVAILABLE AND SUBJECT TO THEIR ACCESSIBILITY AND APPROACHABILITY

NOTE:

1. CUSTOMER WILL PROVIDE THE EOT CRANE, HOWEVER CONTRACTOR WILL HAVE TO PROVIDE THE EOT CRANE OPERATOR FOR HIS OPERATIONS AND WILL CARRY OUT THE DAY TODAY OPERATIONAL MAINTENANCE, GENERAL CLEANLINESS, ATTENDING OF GEAR BOX LEAKAGES ETC., APPLYING CALADIUM COMPOUND ON SLINGS AND HOLDING/SUPPORTING THE SUPPLY CABLES ETC. AS PART OF SCOPE OF WORK
2. EOT CRANES WILL BE USED ON SHARING BASIS BY OTHER AGENCIES WORKING WITHIN THE TG HALL UNDER THE INSTRUCTION OF BHEL. CONTRACTOR HAS TO PLAN HIS ACTIVITIES WELL IN ADVANCE AND INFORM BHEL ENGINEER IN CHARGE/ CONSTRUCTION MANAGER THE DATE OF ACTUAL USE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

AFTER RECEIPT OF FAX LOI, CONTRACTOR SHALL DISCUSS WITH PROJECT MANAGER / CONSTRUCTION MANAGER REGARDING INITIAL MOBILIZATION. CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES WITHIN 2 WEEKS OF ISSUE OF FAX LETTER OF INTENT OR AS PER THE DIRECTIVE OF PROJECT MANAGER / CONSTRUCTION MANAGER. SUCH RESOURCES SHALL BE PROGRESSIVELY AUGMENTED TO MATCH THE SCHEDULE OF MILESTONES AND COMMISSIONING.

6.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

THE ACTIVITIES FOR ERECTION, TESTING ETC. SHALL BE STARTED AS PER DIRECTIONS OF CONSTRUCTION MANAGER OF BHEL. CONTRACTOR SHALL MOBILIZE FURTHER RESOURCES (IN ADDITION TO THOSE REQUIRED FOR ACTIVITIES UNDER CLAUSE NO. 6.1.1) AS PER REQUIREMENT TO COMMENCE THE WORK OF ERECTION, TESTING ETC. OF STB 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”**. START OF CONTRACT PERIOD/START EVENT WILL BE RECOGNIZED INDIVIDUALLY/SEPERATELY FOR ALL THE THREE UNITS. CONTRACTOR WOULD HAVE TO WORK IN PARALLEL FOR ALL THE THREE UNITS. SMALLER ITEMS LIKE PACKER PLATES, SHIMS, ANCHORS, INSERTS ETC. WILL NOT BE CONSIDERED AS START OF CONTRACT PERIOD. ALSO START OF ACTIVITIES PERTAINING TO MATERIAL HANDLING/MANAGEMENT SHALL NOT BE RECKONED AS ~~START~~ OF CONTRACT

THE CONTRACTOR HAS TO SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT FOLLOWING MAJOR MILESTONES OF ERECTION & COMMISSION ARE ACHIEVED ON SPECIFIED SCHEDULES:

ACCORDING TO THE CONTRACT BETWEEN BHEL AND OWNER THE SCHEDULE OF IMPORTANT MILESTONES IS AS FOLLOWS:

Major milestones

ACTIVITY	SCHEDULE OF COMPLETION
LIFTING & PLACEMENT OF CONDENSER ON FOUNDATION	WITHIN 1 MONTH FROM START OF ERECTION WORK
LIFTING & PLACEMENT OF STEAM TURBINE & TURBO- BLOWER ON FOUNDATION	WITHIN 2 MONTHS FROM START OF ERECTION WORK

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

OIL FLUSHING COMPLETION	WITHIN 5 MONTHS FROM START OF ERECTION WORK
BARRING GEAR OPERATION	WITHIN 06 MONTHS FROM START OF ERECTION WORK
ROLLING & READINESS WITH TURBO-BLOWER	WITHIN 06 MONTHS FROM START OF ERECTION WORK
TRIAL OPERATION COMPLETION	WITHIN 07 MONTHS FROM START OF ERECTION WORK
COMPLETION OF ALL OTHER WORKS AND PG TEST OF TURBO BLOWERS	WITHIN 08 MONTHS FROM START OF ERECTION WORK

ON AVAILABLE FRONTS CONTRACTOR HAS TO WORK PARALLELY ON ALL THE 03 UNITS. ACCORDINGLY CONTRACTOR HAS TO PLAN HIS MANPOWER & RESOURCES.

IN ORDER TO MEET ABOVE SCHEDULE IN GENERAL, AND ANY OTHER INTERMEDIATE TARGETS SET, TO MEET CUSTOMER/ PROJECT SCHEDULE REQUIREMENTS, CONTRACTOR SHALL ARRANGE & AUGMENT ALL NECESSARY RESOURCES FROM TIME TO TIME ON THE INSTRUCTIONS OF BHEL.

THE CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK OF STB UNDER THIS SCOPE SHALL BE **EIGHT MONTHS FOR EACH UNIT** FROM THE **%START OF CONTRACT PERIOD+** AS SPECIFIED EARLIER.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

The Per Unit Progressive Payment for erection, testing and commissioning of STB Package (Item No 1 of Volume II Price Bid) will be released as per Billing Break-up in sr no. 1 to 7 as below.

		CND (1)	TUR (2)	BLO (3)	PMP & AUX/ EQ (4)	HEATE RS AND DEAER ATORS (5)	MISCEL LANEO US ITEMS (6)	INTE GRA L PPG (7)	PIPING/INS ULATION(8) ON PER MT BASIS
		20%	18%	15%	13%	11%	7%	16%	
Sl. No.	Activity/Work Description	%							
I	PRO RATA PAYMENTS (85%)								
1	CONDENSER (weightage 20%)								
1.1	PREPARATION OF FOUNDATION	2%			--			--	
1.2	PLACEMENT, ALIGNMENT, ASSEMBLY AND WELDING OF BOTTOM PLATE SEGMENTS, HOT WELL, NDT AND SPRING ELEMENTS PLACEMENT & GROUTING.				--			--	
1.2.1	PLACEMENT OF BOTTOM PLATE SEGMENTS, CONDENSER & HOT WELL	2%							
1.2.2	ALIGNMENT OF BOTTOM PLATE SEGMENTS, CONDENSER & HOT WELL	2%							
1.2.3	ASSEMBLY & WELDING OF HOTWELL WITH CONDENSER	2%							
1.2.4	NDT OF WELDING OF HOTWELL WITH CONDENSER	2%							
1.2.5	FINAL GROUTING OF CONDENSER	2%							
1.3	ASSEMBLY AND POSITIONING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY			--	--			--	
1.3.1	ASSEMBLY AND POSITIONING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES.	3%							
1.3.2	WELDING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES & HINGE ASSEMBLY	3%							
1.3.3	NDT OF WELDING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES & HINGE ASSEMBLY	6%							

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

1.4	ASSEMBLY, ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.			--	--				--
1.4.1	ASSEMBLY OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, ERECTION OF AIR EVACUATION PIPES ETC.	3%							
1.4.2	ALIGNMENT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.	3%							
1.4.3	WELDING OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES & AIR EVACUATION PIPES WITH SUPPORTS ETC.	3%							
1.4.4	NDT OF ABOVE WELDINGS OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES & AIR EVACUATION PIPES WITH SUPPORTS ETC.	4%							
1.5	ASSEMBLY, WELDING & NDT OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING AND STEAM THROW DEVICE, LPH-1 SUPPORT ETC.			--	--				--
1.5.1	ASSEMBLY OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING.	3%							
1.5.2	WELDING OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING ETC.	3%							
1.5.3	NDT OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING	4%							
1.6	INSERTION, EXPANSION, CUTTING ETC. OF CONDENSER TUBES			--	--				--
1.6.1	INSERTION OF CONDENSER TUBES	5%							
1.6.2	EXPANSION OF CONDENSER TUBES	5%							
1.6.3	CUTTING, FINAL FINISHING ETC. OF CONDENSER TUBES	5%							
1.9	HYDRO TEST OF STEAM AND WATER SIDE			--	--				--
1.9.1	FILL TEST OF STEAM SIDE	4%							
1.9.2	HYDRO TEST OF WATER SIDE	4%							
1.9.3	NORMALISATION AND FINAL BOX-UP	2%							
1.10	WELDING OF CONDENSER NECK JOINT AND NDT& COMPLETION OF BALANCE WORKS			--	--				--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

1.10.1	WELDING OF CONDENSER NECK JOINT, EXPANSION BELLOW & COMPLETION OF BALANCE WORKS	5%							
1.10.2	NDT OF WELDING OF CONDENSER NECK JOINT, EXPANSION BELLOW	5%							
1.11	ERECTION, COMMISSIONING, LOAD TESTING OF CONDENSER WATER BOX HANDLING SYSTEM WITH RELEASE OF EXPANSION BELLOW	3%		--	--				--
	Subtotal for condenser	85%							
2	TURBINE (18 %)								--
2.1	PREPARATION OF FOUNDATION, PLACEMENT, ALIGNMENT AND GROUTING OF BASE PLATES AND BEARING PEDESTALS	--			--				--
2.1.1	PREPARATION OF FOUNDATION		2%						
2.1.2	PLACEMENT OF BASE PLATES AND BEARING PEDESTALS		3%						
2.1.3	ALIGNMENT OF BASE PLATES AND BEARING PEDESTALS		4%						
2.1.4	GROUTING OF BASE PLATES AND BEARING PEDESTALS		5%						
2.2	PLACEMENT AND ALIGNMENT OF TURBINE ON FOUNDATION AND LEVELLING	--			--				--
2.2.1	PLACEMENT OF TURBINE ON FOUNDATION		3%						
2.2.2	ALIGNMENT OF TURBINE ON FOUNDATION		4%						
2.2.3	LEVELLING OF TURBINE ON FOUNDATION		5%						
2.3	ALIGNMENT OF TURBINE WITH TURBO BLOWER	--	14%		--				--
2.4	REAMING AND COUPLING OF TURBINE	--	14%		--				--
2.5	GROUTING OF TURBINE BASE PLATES / FRAMES	--	2%		--				--
2.6	FIXING AND ASSEMBLY OF STEAM ADMISSION & CONTROL VALVES	--	5%		--				--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

2.7	ASSEMBLY OF REGULATION SYSTEM AND GOVERNING CONSOLE	--	9%		--			--	
2.14	TURBO VISORY WORKS COMPLETION	--	5%		--			--	
2.15	ASSEMBLY AND PREPARATION OF HYDRO-TEST ETC.	--	5%		--			--	
2.16	FINAL BOXING UP OF PEDESTALS AFTER OIL FLUSHING COMPLETION AND NORMALIZATION	--	5%		--			--	
	Subtotal for Turbine		85%						
3	TURBO BLOWER (15%)	--		--	--			--	
3.1	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES	--						--	
3.1.1	PREPARATION OF FOUNDATION			2%					
3.1.2	LEVELLING, MATCHING OF FOUNDATION PLATES			4%					
3.1.3	GROUTING OF FOUNDATION PLATES			4%					
3.2	LIFTING, LEVELLING AND PLACEMENT OF BLOWER ON FOUNDATION							--	
3.2.1	LIFTING AND PLACEMENT OF BLOWER ON FOUNDATION			11%					
3.2.2	LEVELLING OF BLOWER ON FOUNDATION			12%					
3.3	ALLIGNMENT OF TURBO-BLOWER & TURBINE AND FINAL GROUTING	--	--	16%				--	
3.4	REAMING AND COUPLING OF TURBO - BLOWER	--	--	9%				--	
3.5	ERECTION OF SUCTION FILTER, SUCTION DUCT, VALVES & SILENCER (AIR INTAKE SYSTEM)	--	--					--	
3.5.1	ERECTION OF SUCTION FILTER HOUSE			4%					
3.5.2	ERECTION OF SUCTION DUCT, VALVES & SILENCERS			2%					
3.5.3	ERECTION OF SUCTION DUCT & COUPLING WITH BLOWER USING BELLOW			2%					

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

3.5.4	ERECTION OF FILTERS AFTER FINAL CLEANING IN SUCTION FILTER HOUSE (AIR INTAKE SYSTEM)			3%					
3.6	ERECTION OF AIR DISCHARGE SYSTEM	--	--	11%				--	
3.9	FINAL BOX UP OF BEARINGS OF TURBO - BLOWER	--	--	5%				--	
	Subtotal for TURBO-BLOWERS			85%					
4	PUMPS AND AUXILIARIES (13 %)	--	--		--			--	
4.1	ERECTION / TESTING AND COMMISSIONING OF MAIN OIL PUMP, JOP, EOP, AOP, TRANSFER OIL PUMP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES	--	--					--	
4.1.1	ERECTION/PLACEMENT OF MAIN OIL PUMP, JOP, EOP, AOP, TRANSFER OIL PUMP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES				15%				
4.1.2	ALIGNMENT & GROUTING OF MAIN OIL PUMP, JOP, EOP, AOP, TRANSFER OIL PUMP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES				10%				
4.1.3	TESTING OF MAIN OIL PUMP, JOP, EOP, AOP, TRANSFER OIL PUMP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES				10%				
4.1.4	COMMISSIONING/TRIAL-RUN OF MAIN OIL PUMP, JOP, EOP, AOP, TRANSFER OIL PUMP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES				10%				
4.6	ERECTION, TESTING, GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS	--	--	--				--	
4.6.1	ERECTION/PLACEMENT OF CONDENSATE EXTRACTION PUMPS				10%				
4.6.2	ALIGNMENT & GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS				10%				
4.6.3	ACCESSORIES FIXING & TESTING OF CONDENSATE EXTRACTION PUMPS				10%				

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

4.6.4	COMMISSIONING/TRIAL-RUN OF CONDENSATE EXTRACTION PUMPS WITH AUXILIARIES				10%				
	Subtotal for pumps and Auxiliaries				85%				
5	HEATERS AND COOLERS (11%)								
5.2	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLERS, OIL COOLERS	--	--	--				--	
5.2.1	ERECTION OF GLAND STEAM CONDENSER, OIL COOLERS ETC.					15%			
5.2.2	ALIGNMENT & GROUTING ETC. OF GLAND STEAM CONDENSER, OIL COOLERS ETC.					10%			
5.2.3	ACCESSORIES FIXING & TESTING/FLUSHING OF GLAND STEAM CONDENSER, OIL COOLERS ETC.					10%			
5.2.4	COMMISSIONING OF GLAND STEAM CONDENSER, OIL COOLERS ETC.					10%			
5.3	ERECTION, TESTING & COMMISSIONING OF STEAM JET AIR EJECTOR	--	--	--				--	
5.3.1	ERECTION OF STEAM JET AIR EJECTOR					10%			
5.3.2	ALIGNMENT & GROUTING OF STEAM JET AIR EJECTOR					10%			
5.3.3	ACCESSORIES FIXING & TESTING/FLUSHING OF STEAM JET AIR EJECTOR					10%			
5.3.4	COMMISSIONING OF STEAM JET AIR EJECTOR					10%			
	Subtotal FOR HEATERS AND COOLERS	--	--	--		85%		--	
6	MISCELLANEOUS ITEMS (7%)								
6.1	DUPLEX FILTERS, OIL CENTRIFUGE, OIL ACCUMULATORS, GOVERNING CONSOL, BARRING GEAR CONSOL ETC								
6.1.1	ERECTION, ALIGNMENT, GROUTING OF DUPLEX FILTERS, OIL CENTRIFUGE, OIL ACCUMULATORS, GOVERNING CONSOL, BARRING GEAR CONSOL ETC						10%		

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

6.1.2	ACCESSORIES FIXING & TESTING/FLUSHING OF DUPLEX FILTERS, OIL CENTRIFUGE, OIL ACCUMULATORS, GOVERNING CONSOL, BARRING GEAR CONSOL ETC							10%		
6.1.3	COMMISSIONING OF DUPLEX FILTERS, OIL CENTRIFUGE, OIL ACCUMULATORS, GOVERNING CONSOL, BARRING GEAR CONSOL ETC							10%		
6.2	ERECTION, TESTING & COMMISSIONING MAIN OIL TANK, DRAIN OIL TANK & OVER HEAD LUBE OIL TANK	--	--	--						
6.2.1	ERECTION, ALIGNMENT, GROUTING OF MAIN OIL TANK							4%		
6.2.2	ERECTION, ALIGNMENT, GROUTING OF DRAIN OIL TANK							4%		
6.2.3	ERECTION, ALIGNMENT, GROUTING OF OVER HEAD LUBE OIL TANK							4%		
6.2.4	ACCESSORIES FIXING & TESTING/FLUSHING MAIN OIL TANK							4%		
6.2.5	ACCESSORIES FIXING & TESTING/FLUSHING DRAIN OIL TANK							4%		
6.2.6	ACCESSORIES FIXING & TESTING/FLUSHING OVER HEAD LUBE OIL TANK							4%		
6.2.7	COMMISSIONING OF MAIN OIL TANK							2%		
6.2.8	COMMISSIONING OF DRAIN OIL TANK							2%		
6.2.9	COMMISSIONING OF OVER HEAD LUBE OIL TANK							2%		
6.3	ERECTION, TESTING & COMMISSIONING OF CENTRAL OIL STORAGE TANK, SIMPLEX FILTERS AND OTHER AUXILIARIES ETC.	--	--	--						
6.3.1	ERECTION, ALIGNMENT, GROUTING OF CENTRAL OIL STORAGE TANK, SIMPLEX FILTERS AND OTHER AUXILIARIES ETC.							10%		
6.3.2	ACCESSORIES FIXING & TESTING/FLUSHING OF CENTRAL OIL STORAGE TANK, SIMPLEX FILTERS AND OTHER AUXILIARIES ETC.							5%		
6.3.3	COMMISSIONING OF CENTRAL OIL STORAGE TANK, SIMPLEX FILTERS AND OTHER AUXILIARIES ETC.							10%		
	Subtotal for MISCELLANEOUS ITEMS							85%		

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

7	AUXILIARY/ INTEGRAL PIPING (16%)	--	--	--				--	
7.1	Turbine Integral piping consisting of Cooling water, Lube oil, Jacking oil, Oil vapour extraction, Control oil, Seal steam, Condensate spray/Exhaust Hood spray, Control Stations, Turbine water drainage, Air Piping, Instrument air piping etc including all accessories like thermowells, probes, orifices etc and hangers and supports (Erection and commissioning on prorata basis)	--	--	--					
7.1.1	Turbine & Blower Lube Oil Piping with Oil Vapour Extraction Piping							15%	
7.1.2	Control Oil Piping							5%	
7.1.3	Jacking & Governing & Barring Oil Piping							10%	
7.1.4	Condensate Discharge System Piping							15%	
7.1.5	Aux. Cooling Water piping & Instrument/Supply Air Piping							5%	
7.1.6	Exhaust Hood Spray & Valves Gland Sealing Piping							10%	
7.1.7	Turbine Drains, Balance Piston Piping							10%	
7.1.8	Aux. Steam & Gland Steam Piping incl. Chimney Piping							10%	
7.1.9	Misc. Integral Piping incl. Equipments Drain Piping							5%	
	Total for integral piping							85%	
Per Unit Progressive payment for CB Piping, IBR Piping and Insulation shall be on executed Per MT basis as per billing break up in sr no. 8, 9 & 10 respectively									
8	PIPING (Cold Blast/ Blower interconnection Pipes with all fittings & equipments etc.)								
8.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION TO BE PAID ALONG WITH PLACEMENT IN POSITION)								15%
8.2	PLACEMENT IN POSITION								10%
8.3	ALIGNMENT								15%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

8.4	WELDING/BOLTING/FIXING								15%
8.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT/ RT ETC. (if not applicable, then this portion to be clubbed with next activity)								10%
8.6	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG								10%
8.7	HYDRAULIC TEST/PNEUMATIC TEST/ AIR LEAK TEST WHERE EVER APPLICABLE								10%
	Total								85%
9	PIPING (MAIN STEAM Pipes with all fittings & equipments etc.)								
9.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION TO BE PAID ALONG WITH PLACEMENT IN POSITION)								15%
9.2	PLACEMENT IN POSITION								10%
9.3	ALIGNMENT								15%
9.4	WELDING/BOLTING/FIXING								15%
9.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT/ RT ETC. (if not applicable, then this portion to be clubbed with next activity)								10%
9.6	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG								10%
9.7	HYDRAULIC TEST/PNEUMATIC TEST/ STEAM BLOWING TEST WHERE EVER APPLICABLE								10%
	Total								85%
10	INSULATION								
10.1	TRANSPORT, ERECTION / PLACEMENT/APPLICATION								40%
10.2	ALIGNMENT, BOLTING/ FASTENING								45%
	Total								85%
	Total for Prorata (85%)	85%	85%	85%	85%	85%	85%	85%	85%
II	STAGE/MILESTONE PAYMENTS (15%)								
1	Boiler Light Up	0%	0%	0%	0%	0%	0%	0%	0%
2	ABO	0%	0%	0%	0%	0%	0%	0%	0%
3	Steam Blowing	0%	0%	0%	0%	0%	0%	0%	0%
4	Safety Valve Floating	0%	0%	0%	0%	0%	0%	0%	0%
5	Oil Flushing	1%	1%	1%	1%	1%	1%	1%	1%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

8.0 TAXES, DUTIES, LEVIES (Consolidated Rev 06 dated 28/12/2015)

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, Swachh Bharat Cess and Value Added Tax (VAT) on output services and goods shall be as per following clauses.

8.1.2 Service Tax & Swachh Bharat Cess on Services:

Contractor's price/rates shall be exclusive of Service Tax and Swachh Bharat Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Swachh Bharat Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate presently Service Tax 14% and Swachh Bharat Cess 0.5% on the admitted Service value.

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

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

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

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

8.2 — 'Enabling Works'

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

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

Not applicable

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X: SPECIFIC EXCLUSIONS

10.0 Exclusions

THE FOLLOWING WORKS ARE SPECIFIC EXCLUSIONS FROM THE SCOPE OF WORK UNDER ERECTION, TESTING & COMMISSIONING OF TENDER SPECIFICATION-

- i. CIVIL WORKS EXCEPT TO THE EXTENT SPECIFICALLY INDICATED ELSEWHERE IN THIS TENDER.
- ii. SUPPLY OF PRIMER AND PAINTS FOR FINAL PAINTING
- iii. SUB-DELIVERY ITEMS AND ELECTRICAL COMPONENTS SUCH AS PUSH-BUTTONS, JUNCTION BOXES ETC.
- iv. E&C WORK OF CABLE TRAYS, CABLES AND EARTHING ETC.
- v. CONTROL PANELS, EPMS, MCC ETC.
- vi. ALL ELECTRICAL AND CONTROL & INSTRUMENTATION RELATED TO ITEMS EXCEPT THOSE SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.
- vii. TESTING AND COMMISSIONING OF HEATING ELEMENTS, THERMOSTATS, AND HV RECTIFIER TRANSFORMERS.
- viii. PNEUMATIC COPPER TUBING AND FITTINGS THEREOF.
- ix. ELECTRICAL AND C&I ITEMS OF VARIABLE FREQUENCY DRIVES AS PROVIDED ELSEWHERE IN THESE SPECIFICATIONS.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

TENTATIVE SCOPE OF EQUIPMENTS/SYSTEMS COVERED UNDER THIS TENDER SPECIFICATION FOR ERECTION, TESTING AND COMMISSIONING FOR EACH UNIT.

(A) SURFACE CONDENSER

1. SHELL ASSEMBLY (WITH SHELL, TUBE SHEET, SUPPORT PLATES, SPACERS ETS)
2. TUBES
3. DOME, SHELL, WATER BOXES ,HOTWELL, RUPTURE DISC
4. STEEL BELLOWS WITH CONDENSER NECK, COLLAR, TOP CONNECTING PIECE
5. STAND & SURGE PIPES, SACRIFICIAL ANODES, WATER EXPANSION RELIEF VALVE, VENTS & DRAIN VALVES,
6. FOUNDATION PARTS

(B) STEAM TURBINE & AUXILIARIES:

1. STEAM TURBINE MULTI STAGES WITH BASE FRAME
2. BEARING AND COUPLINGS
3. EMERGENCY OVER SPEED GOVERNOR
4. MAIN THROTTLE VALVE
5. BARRING GEAR CONSOLE (AC/DC MOTOR DRIVEN TURNING/BARRING GEAR WITH MANUAL OPERATION FACILITY)
6. TURBINE SUPERVISORY INSTRUMENTS
7. STEAM TURBINE-MULTISTAGE WITH BASE FRAME
8. EMERGENCY TRIP CUM STOP VALVE
9. TRIPPING DEVICE
10. BLANKET PLATE FOR STEAM BLOWING
11. STEAM TURBINE GOVERNING VALVE
12. STEAM STRAINER BUILT INTO STOP VALVE
13. COUPLING & COUPLING GUARD BETWEEN STEAM TURBINE & TURBO-BLOWER
14. SOLENOID VALVE FOR REMOTE TRIPPING
15. TURBINE SOLE PLATES & FOUNDATION BOLTS
16. SHAFT GROUNDING DEVICE
17. MATING FLANGES FOR TURBINE INLET & EXTRACTION FLANGES
18. GLAND SEALING SYSTEM (AUTOMATIC)
19. GLAND STEAM LEAK OFF PIPING.
20. TURBINE DRAIN WATER PIPING WITHIN AT ONE POINT TG BLOCK/HALL.
21. QCNRV FOR BLEED STEAM PIPING
22. VACUUM BREAKER VALVES
23. CASING DRAIN VALVE

(C) OIL SUPPLY SYSTEM:

1. LUB OIL TANK
2. CENTRAL OIL STORAGE TANK WITH PUMPS

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

3. LUBE OIL PUMP ASSEMBLY
4. EMERGENCY OIL PUMP ASSEMBLY
5. OVERHEAD EMERGENCY OIL TANK
6. LUB OIL ACCUMULATORS
7. GOVERNING OIL ACCUMULATORS
8. DUPLEX FILTER OF LUB OIL
9. SUCTION FILTER AND SILENCER
10. GOVERNING CONSOLE
11. OIL RESERVOIR VAPOUR EXTRACTORS / OIL MIST FANS
12. OVERFLOW TYPE SIGHT FLOW INDICATOR
13. SHAFT DRIVEN MAIN OIL PUMP
14. TURBINE SHAFT DRIVEN MAIN OIL PUMP (MOP)
15. A.C MOTOR DRIVEN AUXILIARY OIL PUMP (AOP)
16. A.C MOTOR DRIVEN JACKING OIL PUMP (JOP)
17. DC MOTOR DRIVEN EMERGENCY OIL PUMP (EOP)
18. OIL COOLER
19. OIL STRAINER (OIL FILTER)
20. OIL CENTRIFUGE (TROLLEY TYPE)
21. OIL HEATER
22. POLISHING FILTER
23. FILTER VESSEL
24. MOTOR DRIVEN VENT BLOWER (OIL MIST FAN)

(D) STEAM JET AIR EJECTOR

1. AIR EJECTOR
2. INTER CONDENSER DRAINS
3. AFTER CONDENSER DRAINS
4. STARTING EJECTOR
5. STEAM & AIR VAPOUR SUCTION HEADERS
6. SLIDE PLATES & FOUNDATION PARTS
7. ISOLATION VALVES ON STEAM SUPPLY HEADER & INDIVIDUAL EJECTOR
8. WATER EXPANSION RELIEF VALVES
9. INSTRUMENTS ISOLATION VALVES
10. VENTS & DRAIN VALVES
11. SILENCER FOR STARTING EJECTOR
12. STRAINERS

(E) GLAND STEAM CONDENSER WITH STEAM JET EJECTORS 2X100%, WATER EXPANSION RELIEF VALVE, STAND PIPE, and ISOLATION VALVES FOR INSTRUMENTS & STAND PIPES, VENTS & DRAIN VALVES.

(F) BLOWER IN ASSEMBLED CONDITION WITH AIR VOLUMES REGULATOR, ANTI SURGE CONTROL DEVICE AND ANTI CHOKE CONTROLLER, SUCTION AIR FILTERS, SILENCER, SUCTION AIR INTAKE ETC

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

(G) STEAM TURBINE CONTROL, PROTECTION AND SUPERVISORY SYSTEM:

TURBINE CONTROL PANELS HOUSING ELECTRONIC GOVERNOR, TURBINE SHAFT VIBRATION & AXIAL DISPLACEMENT MONITORING SYSTEM, TSI PROXIMITORS/PROBES, TEMPERATURE SCANNERS, PUSH BUTTONS & LAMPS FOR REMOTE OPERATIONS, FIELD AND LOCAL INSTRUMENTS/GAUGES LIKE TEMPERATURE GAUGES/ PRESSURE GAUGES, TRANSMITTERS , FLOW ELEMENTS, LEVEL INDICATORS ETC, LOCAL GAUGE BOARD.

(H) BALANCE OF PLANT- MECHANICAL

1. 2X120% CAPACITY (1W+1S) CONDENSATE EXTRACTION PUMPS (02 NO.S) WITH SUCTION & DISCHARGE CONNECTION AND PUMP BEARING
2. CONDENSATE PIPING FROM HOTWELL TO CEP,
3. CONDENSATE PIPING FROM CEP TO GSC AND STEAM JET AIR EJECTOR ETC.
4. AIR AND STEAM PIPING BETWEEN CONDENSER AND EJECTOR.
5. DRAIN PIPING FROM DRAIN COOLER, GLAND STEAM CONDENSER AND EJECTOR CONDENSERS TO CONDENSER.
6. CONDENSER HOTWELL LEVEL CONTROL SYSTEM INCLUDING MAIN AND RE-CIRCULATION CONTROL VALVES
7. BLOWER EXHAUST PIPING FROM BLOWER TO TERMINAL POINT.
8. APPLICATION OF THERMAL INSULATION OF EQUIPMENTS (EXCLUDING SPRAY INSULATION OF STEAM TURBINE) AND PIPING.
9. TURBINE DRAINS PIPING.
10. GLAND STEAM LEAK OFF PIPING.
11. VACUUM BREAKER VALVE WITH PIPING.
12. QCNRV WITH EXTRACTION PIPING.

NOTE:

BILL OF QUANTITY, DIMENSION, WEIGHT OF COMPONENTS ARE TENTATIVE AND WILL BE RECEIVED IN LOOSE CONDITION. APART FROM ABOVE CERTAIN ITEMS WILL BE SUPPLIED IN ASSEMBLED CONDITION. ENTIRE WORK ALONG WITH INSTRUMENTS/ITEMS SUPPLIED IN ASSEMBLED CONDITION SHALL BE CARRIED AT SITE AS PER BHEL DRAWINGS & TERMINAL POINTS ISSUED AT SITE & INSTRUCTION OF BHEL SITE ENGINEER.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

1. TENTATIVE WEIGHT DETAILS EQUIPMENTS SUPPLIED FROM BHEL HPEP HYDERABAD FOR EACH UNIT

DRIVE TURBINE			
SI No	Material Description	Qty	Total Weight
1	TURBINE ASSEMBLY	1	56,836.91
2	ESV ASSEMBLY-RIGHT	1	613.821
3	HP SERVOMOTOR ASSEMBLY	1	119.494
4	TAPER PIN DIA.30X250	2	2.28
5	TAPER PIN DIA.40X320	2	4.76
6	SOLID TAPER PIN DIA 16X80	4	0.12
7	TAPER PIN INT THREAD 16 X L=110	2	0.32
8	TAPER PIN DIA 20X165	2	0.9
9	TAPER PIN WITH INTL THREADS	2	0.74
10	TAPER PIN DIA 40X220	2	3.62
11	BED PLATE UNDER EXHAUST HOOD 71	1	1,861.00
12	GUIDE OF EXHAUST HOOD 71	1	44
13	STEAM VENT FRONT	1	18.73
14	STEAM VENT REAR	1	40.58
15	SPANNER 162X700X9	1	9.4
16	STEAM STRAINER 250-1	1	37
17	Gov oil console Assy	1	700
18	DAMPING DEVICE (SECONDARY OIL)	1	1.7
19	PLATE	1	0.01
20	PLATE	1	0.4
21	MACHINED WASHER DIA12XDIA 30X12	2	0.08
22	TAPER PIN WITH THREADS DIA10X65	2	0.08
23	SCREW CAP SOC P M10X35-12.9	2	0.062
24	NUT HEX P M12-8	6	0.108
25	NUT HEX P M10-8	2	0.024
26	DISC SPRING OD25 ID12.2 H1.29	64	0.64
27	WASHER MCD GAL 10.5-ST	2	0.008
28	SL.HEAD GRUB SCREW M5X21	1	0.002
29	BALANCE PISTON PIPING	1	230
30	SCRU SLT CHS A-4.8,M4X6	12	0.012
31	TURBINE ENCLOSURE AS PER TC64327-71	1	9,000.00

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

32	THERMAL INSULATION MIN.WOOL MATT.AL.CLAD	1	750
33	TRANSF OIL PUMP ASSY,50 LPM,3 KSC(G)	1	200
34	OIL PURIF UNT,FXD,1000LPH,DRG23080000040	1	1,250.00
35	SET OF OIL ACCUMULATOR 6X55LTS, S.S 316	1	1,080.00
36	SET OF OIL ACCUMULATOR 2X55LTS, S.S 316	1	400
37	SET OF OIL ACCUMULATOR 2X55LTS, S.S 316	1	400
38	JOP AC+DC CONS25LPM 160KG IE2/415 DC220	1	1,700.00
39	CHARGING KIT FOR 35/55L ACCUMULATOR	1	10
40	OCBG,3LPM,100KG/CM2(G)415V AC,SV-24V DC	1	150
41	LOCAL GAUGE BOARD	1	750
42	RFLX LVL GAUG,1"300RF,D575,VIS L320,SS	1	30
43	EL LQD LVL SMART TRNSM,C-C356,WP,2"150RF	1	15
44	SMRT WP DIF. PR. TRANS. -300 TO 800 MMWC	2	30
45	THERMOWELL MED.PR BLB8 L1=150,N1=27 SS	3	2.4
46	THRM.CPL CR-AL-SD=8-L=244-M20X1.5-M-DUP	3	2.4
47	NI/CR-NI/ALTCTD,SD8,L=196,DUP,M20X1.5-M	2	1.6
48	THERMOWELL HP BLB8 L1=150,N1=100 SS	2	0.8
49	THERMOWELL HP BLB12 L1=150,N1=100 SS	4	1.6
50	THERMOWELL SCREWED,M20X1.5-F/ M33X2-M,ID	2	1
51	TW,SS316,SCR,M20X1.5-F/M33X2-M,L-196MM	2	0.8
52	SMART WP PT 0 TO 1 (ABS) KG/CM2	4	40
53	SMART WP PRESS. TRANS. 0 TO 250 KG/CM2	2	20
54	SMART WP PRESS. TRANS. 0 TO 6 KG/CM2	4	40
55	PR TRANS, SMART, WP, 0-16 KSC	1	10
56	SMART WP PRESS. TRANS. 0 TO 40 KG/CM2	1	10
57	SMART WP PRESS. TRANS. 0 TO 100 KG/CM2	4	40
58	THERMOWELL,SCREWED,SS 316, M20X1.5-F	2	0.8
59	SMART TEMP TRANSMITTER,W.P,DUAL SENSOR	7	35
60	HAND HELD COMMUNR,UNIVL HART COMPATIBLE	1	0.8
61	SMART WP DPT 0- 0.3- 30 KG/CM2	1	15
62	BIMET TH.MTR,80C,D150,1/2"NPT-M,BULB D8	1	1.5
63	GLAND STEAM INLET CONTROL VALVE	1	100
64	GLAND STEAM DUMP CONTROL VALVE	1	100
65	MOUNTING BRACKET FOR VELOMITOR	4	2
66	SYSTEM-1 ACCESORIES	1	250
67	THERMOCOUPLE ASSEMBLY (K TYPE)	1	15
68	DETAILS OF RATING PLATE	1	0.5
69	SPECIAL TOOLS	1	85

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

70	PACKING DIA.600XDIA.400X2	1	0.58
71	REDUCER PIECE 1"//3/8"	5	0.5
72	DT PRL MALE STUD COUPLING 1/2",CS,G1B12G	5	0.05
73	WELD NECK FLANGE C25X33.4	2	3
74	GASKET NON ASBT M.S.W CL300,1"GRPHT FLLR	4	0.08
75	DIRT TRAP,Y-TYPE STRAINER,NB25	1	0.5
76	2/2 WAY SOL VLV,SS BODY, 24V DC,1"CL.300	1	6
77	GASKET NON ASBT M.S.W CL300,1"GRPHT FLLR	2	0.04
78	STIRRUP (UPPER HALF)	1	29
79	STIRRUP (LOWER HALF)	1	14.2
80	PLATE	2	18.4
81	STUD M30/M20	2	5.6
82	THREADED PIN DIA 40/M30	2	0.3
83	STUD M27 X 105	2	1.6
84	HEX NUT M30	2	0.46
85	STIRRUP BODY (LOWER HALF)	1	21
86	PLATE	2	42.62
87	BODY(UPPER HALF)	1	38
88	STUD M36X1.5/M24	2	4.72
89	THREADED PIN DIA. 45/M30	2	2.36
90	WASHER SPHERICAL AS 37 IS4297	2	0.174
91	NUT M36 X 1.5	2	0.6
92	HEX.SCREW M52X165	4	17.88
93	TOOL KIT FOR IT	1	60
94	SPECIAL TOOLS	1	163
95	COMPANY MNGRM PLT STNLS ST NOM.SIZE 200	2	0.504
96	ASSEMBLY FIXTURE	1	29.4
97	CLAMPING DEVICE	1	4.44
98	MOUNTING FIXTURE	1	28.8
99	HOOK SPANNER 69	1	0.33
100	GUIDE BUSH (PRESS FOR PACKING)	1	0.07
101	PRESS ASSEMBLY (PRESS FOR PACK)	1	5.78
102	PIN SPANNER	1	0.65
103	ASSLY.FIXTURE FOR ESV SEAT N250	1	33
104	BOLT HEATING EQUIPMENT (ELECTRICAL)	1	900
105	FLANGE AND PIPE ASSY	1	157.5
106	PLATE	1	10.4
107	SPINDLE	1	3.38

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

108	WASHER	1	33.6
109	FOUNDATION BOLT M56X3200	4	300
110	PLATE	4	71.6
111	HEX.NUT M56	8	12
112	FOUNDATION BOLT M64 X3150	6	564.6
113	PLATE, D=68	6	106.8
114	HEX.NUT M64	12	23.76
115	PACKING PLATE 160X100X28	57	200.64
116	PACKING PLATE 160X100X10	114	143.184
117	PACKING PLATE 160X100X2	114	28.614
118	PACKING PLATE 160X100X1.6	114	22.914
119	PACKING (SS) 160X100X0.5 MM	57	3.705
120	LIFTING EQUIPMENT FOR ROTOR	1	706.5
121	WIRE ROPE SLING GALV ROPEDIA32 SLING 5M	2	58
122	WIRE ROPE SLING GALV ROPEDIA32 SLING 2M	2	24
123	WRPF CR-AL TC DPLX2WR L1000	2	10
124	WRPF CR-AL TC DPLX2WR L1000	2	10
125	CEN EXH FAN+AC MTR,0.11M3/S,415V,2900RPM	2	150
126	PRGG SS CASING 0T016 DIA150	5	7.5
127	PR GAUGE,SS,0-250KG/CM2,1/2"NPTM,D150	4	3
128	BIMET TH.MTR,120C,D150,1/2"NPT-M,BULB D8	3	4.5
129	TH.MTR,GAS FILL,SS,0-400C,D150,1/2NPT,3M	1	2.5
130	TH.MTR,GAS FILL,SS,0-600C,D150,1/2NPT,3M	3	7.5
131	PR GAUGE,SS,-1-1.5KG/CM2,1/2"NPTM,D150	3	4.5
132	PR GAUGE,SS,0-25KG/CM2,1/2"NPTM,D150	4	10
133	PRGG SS CASING 0T10 DIA150	1	2.5
134	PRGG SS CASING 0T06 DIA150	10	15
135	PR.SW.DIFFL.RNG 0.4-4KG/SQCM 2SPDT	1	2
136	CONNECTOR TUBE MALE 1/2"X1/4"	25	2.5
137	ADAPTOR DIA 1/2"NPT-F X 1/2" BW-M,CS	5	0.5
138	DT PRL MALE STUD COUPLING 1/2",SS,G1B12G	1	0.5
139	SYPHON 21.3X3.73 BW CS	8	40
140	TEE TUBE UNION 1/2 X 1/2"	9	0.9
141	CONNECTOR TUBE MALE 1/2"X1/2"	75	7.5
142	RDCR CONTC 1" X 1/2" SCH 80 BW AS	12	1.92
143	SCROLL SYPHON,AS P22,21.3X3.73,SCH 80	8	40
144	ADAPTOR DIA 1/2"NPT-F X 1/2" BW-M,AS	7	0.7
145	DT ST COUPLING,1/2",SS,G1A 16	28	11.2

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

146	GLOBE VLV CS(SA105)1/2"CL1500 SW ENDS	13	65
147	CONNECTOR TUBE FEMALE1/2"X1/2"	27	2.7
148	VIB PROBE,XL 330105-02-12-10-02-00.	2	0.2
149	AXIAL PROBE 330102-04-25-10-02-00	2	1
150	VIB PROBE,XL 330105-02-12-10-02-00.	6	0.6
151	AXIAL PROBE 330102-04-25-10-02-00	2	1
152	EXTENSION CABLE XL 330130-040-01-00.	8	0.8
153	PROXIMETER, M/S MODEL NO:330180-50-00	8	1.6
154	PROX HSG,BNC:72381-10-02-02 (2UNIT 3300)	5	25
155	ADOPTER 3/4"X1/4",BNC:4190-36	5	1
156	CONNECTOR PROTECTOR KIT,BNC:40113-02	1	4
157	SEALTIT FLX CONDT3/4"100FT,BNC:02199076	2	30
158	LOW PR CABLE SEAL,BNC:43501-02-04-02	5	0.5
159	SEALTIT FLX CONNR 3/4"-M,BNC:03839202	40	8
160	JN BOX,BNC:03818016,CONDT 5WAY,3/4"NPTF	2	2
161	CONNECTOR PROTECTORS,BNC:40180-02	1	0.02
162	DATA ACQN SOFTWARE,BNC :3500/02-01	1	0.5
163	OPERATOR DISPLAY SOFTWARE,BNC:3500/03-01	1	0.5
164	RACK CONFIGN SOFTWARE,BNC:3500/01-01	1	0.5
165	HC TO 3500 RACK CABLE,BNC:138131-0150.	1	1
166	LVDT BENTLY MODEL NO 24765-02-01	1	0.5
167	DIFF PRB,BNC:330851-04-000-015-10-00-00	2	2
168	EXT CAB FOR DIFEXP PRB,330854-040-25-00	2	4
169	PROX OF DIF EXP PRB,BNC:330850-50-00	2	2
170	ADAPTOR 4190-01	5	2.5
171	VELOCITY PROBES	4	4
172	TERMINAL HOUSING	2	2
173	CABLE FOR VELOMETOR.	4	4
174	CABLE SEAL 10076-03	5	2.5
175	TSI RACK	1	100
176	SYSTEM-1 ANALY & DIAG SOFTWARE PKG	1	250
177	SS GATE VLV 3/4"CL800 S W ENDS	1	3.4
178	MSW GASKET-3/4"-300#GRAPHITE FILLER	1	0.01
179	GASKET NON ASBT M.S.W CL300,1"GRPHT FLLR	1	0.02
180	NAB M.S.W. GASKET SIZE 2" #300 GRPH	1	0.05
181	FLANGE 2" SCH 40S ANSI 300 WNRF SS	2	7
182	FLANGE, 3/4",A182 F321, #300, WNRF	1	1

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

183	BALL VLV SS NB1" CL800 SW	1	6
184	BALL VALVE SS BODY 1/2" NPTF +SS INTL	3	3
185	UNION TUBE 1/2"	4	0.4
186	CONNECTOR TUBE MALE 1/2"X1/2"	8	0.8
187	CONNECTOR TUBE MALE 1/2"X1/4"	4	0.4
188	CONNECTOR TUBE FEMALE 1/2"X1/2"	4	0.4
189	SOCKET REDUCER,SS,48.8/27.5MM	4	1.76
190	SOCKET REDUCER,SS,48.8/27.5MM	3	1.32
191	OIL SEPERATOR	1	29.24
192	OVER HEAD OIL TANK CAP:8000 LTS (SS)	1	2,192.00
193	DT PRL MALE STUD COUPLING 1/2",SS,G1B12G	2	1
194	DT PRL MALE STUD COUPLING 1/2",SS,G1B12G	2	1
195	DT ST COUPLING, 3/8",SS, G1A 12	2	0.24
196	DT PRL MALE STUD COUPLG 11/4",SS,G1B25G	1	0.25
197	DT ST COUPLING,1",SS,G1A 25	1	0.1
198	DT PRL MALE STUD COUPLING 1",SS,G1B20G	2	0.5
199	DT ST COUPLING,1",SS,G1A 25	2	0.2
200	DT PRL MALE STUD COUPLING 3/4",SS,G1B16G	2	0.24
201	METAL HOSE L1000 2" ASA150RF	1	12
202	METAL HOSE L1000 3"ASA150RF	1	15.26
203	CLAMP+2 BOLTS GLVNZD,AS,SIZE: 2" VAR 32	2	2.72
204	CLAMP+2 BOLTS GLVNZD,AS,SIZE: 3" VAR 33	2	3.28
205	SQUARE FLANGE ND 50 CS NP 16 FF	1	0.65
206	SQ.FLANGE ND80 NP16 VAR.06	1	1.9
207	BELLOW SS ND 1 1/2"	4	8.8
208	BELLOW SS ND 4"	1	3
209	BELLOW SS ND 6"	1	7
210	WN FLANGE SS 3" SCH 10S #300 RF	2	11.8
211	FLANGE, 4",A182 F321, #150, WNRF	8	44
212	FLANGE, 3/4",A182 F321, #300, WNRF	24	24
213	FLANGE 6" SCH 10S ANSI 150 WNRF SS	8	62.4
214	S.S FLANGE 1 1/2" #300WNRF SCH 40	10	30
215	FLANGE 2" PR.CL.150# WNRF SCH 40S	45	450
216	FLANGE 2" SCH 40S ANSI 300 WNRF SS	4	14
217	NAB M.S.W. GASKET SIZE 3" #150 GRPH	22	1.54
218	NAB M.S.W. GASKET SIZE 4" #150 GRPH	8	0.64
219	MSW GASKET-3/4"-600#GRAPHITE FILLER	24	1.2
220	NAB M.S.W. GASKET SIZE 6" #150 GRPH	8	1.2

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

221	MSW GASKET-1-1/2"-600#GRAPHITE FILLER	10	0.35
222	NAB M.S.W. GASKET SIZE 2" #150 GRPH	50	2.5
223	FLOW GLASS RING (PMMA)SIZE 3/4"CL 300 RF	2	0.16
224	TEMP STUB -ST IMMERSION,SS,M33X2F,FOR 8"	4	4
225	NAB M.S.W. GASKET SIZE 10" #150 PTFE	4	1.2
226	SS BL FLANGE 10" # 150 RF	1	30
227	SS Elbow 90 Deg LR 10" Sch 10S (WP321)	6	120.6
228	WN FLANGE SS 8" SCH 10S #150 RF	1	12.5
229	NAB M.S.W. GASKET SIZE 8" #150 GRPH	1	0.2
230	BELLOW SS ND 6"	1	7
231	FLANGE 6" SCH 10S ANSI 150 WNRF SS	4	31.2
232	NAB M.S.W. GASKET SIZE 6" #150 GRPH	2	0.3
233	GATE VLV SS(A351CF8)2" CL150 FLNGD RF	1	22
234	FLANGE, 1",A182 F321, #300, WNRF,SCH 40S	4	6
235	NAB M.S.W. GASKET SIZE 1" #300 PTFE	4	0.08
236	SS Rdcr 3 x 1 1/2" Sch 80Sx40S BW(WP321)	4	5.2
237	S.S FLANGE 1 1/2" #300WNRF SCH 40	6	18
238	MSW GASKET-1-1/2"-600#GRAPHITE FILLER	8	0.28
239	NAB M.S.W. GASKET SIZE 1 1/2"#300 PTFE	4	0.14
240	NAB M.S.W. GASKET 2" #150 PTFE FILLER	1	0.05
241	NAB M.S.W. GASKET SIZE 1" #300 PTFE	1	0.02
242	NAB M.S.W. GASKET SIZE 3/4" 300 PTFE	5	0.25
243	SS SWTN M16X2X90	24	4.56
244	DT PRL MALE STUD COUPLG 1/4",SS,N3B 4G	1	0.12
245	DT PRL MALE STUD COUPLG 1",SS,G2B20G	2	0.6
246	TUBE END NRV,CS,OD14,NP400KG/CM2,NB1/4"	6	1.8
247	NEEDLE VAV-PR REDN,12 LPM,6MM	6	3
248	GLOBE VLV CS(SA105)1/2"CL1500 SW ENDS	8	40
249	'CS REG. GLOBE VALVE 3/4"' #800 SW	1	27
250	CHECK VLV PL CS(SA105)3/4"CL800 SOC WELD	2	3
251	CS STRAINER-Y-TYPE-3/4"-800#-A105 3/4	1	1.6
252	SS Tee 3/4" # 3000 SW (SA182 F321)	2	0.56
253	SS Socket Reducer 1" x 1/2"	2	0.518
254	DT ST COUPLING,1",SS,G1A 25	1	0.1
255	DT ST COUPLING,3/4",SS,G1A 20	2	0.48
256	DT ST COUPLING, 3/8",SS, G1A 12	1	0.12
257	FLANGE 2" PR.CL.150# WNRF SCH 40S	12	120
258	NAB M.S.W. GASKET SIZE 3" #150 PTFE	1	0.07

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

259	NAB M.S.W. GASKET 2" #150 PTFE FILLER	10	0.5
260	NAB M.S.W. GASKET SIZE 2" #150 GRPH	4	0.2
261	MSW GASKET-1"-600#GRAPHITE FILLER	4	0.08
262	NAB M.S.W. GASKET SIZE 1" #300 PTFE	16	0.32
263	DT PRL MALE STUD COUPLING 1/4",SS,N1B 8G	2	0.16
264	NAB M.S.W. GASKET SIZE 3/4" 300 PTFE	2	0.1
265	FLANGE, 3/4",A182 F321, #300, WNRF	1	1
266	NAB M.S.W. GASKET SIZE 3" #150 GRPH	14	0.98
267	MSW GASKET-3/4"-600#GRAPHITE FILLER	1	0.05
268	FLAP TYPE NRV, CS BODY,NB 3"CL150RF	2	3.2
269	WAFER TYPE BUTTER-FLY VLV3"CL150RF CS	2	8.2
270	STEAM TRAP,THERMODYN-AS -1"-CL1500 -SW	1	0.4
271	CAP AS(SA234WP11) NOM SIZE 4" SCH 40 BW	1	5
272	ELBOW 90DEG 3/4" 6000 SW AS(A182F22)	7	4.375
273	LR ELBOWS 90DEG AS 2" SCH 40 BW	14	9.1
274	LR ELBOWS 90DEG AS 6" SCH 40 BW	12	126
275	FLANGE 2" ANSI 300 WNRF SCH 80 AS	8	28.8
276	CR AS(SA234 WP11) 6"X4" SCH 40X40BW	4	16
277	CR AS(SA234 WP11) 4"X2"SCH40X40BW	1	4
278	AS TEE-2"SCH 80-BW-F22	2	3.6
279	STRAIGHT TEES AS 6" SCH 40BW	2	33
280	NAB M.S.W. GASKET SIZE 2" #150 GRPH	8	0.4
281	MSW GASKET-3/4"-600#GRAPHITE FILLER	4	0.2
282	ORIFICE PLATE SS 2" 300RF	1	0.95
283	NAB M.S.W. GASKET SIZE 2" #150 GRPH	8	0.4
284	MSW GASKET-1-1/2"-600#GRAPHITE FILLER	4	0.14
285	FLANGE1 1/2"WELD NECK CS SCH 80 CL300 RF	4	13.2
286	MSW GASKET-1-1/2"-600#GRAPHITE FILLER	4	0.14
287	FLANGE 3" #300 WNRF SCH 40, SA 182 F11	2	14.8
288	MSW GASKET-3/4"-600#GRAPHITE FILLER	1	0.05
289	MSW GASKET-3/4"-600#GRAPHITE FILLER	1	0.05
290	CS Conc Rdcr 3 x 2" Sch 40 x 80 BW	1	1
291	TEE STRT 3" SCH 80 BW AS	1	4.5
292	RDCR CONTC 6"X3" SCH 80X80 BW AS	4	23.6
293	TEE STRT 3" SCH 80 BW AS	4	18
294	ELBOW 90DEG LR 3" SCH 40 BW AS	10	20.5
295	NAB M.S.W. GASKET SIZE 3"#600 GRPH	5	0.35
296	CR AS(SA234 WP11) 4"X2"SCH40X40BW	4	16

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

297	MSW GASKET-3/4"-600#GRAPHITE FILLER	4	0.2
298	CR AS(SA234 WP11) 4"X2"SCH40X40BW	1	4
299	LR ELBOWS 90DEG AS 2" SCH 40 BW	4	2.6
300	STRAIGHT TEES AS 4" SCH 40BW	3	18.3
301	MSW GASKET-3/4"-600#GRAPHITE FILLER	2	0.1
302	DT Parllel Mate Stud Coupling 3/8",CS, N	2	0.2
303	SOCKET REDUCER,CS, SOCKET DIA 34.2/22	4	1.036
304	DT PRL MALE STUD COUPLG 1 1/4",SS,G1B25G	1	0.25
305	DT PRL MALE STUD COUPLING 1",SS,G1B20G	1	0.25
306	DT PRL MALE STUD COUPLING 3/4",SS,G1B16G	1	0.12
307	DT PRL MALE STUD COUPLING 1/2",SS,G1B12G	1	0.5
308	DT PRL MALE STUD COUPLING 1/2",SS,G1B12G	1	0.5
309	SPRING HOUSING 63/150	4	32
310	FORK 12	10	7.19
311	L.H-SUSPENSION BOLT DIA 12	10	5.33
312	L.H-EYE ROD DIA 12	6	1.902
313	R.H-SUSPENSION BOLT DIA 12	6	3.198
314	EYE ROD DIA 12	4	2.08
315	TURN BUCKLE M12	10	6.6
316	CLAMP AS WITH 3 BOLTS DIA.49	10	7.06
317	DT BLIND SHEET,SIZE 25,SS, DILO TYPE	20	2
318	DT Parllel Mate Stud Coupling 3/8",CS, N	18	1.8
319	DT PRL MALE STUD COUPLG 1",SS,G2B20G	14	4.2
320	DT PRL MALE STUD COUPLG 1/4",SS,N3B 4G	7	0.84
321	S.S FLANGE 1 1/2" #300WNRF SCH 40	3	9
322	NAB M.S.W. GASKET SIZE 1 1/2"#300 PTFE	3	0.105
323	MSW GASKET-1"-600#GRAPHITE FILLER	8	0.16
324	NAB M.S.W. GASKET SIZE 1" #300 PTFE	3	0.06
325	NAB M.S.W. GASKET SIZE 3" #150 PTFE	2	0.14
326	R.H-SUSPENSION BOLT DIA 12	10	5.33
327	R.H.SUSPENSION BOLT DIA 16	4	3.788
328	SUSPENSION EYE 12	20	3.16
329	SUSPENSION EYE DIA 16	10	3.31
330	FORK M20X130 (VAR.NO.02)	18	21.6
331	FORK M24 x 130 (VAR.NO.03)	2	3.8
332	L.H-EYE ROD DIA 12	12	3.804
333	L.H.-EYE ROD DIA 16	4	2.4
334	FORK M20X130 (VAR.NO.02)	12	14.4

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

335	TURN BUCKLE M16	4	4.4
336	FORK ATTACH DIA 12	18	5.76
337	FORK ATTACH VAR.NO.05	4	2.24
338	CLAMP AS WITH 3 BOLTS DIA.89	6	12.6
339	CLAMP AS WITH 3 BOLTS DIA.115	12	49.896
340	CLAMP AS WITH 3 BOLTS DIA.169	3	28.719
341	SPRING HOUSING 160/150	1	8.91
342	SPRING HOUSING 250/150	1	10.9
343	SPRING HOUSING 400/150	2	27.2
344	SPRING HOUSING 400/200	2	36
345	SPRING HOUSING 630/200	1	24
346	EXT.CIRCLIP PLIER ST.NOSE 8MM	1	1
347	EXT.CIRCLIP PLIER ST.NOSE 10MM	1	1
348	EXT.CIRCLIP PLIER ST.NOSE 19MM	1	1
349	CIRCLIP PLIER INTERNAL STRAIGHT 8MM	1	1
350	INT.CIRCLIP PLIER ST.NOSE 19MM	1	2
351	SHT CS 4.0,4*30.00*300.00MM	1.132	1.132
352	PIPE SS 17.1 X 1.8 A312 TP321	1	0.692
353	RND AS, HTS 50	2	2
354	PIPE SS 6 X 1.0 A312 TP321	100	12.6
355	PIPE SS 12.7 X 2.1 A312 TP321	185	103.415
356	PIPE SS 26.7 X 2.9 A312 TP321	5	8.675
357	PIPE SS 33.4 X 3.4 A312 TP321	60	153.84
358	PIPE SS 12.7 X 2.1 A312 TP321	40	22.36
359	PIPE SS 17.1 X 1.8 A312 TP321	6	4.152
360	PIPE SS 17.1 X 1.8 A312 TP321	18	12.456
361	PIPE SS 33.4 X 2.8 A312 TP321	6	12.918
362	PIPE SS 33.4 X 2.8 A312 TP321	6	12.918
363	PIPE SS 33.4 X 2.8 A312 TP321	12	25.836
364	PIPE SS 60.3 X 2.8 A312 TP321	12	48.552
365	PIPE SS 33.4 X 3.4 A312 TP321	18	46.152
366	PIPE SS 26.7 X 2.9 A312 TP321	12	20.82
367	PIPE SS 21.3 X 2.8 A312 TP321	48	62.496
368	PIPE SS 13.7 X 2.2 A312 TP321	12	7.632
369	PIPE SS 10 X 2 A312 TP321	12	4.824
370	PIPE(SMLS) 88.9X3.05 S.S SA312 GRTP321	60	394.86
371	PIPE SS 114.3 X 3.05 A312 TP321	36	307.008
372	PIPE SS 60.3 X 3.9 A312 TP321	72	398.016

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

373	PIPE SS 48.3 X 5.1 A312 TP321	24	132.888
374	PIPE SS 21.3 X 3.7 A312 TP321	24	39.288
375	PIPE SS 168.3 X 3.4 A312 TP321	48	676.368
376	PIPE SS 33.4 X 4.5 A312 TP321	6	19.614
377	PIPE SS 33.4 X 3.4 A312 TP321	6	15.384
378	PIPE SS 273 X 9.3 A312 TP321	30	1,849.08
379	PIPE SS 219.1 X 3.76 A312 TP321	6	122.094
380	PIPE SS 33.4 X 3.4 A312 TP321	30	76.92
381	PIPE SS 26.7 X 2.9 A312 TP321	78	135.33
382	PIPE SS 21.3 X 2.8 A312 TP321	24	31.248
383	PIPE(SMLS) 88.9X3.05 S.S SA312 GRTP321	78	513.318
384	PIPE SS 60.3 X 3.9 A312 TP321	24	132.672
385	PIPE SS 48.3 X 3.7 A312 TP321	12	49.764
386	PIPE SS 33.4 X 3.4 A312 TP321	6	15.384
387	PIPE SS 26.7 X 3.9 A312 TP321	66	147.51
388	PIPE SS 21.3 X 3.7 A312 TP321	12	19.644
389	PIPE SS 17.1 X 3.2 A312 TP321	3	3.354
390	PIPE SS 13.7 X 2.2 A312 TP321	42	26.712
391	PIPE SS 10 X 2 A312 TP321	1	0.402
392	PIPE(SMLS) 88.9X3.05 S.S SA312 GRTP321	12	78.972
393	PIPE SS 60.3 X 3.9 A312 TP321	24	132.672
394	PIPE SS 48.3 X 5.1 A312 TP321	12	66.444
395	PIPE SS 33.4 X 4.5 A312 TP321	12	39.228
396	PIPE SS 26.7 X 3.9 A312 TP321	12	26.82
397	PIPE(SMLS) 21.3X2.1 S.S SA312 GRTP321	12	12.156
398	PIPE(SMLS) 88.9X3.05 S.S SA312 GRTP321	36	236.916
399	PIPE SS 26.7 X 3.9 A312 TP321	24	53.64
400	PIPE SS 33.4 X 3.4 A312 TP321	54	138.456
401	PIPE SS 48.3 X 3.7 A312 TP321	12	49.764
402	RND CS 12,1*18000.00MM	16.02	16.02
403	RND CS 16,1*18000.00MM	28.44	28.44
404	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	42	135.954
405	PIPE(SMLS)- 17.1X 2.31 CS SA106 GR B	15	12.645
406	PLT CS 5,2*20.00*50.00MM	0.078	0.078
407	CS FL40X6,6*150.00MM	1.692	1.692
408	CHNL CS 75,1*50000.00MM	340	340
409	FLAT CS 25 X 6,1*25000.00MM	29.5	29.5
410	FLAT CS 50 X 6,1*50000.00MM	118	118

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

411	ANGLE CS 50X50X6,1*50000.00MM	225	225
412	PIPE(SMLS) 21.3X 3.73 AS SA335 GRP22	200	323.2
413	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	100	161.6
414	ANGLE CS 50X50X6,1*50000.00MM	225	225
415	PIPE(SMLS) 88.9X 5.49 CS SA106 GR B	12	135.516
416	ANGLE CS 50X50X6,1*50000.00MM	225	225
417	ANG CS 100X100X10,1*100000.00MM	1,490.00	1,490.00
418	PIPE CS, HTS 10.2 X 2 S/L A106GRB	9	3.636
419	ANGLE CS 50X50X6,1*15000.00MM	67.5	67.5
420	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	6	19.422
421	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	4	12.948
422	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	36	116.532
423	PIPE(SMLS)- 26.7X 3.91 CS SA106 GR B	14	30.772
424	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	1	1.616
425	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	3	9.711
426	PIPE(SMLS) 60.3X 5.54 CS SA106 GR B	18	134.676
427	PIPE(SMLS) 33.4X4.55 AS SA335 GRP11	24	77.688
428	PIPE(SMLS) 60.3 X 3.91 AS SA335 GRP11	36	195.732
429	PIPE(SMLS) 114.3X 6.02 AS SA335 GRP11	18	289.35
430	PIPE(SMLS) 168.3X 7.11 AS SA335 GRP11	36	1,017.50
431	PIPE(SMLS)- 21.3 X4.78 CS SA106 GR B	24	46.728
432	PIPE(SMLS) 88.9X 5.49 CS SA106 GR B	36	406.548
433	PIPE(SMLS)- 48.3X 5.08 CS SA106 GR B	24	129.96
434	PIPE(SMLS) 88.9 X 5.49 AS SA335 GRP11	24	271.032
435	PIPE(SMLS) 88.9X 5.49 CS SA106 GR B	36	406.548
436	PIPE(SMLS)168.3X 7.11 CS SA106 GR B	48	1,356.67
437	PIPE(SMLS) 168.3X 7.11 AS SA335 GRP11	24	678.336
438	PIPE(SMLS) 26.7 X 3.91 AS SA335 GRP22	18	39.564
439	PIPE(SMLS) 114.3X 6.02 CS SA106 GR B	30	482.25
440	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	18	58.266
441	PIPE(SMLS) 114.3X 6.02 AS SA335 GRP11	24	385.8
442	PIPE(SMLS) 21.3X 4.78 AS SA335 GRP22	24	46.728
443	PIPE(SMLS) 114.3X 6.02 CS SA106 GR B	18	289.35
444	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	18	58.266
445	PIPE(SMLS) 60.3 X 3.91 AS SA335 GRP11	12	65.244
446	PIPE(SMLS) 88.9 X 5.49 AS SA335 GRP11	12	135.516
447	PIPE(SMLS) 114.3X 6.02 AS SA335 GRP11	36	578.7
448	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	12	19.392

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

449	PIPE CS, HTS 14 X 2 S/L A106GRB	6	3.93
450	ANGLE CS 50X50X6,1*10000.00MM	135	135
451	PIPE CS, HTS 10.2 X 2 S/L A106GRB	2	0.808
452	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	60	96.96
453	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	18	58.266
454	ANGLE CS 50X50X6,1*30000.00MM	300	300
455	PIPE CS, HTS 14 X 2 S/L A106GRB	18	11.79
456	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	24	38.784
457	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	162	524.394
458	PIPE(SMLS)168.3X 7.11 CS SA106 GR B	18	508.752
459	PIPE(SMLS)- 60.3X 3.91 CS SA106 GR B	12	65.244
460	PIPE(SMLS) 88.9X 5.49 CS SA106 GR B	12	135.516
461	PIPE(SMLS) 114.3X 6.02 CS SA106 GR B	12	192.9
462	PIPE(SMLS)- 33.4X 3.38 CS SA106 GR B	12	30.024
463	PLT CS 10,1*1500.00*1500.00MM	176.625	176.625
464	ANGLE CS 80X80X6,1*102000.00MM	744.6	744.6
465	ANG CS 100X100X8,1*60000.00MM	726	726
466	CHNL CS 100,1*24000.00MM	220.8	220.8
467	STRAIGHT TEE CS 1" SCH 80 BUTT WELD ENDS	6	2.1
468	ELBOW LR 90DEG CS 1" SCH 80 BW ENDS	7	1.4
469	FLANGE WELD NECK CS 1" SCH 80 CL 300 RF	8	15.2
470	SCREW HEX M16X55-8.8	16	1.856
471	NUT HEX P M16 P8 ELEGAL	16	0.528
472	GLOBE VALVE CS 1" CL 800 SW ENDS	3	10.2
473	SCREW HEX M16X55-8.8	8	0.928
474	NUT HEX P M16 P8 ELEGAL	8	0.264
475	WASHER MCD 66 ST	2	0.972
476	SEAT CONICAL 42	2	0.472
477	WASHER MCD 5.3-ST	12	0.012
478	SCREW HEX M20X100-8.8	6	1.44
479	NUT HEX P M20 P8 ELEGAL	6	0.384
480	TEE CS 1/2" CL 3000 SOCKET WELD ENDS	17	4.76
481	COUPLING CS 1/2" CL 3000 SOC WELD ENDS	17	1.921
482	PR GAGE VLV 3WAY 250KSC SS M20X1.5 R/R/L	1	3.5
483	MANIFOLD, 2VLV 1/2"NPT-F CL3000 SS BODY	25	20
484	WASHER SEALING 6.5X17X2	2	0.02
485	RDCR CONC SS 1"X1/2" SCH 80SX80S BW ENDS	5	1
486	NIPPLE SS 1/2"SCH80S L=100 NPT & BW ENDS	25	3.75

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

487	CAP CS 1/2" CL 3000 NPT END	8	1.84
488	SS ADAPTER RDCG 1/2" NPT M20X1.5	1	0.3
489	M FOLD 5VLV 3000LB 1/2" SS NPT-F	1	0.8
490	NUT SLID PR GAG 640KSC CS M20X1.5D=16.5	1	3.5
491	NIPPLE CS 20A PR GAGE NUTM20X1.5 640KSC	8	1.36
492	TEE SS 1/2" CL 3000 SOCKET WELD ENDS	16	4.48
493	COUPLING AS 1/2" CL 6000 SOC WELD ENDS	48	10.896
494	GLOBE VALVE AS 1/2" CL 2500 SW ENDS	17	85
495	CAP SS 1/2" CL 3000 NPT END	38	3.8
496	NIPPLE AS 1/2" SCH80 L=100 NPT & BW ENDS	22	6.6
497	NIPPLE CS 1/2" SCH80 L=100 NPT & BW ENDS	14	2.8
498	ELBOW 90DEG SS 1" SOC WELD ENDS CL 3000	10	9.9
499	STRAIGHT TEE SS 1" SCH 40 BUTT WELD ENDS	8	2.4
500	COUPLING SS 1" CL 3000 SOCKET WELD ENDS	4	1.136
501	RDCR CONC SS 2"X1" SCH 40SX40S BW ENDS	1	0.4
502	STUD 2 NUTS M16X90	16	4.096
503	RDCR CONC 1"X3/4" SCH 40SX40S BW SS	1	0.3
504	RDCR CONC SS 1"X1/2" SCH 40SX40S BW ENDS	4	0.64
505	NIPPLE SS 1/2" SCH80S L=100 NPT & BW ENDS	4	0.6
506	FLANGE SOW SS 1" CL 300 RAISED FACE	1	1.5
507	FLANGE BLIND SS 3/4" CL 300 RAISED FACE	1	2
508	FLANGE BLIND SS 1" CL 300 RAISED FACE	1	1.5
509	U-BOLT GALVZD 1"	48	10.8
510	WASHER SEALING 21X25X1.5	2	0.002
511	WASHER SEALING 21X25X1.5	2	0.002
512	WASHER SEALING 42X51X2	1	0.002
513	ELBOW LR 90DEG SS 1" SCH 40S BW ENDS	6	1.8
514	WASHER SEALING 33X39X2	2	0.002
515	ELBOW LR 90DEG SS 1" SCH 40S BW ENDS	16	4.8
516	RDCR CONC 1"X3/4" SCH 40SX40S BW SS	12	3.6
517	PIPE CLAMP SHELL TYPE 1"	6	1.2
518	PIPE CLAMP SHELL TYPE 3/4"	12	1.8
519	PIPE CLAMP SHELL TYPE 3/8"	12	2.4
520	WASHER SEALING 27X32X2	2	0.002
521	RDCR CONC SS 1"X1/2" SCH 40SX40S BW ENDS	1	0.16
522	ELBOW LR 90DEG SS 2" SCH 10S BW ENDS	4	5.2
523	STUD 2 NUTS M16X90	8	2.048
524	ELBOW LR 90DEG CS 3" SCH 40 BW ENDS	3	6.15

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

525	FLANGE SOW CS 3" CL 150 RAISED FACE	2	8
526	STUD 2 NUTS M16X90	8	2.048
527	PIPE CLAMP SHELL TYPE 1"	6	1.2
528	U-BOLT GALVZD 2"	2	0.664
529	U-BOLT GALVZD 3"	2	0.8
530	ELBOW 90DEG SS 1" SOC WELD ENDS CL 3000	55	54.45
531	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	55	31.35
532	ORIFICE ADJ SS ND 1 1/2"	3	6
533	FLANGE BLIND SS 3" CL 150 RAISED FACE	2	8
534	FLANGE BLIND SS 6" CL 150 RAISED FACE	1	4
535	FLANGE BLIND SS 3/4" CL 300 RAISED FACE	12	24
536	ELBOW LR 90DEG SS 3" SCH 10S BW ENDS	40	124
537	ELBOW LR 90DEG SS 4" SCH 10S BW ENDS	16	33.6
538	ELBOW LR 90DEG SS 2" SCH 40S BW ENDS	60	108
539	ELBOW 90DEG SS 1 1/2" CL 3000 SW ENDS	20	42.5
540	ELBOW 90DEG CS 1/2" CL 3000 SW ENDS	12	4.68
541	ELBOW LR 90DEG SS 6" SCH 10S BW ENDS	18	99
542	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	6	3.42
543	FLANGE WELD NECK SS 3" SCH 10S CL 150 RF	20	80
544	SOCKET REDUCER SS 27.5X22	8	8
545	RDCR CONC SS 8"X6" SCH 40SX40S BW ENDS	1	6.5
546	RDCR CONC SS 3"X2" SCH 40SX40S BW ENDS	1	1
547	FLOW GLASS RING (PMMA) FOR 1" CL 300 RF	1	0.086
548	FLOW GLASS RING (PMMA) FOR 3" CL 150 RF	2	0.78
549	FLOW GLASS RING (PMMA) FOR 4" CL 150 RF	1	0.52
550	FLOW GLASS RING (PMMA) FOR 6" CL 150 RF	1	0.836
551	STUD 2 NUTS M16X110	436	125.132
552	STUD 2 NUTS M16X130	20	6.56
553	STUD 2 NUTS M20X140	196	105.448
554	STRAIGHT TEE SS 3" SCH 10S BW ENDS	5	15.5
555	TEE SS 1 1/2" CL 3000 SOCKET WELD ENDS	4	5.12
556	TEE SS 3/4" CL 3000 SOCKET WELD ENDS	4	1.48
557	STRAIGHT TEE SS 2" SCH 10S BW ENDS	12	15.6
558	VERTICAL INSERT SS 1 1/2" SW CL 3000	15	8.4
559	VERTICAL INSERT SS 3/4" SW CL 3000	12	3.84
560	ORIFICE PLATE 3/4" CL 300 RF HOLE SIZE 5	1	0.161
561	STUB SLNT IMMER SS M33X2-F L=64 NB4"	4	4
562	FLANGE SOW SS 10" CL 150 RAISED FACE	4	68

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

563	STUD 2 NUTS M24X140	48	37.056
564	ELBOW LR 90DEG SS 8" SCH 10S BW ENDS	1	11.3
565	FLANGE BLIND SS 6" CL 150 RAISED FACE	1	4
566	ELBOW 90DEG CS 1/2" CL 3000 SW ENDS	16	6.24
567	RDCR CONC SS 3"X2" SCH 40SX40S BW ENDS	3	3
568	FLOW GLASS RING (PMMA) FOR 6" CL 150 RF	2	1.672
569	TEE SS 1 1/2" CL 3000 SOCKET WELD ENDS	3	3.84
570	VERTICAL INSERT SS 1/2" SW CL 3000	20	2.2
571	FLANGE BLIND SS 2" CL 150 RAISED FACE	2	3.2
572	NIPPLE SS 3/4" SCH160S L=100 NPT&BW ENDS	4	2.32
573	VERTICAL INSERT SS 1" SW CL 3000	4	1.6
574	NIPPLE SS 1" SCH80S L=100 NPT & BW ENDS	4	1.44
575	RDCR CONC SS 4"X3" SCH 10SX10S BW ENDS	6	4.92
576	FLOW GLAS RNG(PMMA) FOR 1 1/2"CL300 RF	2	0.38
577	STRAIGHT TEE SS 6" SCH 10S BW ENDS	1	13.3
578	VERTICAL INSERT SS 3/4" SW CL 3000	12	3.84
579	FLANGE SOW SS 1 1/2" CL 300 RAISED FACE	4	10.4
580	STUD 2 NUTS M20X90	32	13.28
581	ELBOW 90DEG SS 1 1/2" CL 3000 SW ENDS	8	17
582	GATE VALVE CS 1 1/2" CL 800 SW ENDS	1	6.47
583	ELBOW 90DEG SS 3/4" CL 6000 SW ENDS	12	13.5
584	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	12	6.84
585	ELBOW 90DEG SS 1 1/2" CL 6000 SW ENDS	12	49.2
586	TEE SS 1" CL 3000 SOCKET WELD ENDS	2	1.13
587	TEE SS 3/4" CL 3000 SOCKET WELD ENDS	4	1.48
588	TEE SS 3/4" CL 6000 SOCKET WELD ENDS	5	4.3
589	TEE UNEQ SS 1/4"X1/2"X1/4" CL3000 SW END	2	0.56
590	SOCKET REDUCER SS 34.2/27.5	4	0.72
591	ELBOW 90DEG SS 1" SOC WELD ENDS CL 3000	5	4.95
592	SOCKET REDUCER SS 22/14	3	0.537
593	SOCKET REDUCER SS 27.5X22	5	5
594	ADAPTER SS NB 14X10.7	1	0.161
595	FLANGE SOW SS 2" CL 150 RAISED FACE	1	2.2
596	FLANGE SOW SS 1" CL 300 RAISED FACE	1	1.5
597	FLANGE SOW SS 3/4" CL 300 RAISED FACE	5	6.5
598	FLANGE WELD NECK AS 1" SCH 160 CL1500 RJ	1	4
599	RJ GASKET SS RING NO:R16 PITCH DIA 50.80	1	0.13
600	WASHER SEALING 33X39X2	2	0.002

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

601	WASHER SEALING 13X19X1.5	1	0.001
602	GLOBE VALVE CS 3/4" CL 800 SW ENDS	3	5.4
603	WELDON ETN PCE SS PR GAGE 20X1.5L640KSC	7	1.12
604	PIPE CLAMP SHELL TYPE 1"	5	1
605	PIPE CLAMP SHELL TYPE 3/4"	18	2.7
606	PIPE CLAMP SHELL TYPE 1/2" AR NO.4	2	0.26
607	PIPE CLAMP SHELL TYPE 1/4"	10	1.2
608	PIPE CLAMP SHELL TYPE 1/8"	2	0.2
609	VERTICAL INSERT SS 1" SW CL 3000	2	0.8
610	VERTICAL INSERT SS 3/4" SW CL 3000	3	0.96
611	ELBOW LR 90DEG SS 3" SCH 10S BW ENDS	5	15.5
612	ELBOW LR 90DEG SS 2" SCH 40S BW ENDS	10	18
613	ELBOW 90DEG SS 1 1/2" CL 3000 SW ENDS	4	8.5
614	ELBOW 90DEG SS 1" SOC WELD ENDS CL 3000	4	3.96
615	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	4	2.28
616	STRAIGHT TEE SS 2" SCH 40S BW ENDS	3	5.4
617	TEE SS 1" CL 3000 SOCKET WELD ENDS	2	1.13
618	RDCR CONC SS 3"X2" SCH 10SX10S BW ENDS	1	0.42
619	RDCR CONC SS 2"X1 1/2" SCH 80SX80S BW ENDS	1	0.8
620	SOCKET REDUCER SS 27.5X22	2	2
621	VERTICAL INSERT SS 1" SW CL 3000	4	1.6
622	VERTICAL INSERT SS 1/2" SW CL 3000	5	0.55
623	FLANGE WELD NECK SS 3" SCH 10S CL 150 RF	1	4
624	STUD 2 NUTS M16X90	88	22.528
625	FLANGE WELD NECK CS 1" SCH 80 CL 600 RF	4	8
626	STUD 2 NUTS M16X110	32	9.184
627	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	20	19.8
628	TEE CS 1" CL 3000 SOCKET WELD ENDS	2	1.13
629	FLANGE SOW CS 1" CL 300 RAISED FACE	14	21
630	ORIFICE PLATE SS 1" CL 300 RF	4	0.316
631	STUD 2 NUTS M16X110	64	18.368
632	FLOW GLASS RING (PMMA) FOR 1" CL 300 RF	2	0.172
633	WASHER SEALING 13X19X1.5	2	0.002
634	SOCKET REDUCER,CS, SOCKET DIA 14/10.7	2	0.158
635	SOCKET REDUCER,CS, SOCKET DIA 22/14	2	0.322
636	RDCR CONC CS 1"X1/2" SCH 80X80 BW ENDS	2	0.5
637	NIPPLE CS 3/4"X100 SCH80 NPT BW	2	0.4
638	SOCKET REDUCER,CS, SOCKET DIA 34.2/27.5	2	0.47

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

639	U-BOLT GALVZD 1"	10	2.25
640	NIPPLE CS 1"X100 SCH80 NPT BW	2	0.8
641	ELBOW 90DEG CS 3/4" CL 3000 SW ENDS	9	5.13
642	TEE CS 3/4" CL 3000 SOCKET WELD ENDS	3	1.11
643	RDCR CONC CS 3/4"X1/2" SCH 80X80 BW ENDS	3	0.3
644	FLANGE SOW CS 3/4" CL 300 RAISED FACE	2	2.6
645	STUD 2 NUTS M16X90	8	2.048
646	GLOBE VALVE CS 1/2" CL 800 SW ENDS	3	4.8
647	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	2	1.98
648	GLOBE VALVE CS 1" CL 800 SW ENDS	1	3.4
649	ELBOW LR 90DEG SS 3" SCH 10S BW ENDS	12	37.2
650	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	10	5.7
651	STRAIGHT TEE SS 3" SCH 10S BW ENDS	1	3.1
652	FLANGE WELD NECK SS 3" SCH 10S CL 150 RF	14	56
653	STUD 2 NUTS M16X110	56	16.072
654	STUD 2 NUTS M16X130	4	1.312
655	RJ GASKET SS RING NO:R16 PITCH DIA 50.80	2	0.26
656	ELBOW 90DEG AS 1" SOC WELD ENDS CL 6000	6	0.9
657	ELBOW LR 90DEG AS 4" SCH 40 BW ENDS	5	19.5
658	TEE AS 1" CL 3000 SOCKET WELD ENDS	1	1.28
659	STUB SLNT IMMER CS SCRWD M33X2-F L=64 250	3	1.2
660	STUB STRT IMER AS SCRWD M33X2-F L=64 250	4	1.6
661	VRTCL INSERT 1" 6000 SW AS	4	4.8
662	VERTICAL INSERT CS 1/2" SW CL 6000	5	2
663	VERTICAL INSERT 3/4" 6000 SW AS	4	3.56
664	STUD 2 NUTS M16X110	24	6.888
665	ELBOW LR 90DEG CS 2" SCH 80 BW ENDS	14	12.6
666	FLANGE WELD NECK CS 2" SCH 40 CL 300 RF	8	28.8
667	STRAIGHT TEE CS 2" SCH 80 BUTT WELD ENDS	1	1.96
668	STUD 2 NUTS M20X140	16	8.608
669	ELBOW 90DEG CS 1/2" CL 3000 SW ENDS	6	2.34
670	ELBOW LR 90DEG CS 3" SCH 40 BW ENDS	10	20.5
671	VERTICAL INSERT CS 1" SW CL 3000	1	0.4
672	VERTICAL INSERT CS 1/2" SW CL 6000	1	0.4
673	STUD 2 NUTS M20X90	16	6.64
674	ELBOW 90DEG CS 1 1/2" CL 3000 SW ENDS	8	17
675	STUD 2 NUTS M20X90	16	6.64
676	VERTICAL INSERT CS 3/4" SW CL 3000	1	0.3

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

677	FLANGE BLIND CS 3/4" CL 300 RAISED FACE	1	1.5
678	ELBOW LR 90DEG AS 3" SCH 40 BW ENDS	6	12
679	ELBOW LR 90DEG CS 3" SCH 40 BW ENDS	8	16.4
680	ELBOW LR 90DEG CS 6" SCH 40 BW ENDS	12	126
681	VERTICAL INSERT 3/4" 6000 SW AS	1	0.89
682	FLANGE WELD NECK CS 3/4" SCH 80 CL300 RF	1	1.9
683	RDCR CONC CS 6"X3"SCH 40X40 BW ENDS	2	8
684	RJ GASKET SS RING NO:R16 PITCH DIA 50.80	2	0.26
685	STUD 2 NUTS M20X130	16	8.208
686	STUD 2 NUTS M16X110	24	6.888
687	STUD 2 NUTS M16X110	4	1.148
688	STRAIGHT TEE CS 3" SCH 40 BUTT WELD ENDS	1	3.8
689	VERTICAL INSERT AS 1/2" SW CL 3000	4	0.44
690	WASHER SEALING 33X39X2	10	0.01
691	PLUG HEX HD AS 3/4" NPT ENDS	30	4.26
692	ELBOW LR 90DEG CS 4" SCH 40 BW ENDS	6	23.4
693	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	10	9.9
694	STUD 2 NUTS M16X110	144	41.328
695	RDCR CONC AS 4"X3" SCH 40X40 BW ENDS	2	3.2
696	ELBOW LR 90DEG AS 3" SCH 40 BW ENDS	4	8
697	ELBOW LR 90DEG AS 4" SCH 40 BW ENDS	18	70.2
698	VERTICAL INSERT 3/4" 6000 SW AS	4	3.56
699	RJ GASKET SS RING NO:R16 PITCH DIA 50.80	2	0.26
700	ELBOW LR 90DEG CS 4" SCH 40 BW ENDS	6	23.4
701	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	6	5.94
702	VERTICAL INSERT CS 1" SW CL 3000	1	0.4
703	TEE CS 1" CL 3000 SOCKET WELD ENDS	2	1.13
704	SOCKET REDUCER,CS, SOCKET DIA 34.2/27.5	2	0.47
705	FLANGE SOW CS 3/4" CL 300 RAISED FACE	2	2.6
706	FLANGE BLIND CS 3/4" CL 300 RAISED FACE	2	3
707	TEE RED CS 1/2"X1/2"X1/4" CL 3000 SW END	2	0.56
708	GLOBE VALVE REG CS NB 1/4" CL800 SW ENDS	2	3.2
709	WASHER SEALING 17X22X1.5	2	0.002
710	U-BOLT 1/2"	10	1
711	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	8	7.92
712	SOCKET REDUCER,CS, SOCKET DIA 27.5/22	1	0.179
713	SOCKET REDUCER SS 22/17.7	4	0.94
714	SOCKET REDUCER SS 17.7/10.7	3	0.459

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

715	WASHER SEALING 33X39X2	2	0.002
716	WASHER SEALING 42X51X2	2	0.004
717	WASHER SEALING 21X25X1.5	2	0.002
718	WASHER SEALING 27X32X2	2	0.002
719	U-BOLT GALVZD 1"	10	2.25
720	U-BOLT 1/2"	10	1
721	VERTICAL INSERT CS 1" SW CL 3000	12	4.8
722	ADAPTER SS NB 14X10.7	4	0.644
723	FLANGE BLIND CS 6" CL 150 RF(SA105)	1	12
724	RDCR CONC SS 2"X1" SCH 10SX40S BW ENDS	1	0.23
725	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	20	19.8
726	ELBOW 90DEG CS 1" SOC WELD ENDS CL 3000	12	11.88
727	ELBOW 90DEG SS 1 1/2" CL 3000 SW ENDS	4	8.5
728	ELBOW 90DEG SS 1" SOC WELD ENDS CL 3000	15	14.85
729	FLANGE SOW CS 1" CL 300 RAISED FACE	8	12
730	FLANGE WELD NECK CS 6" SCH 40 CL 150 RF	1	11
731	FLANGE SOW SS 1" CL 300 RAISED FACE	3	4.5
732	FLANGE WELD NECK SS 3" SCH 10S CL 150 RF	2	8
733	GLOBE VALVE REG CS NB 1/4" CL800 SW ENDS	18	28.8
734	RDCR CONC CS 1"X1/2"SCH 80X80 BW ENDS	20	5
735	SOCKET REDUCER,CS, SOCKET DIA 22/14	20	3.22
736	RJ GASKET SS RING NO:R16 PITCH DIA 50.80	1	0.13
737	STUD 2 NUTS M16X90	32	8.192
738	TEE CS 1" CL 3000 SOCKET WELD ENDS	20	11.3
739	TEE RED CS 1/2"X1/2"X1/4" CL 3000 SW END	13	3.64
740	TEE SS 1" CL 3000 SOCKET WELD ENDS	9	5.085
741	U-BOLT GALVZD 1"	30	6.75
742	U-BOLT 1/2"	2	0.2
743	VERTICAL INSERT SS 3/4" SW CL 3000	2	0.64
744	WASHER SEALING 17X22X1.5	18	0.018
745	PIPE CLAMP SHELL TYPE 1"	15	3
746	U-BOLT GALVZD 1"	4	0.9
747	U-BOLT GALVZD 1 1/2"	5	0.8
748	U-BOLT GALVZD 2"	25	8.3
749	U-BOLT GALVZD 3"	35	14
750	U-BOLT GALVZD 4"	30	25.2
751	U-BOLT GALVZD 6"	14	14.56
752	U-BOLT GALVZD 8"	2	3

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

753	U-BOLT GALVZD 12"	3	8.13
	TOTAL		110019.51
TURBO BLOWER AND ITS AUXILIARIES			
1	TURBO BLOWER	1	64362.420
2	PIPE(SMLS) 355.6X12.7 CS SA106 GR B	12	1,288.76
3	PIPE(EFSW) 508X9.53 CS SA672 GRB60 CL22	36	4,217.47
4	PIPE(EFSW) 610X9.53 CS SA672 GRB60 CL22	36	5,080.50
5	PIPE(SMLS) 406.4X 9.52 CS SA106 GR B	12	1,118.14
6	PIPE(SMLS)- 21.3 X4.78 CS SA106 GR B	36	70.092
7	PIPE CS, HTS 813 X 9.53 EFSW A672 GRB60	24	4,532.04
8	CS PIPE ASTM A672 GR B60 1016.4X9.52THK	48	11,347.20
9	CS PIPE(EFSW)- OD965X9.53ASTM A672GR.B6	60	13,500.00
10	CS ELBOW 90 DEG LR 20"SCH STD BW	1	94
11	CS ELBOW 90 DEG LR 38"SCH STD BW	2	320
12	SORF FLANGE CL-150-32"	1	140
13	CS FLANGE 14" #150 SORF	1	35
14	FLANGE CS 38"#150SORF ANSI 16.47B	2	240
15	FLANGE 16"SLIP ON WELDING CS CL150 RF	2	90
16	MSW GASKET GRAPHITE FLR 32"#150 16.47A	1	2.5
17	NAB MSW GASKET 20"" #150 RF GRAPHITE	4	1.92
18	NAB M.S.W. GASKET SIZE 14" #150 GRPH	1	0.4
19	NAB M.S.W. GASKET SIZE 16" #150 GRPH	2	0.9
20	MSW GASKET GRAPHITE FLR 38"#150 16.47B	2	5
21	STUD WITH TWO NUTS M39X3X300	28	147.224
22	NAB M.S.W. GASKET SIZE 1/2"#600 GRPH	8	0.08
23	CS EQUAL TEE 32" SCH STD BW ENDS	1	365
24	ELBOW 90 DEG LR 32" SCH STD CS BW	2	400
25	CS ELBOW 90 DEG SR 32"SCH STD BW	1	150
26	CS ELBOW 90 DEG LR 40"SCH STD BW	2	370
27	CS ELBOW 90 DEG LR 20"SCH STD BW	2	188
28	ELBOW 90 DEG LR 24" SCH STD CS BW	3	525
29	CS ELBOW 90 DEG LR 38"SCH STD BW	3	480
30	CONC.REDUCER38"X32"SCH STDSTD BW ENDS	1	200
31	CONCENTRIC REDUCER CS 32"X20" SCH STD	2	350
32	CS REDUCER 40X32 SCH STDSTD BW ENDS	2	340
33	CS REDUCER 20X14 SCH STDSTD BW ENDS	1	60
34	CONCENTRIC REDUCER CS 20"X16"SCH STD	1	120
35	CONCENTRIC REDUCER CS 24"X16"SCH STD	1	100

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593
Technical Conditions of Contract

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

36	CS ELBOW 90 DEG LR 38"SCH STD BW	1	160
37	FLANGE CS 20" ANSI 300 SORF	4	572
38	PLT CS 32,1*1200.00*1200.00MM	361.728	361.728
39	STUD 2 NUTS M27X3X150	44	47.388
40	STUD 2 NUTS M27X325	80	186.4
41	STUB STRT IMMER CS SCRW M33X2-F L=45 250	5	2
42	VERTICAL INSERT CS 1/2" SW CL 3000	10	1.1
43	ELBOW 90DEG CS 1/2" CL 3000 SW ENDS	12	4.68
44	FLANGE SOW CS 1/2" CL 300 RAISED FACE	8	4
45	FLANGE BLIND CS 1/2" CL 300 RAISED FACE	32	48
46	STUD 2 NUTS M33X3X225	96	201.6
47	INLINE DISCHARGE SILENCER TURBO BLOWER	1	5,000.00
48	MOP TRIP ECCEN BUTTERFLYVALVE 38"#150RF	3	7,200.00
49	SET OF HANGERS FOR NMDC	1	3,000.00
50	STUD M30, L=2500	8	112
51	SQ. PLATE	8	134.96
52	JACKING SPINDLE	10	5.64
53	WASHER MCD 31ST	16	0.832
54	NUT HEX P M30-8	16	3.696
55	SUCTION AIR FILTER SILENCER FOR NMDC	1	5,550.00
56	PRESSURETHRUST BLD BELLOW 32"#150RF	1	1,500.00
57	UNIVERSAL TIED LATERAL BELLOW-32"#150RF	1	1,200.00
58	UNIVERSAL TIED LATERAL BELLOW-40"#150RF	2	3,000.00
59	UNIVERSAL TIED LATERAL BELLOW-20"BW	1	900
	TOTAL		139437.67
	SURFACE CONDENSER		
1	PIPE(SMLS)- 21.3 X4.78 CS SA106 GR B	1	1.947
2	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	3	9.711
3	PIPE(SMLS)- 21.3 X4.78 CS SA106 GR B	1	1.947
4	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	4	12.948
5	PIPE(SMLS) 60.3X 5.54 CS SA106 GR B	6	44.892
6	PIPE(SMLS)- 21.3 X4.78 CS SA106 GR B	6	11.682
7	PIPE(SMLS) 168.3X10.97 CS SA106 GR B	6	255.384
8	SURFACE CONDENSER ASSLY	1	58,000.00
9	STAND PIPE ASSLY-1	1	202.26
10	GLOBE VALVE,CS 1/2", 800,SOCKET	2	3.2
11	GLOBE VLV CS GRAPHOL PKG 1" CL800 SW END	6	30
12	FLANGE SOW CS 1" CL 300 RAISED FACE	2	3

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593
Technical Conditions of Contract

Page 82

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

13	NAB M.S.W. GASKET SIZE 1" #300 PTFE	2	0.04
14	STUD 2 NUTS M16X90	8	2.048
15	STAND PIPE ASSLY-2	1	204.78
16	GLOBE VALVE,CS 1/2", 800,SOCKET	2	3.2
17	GLOBE VLV CS GRAPHOL PKG 1" CL800 SW END	8	40
18	FLANGE SOW CS 1" CL 300 RAISED FACE	2	3
19	NAB M.S.W. GASKET SIZE 1" #300 PTFE	2	0.04
20	STUD 2 NUTS M16X90	8	2.048
21	SURGE PIPE ASSLY	1	644.05
22	BEND PIPE	2	3.7
23	BED PLATE	2	792
24	PACKER PLATE 32X100X750	10	188
25	PACKER PLATE	10	147.3
26	PACKER PLATE	10	117.9
27	PACKER PLATE	10	94.3
28	PACKER PLATE	10	58.9
29	PACKER PLATE	10	35.3
30	PACKER PLATE	10	23.5
31	PACKER PLATE	10	18.5
32	PACKER PLATE	10	11.79
33	PACKER PLATE	10	5.8
34	HOTWELL ASSLY	1	2,280.00
35	HOTWELL RIB	10	111
36	NON-ASB.SH.3.2,4*1500.00*1500.00MM	48.384	48.384
37	SORF FLANGE CL-150-30"	4	500
38	NON-ASB.SH.3.2,4*1500.00*1500.00MM	48.384	48.384
39	GLOBE VLV CS(SA105)2"CL800PTFE PKG SOC	12	133.2
40	GLOBE VALVE,CS 1/2", 800,SOCKET	5	8
41	COLLAR	1	30
42	SS EXPN BELLOW	1	600
43	TOP CONNECTING PIECE ASSLY	1	2,080.00
44	FOUNDATION BOLT ASSLY.	8	44.24
45	CS FLANGE 24" #150 SORF	1	96
46	NON-ASB.SH.3.2,1*1500.00*1500.00MM	12.096	12.096
47	VALVE ATY 24" 77131-113400KG/H	1	1,800.00
48	STUD 2 NUTS M33X3X190	120	240.6
49	NUT HEX P M36-8	8	3.168
50	WASHER MCD 37ST	8	0.712

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

51	STUD 2 NUTS M33X3X180	20	38.76
	TOTAL		69047.711
	STEAM JET AIR EJECTOR		
1	STEAM JET AIR EJECTOR ASSLY	1	6,500.00
2	EJECTOR ASSLY-ST	1	90.3
3	AIR PIPING	1	92.3
4	STEAM PIPING ASSLY.	1	330
5	PIPE	1	5.85
6	RIB	1	5.2
7	RIB	1	8.478
8	GROUTING PLATE (FOR SJAE)	2	38
9	WELDED ON PIECE M 33 X 2	2	9
10	NAB M.S.W. GASKET SIZE 4" #150 PTFE	1	0.08
11	NAB M.S.W. GASKET SIZE 6" #150 PTFE	1	0.15
12	NAB M.S.W. GASKET SIZE 6" #300 PTFE	4	0.6
13	GLOBE VLV CS(SA105)2"CL800PTFE PKG SOC	4	44.4
14	NAB M.S.W. GASKET SIZE 1 1/2"#300 PTFE	1	0.035
15	EJECTOR SILENCER. (4"/6"-350)	1	226.62
16	PLUG M 33X2	4	0.8
17	GATE VLV CS(A216WCB)4" SG CL150 BW	2	96
18	GLOBE VALVE MOTOR OPERATED CS 2"ANSI300#	3	60
19	MOP,GT-VLV,FSG,WITH I/S,CS,NB100,CL150BW	1	95
20	GLOBE VALVE CS 1 1/2" CL300 FLGD RF ENDS	4	120
21	GLOBE VALVE CS 1/2" CL 800 SW ENDS	2	3.2
22	STUD 2 NUTS M16X110	8	2.296
23	FLANGE SOW CS 6" CL 150 RF (SA105)	1	7.8
24	STUD 2 NUTS M20X110	8	3.712
25	FLANGE SOW CS 6" CL 300 RAISED FACE	4	66
26	GLOBE VALVE CS 1/2" CL 800 SW ENDS	10	16
27	STUD 2 NUTS M20X100	16	7.024
28	STUD 2 NUTS M27X325	8	18.64
29	STUD 2 NUTS M27X120	8	7.536
30	WASHER MCD 28-ST	32	1.344
31	PISTN LIFT CHK VLV CS 1 1/2" CL800SW END	2	20.8
	TOTAL		7877.17
	GLAND STEAM CONDENSER		
1	PIPE(SMLS) 60.3X 5.54 CS SA106 GR B	2	14.964

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

2	PIPE(SMLS)- 33.4X 4.55 CS SA106 GR B	6	19.422
3	PIPE(SMLS)- 21.3 X3.73 CS SA106 GR B	4	6.464
4	GSC ASSEMBLY	1	1,100.00
5	STAND PIPE ASSLY	1	30
6	EJECTOR SILENCER (3"/6"-1500L)	2	296.72
7	2X100% EJECTOR ASSEMBLY	1	210
8	GLOBE VALVE CS 1" CL 800 SW ENDS	7	23.8
9	NON-ASB.SH.3.2,2*1500.00*1500.00MM	24.192	24.192
10	PLT CS 10,6*100.00*850.00MM	40.038	40.038
11	STUD 2 NUTS M24X300	8	10.712
12	WASHER (M24 BOLT)	16	0.48
13	ELBOW LR 90DEG CS 2" SCH 80 BW ENDS	2	1.8
14	GLOBE VALVE CS 2" CL 800 SW ENDS	2	22.2
15	GLOBE VALVE CS 1/2" CL 800 SW ENDS	9	14.4
16	FLANGE SOW CS 1" CL 300 RAISED FACE	2	3
17	STUD 2 NUTS M16X90	8	2.048
18	FLANGE SOW CS 6" CL 150 RF (SA105)	2	15.6
19	STRAIGHT TEE CS 2" SCH 40 BUTT WELD ENDS	2	3.6
20	GATE VALVE GL SEALED CS 2" CL150 BW ENDS	2	40
	TOTAL		1879.44
	LUBE OIL COOLER + CONSOLE		
1	PIPE(SMLS) 88.9X3.05 S.S SA312 GRTP321	3	19.743
2	PIPE SS 48.3 X 3.7 A312 TP321	7	29.029
3	PIPE SS 26.7 X 3.9 A312 TP321	9	20.115
4	GASKET &O-RING SET FOR 480L SIMPLX FILTR	1	1
5	FILTER ELEMENT SET, 10 MIC, 480L, SIMPLE	1	3
6	SPARESET 5MIC FILTER FOR 1440LPM 23BAR	1	50
7	SPARESET 40MIC FILTER FOR 1440LPM 23BAR	1	50
8	SPARESET OF GASKETS&O RINGS 1440L 23BAR	1	5
9	NAB M.S.W. GASKET SIZE 3" #150 PTFE	3	0.21
10	NAB M.S.W. GASKET SIZE 3" #300 PTFE	1	0.07
11	GATE VLV SS(A351CF8)3" CL150 FLNGD RF	1	41
12	NAB M.S.W. GASKET SIZE 1 1/2"#300 PTFE	4	0.14
13	SS GLOBE VALVE 1 1/2" 300 RF	1	30
14	NAB M.S.W. GASKET SIZE 3/4" 300 PTFE	3	0.15
15	ELBOW LR 90DEG SS 3" SCH 10S BW ENDS	2	6.2
16	FLANGE WELD NECK SS 3" SCH 10S CL 150 RF	2	8
17	STUD 2 NUTS M16X110	12	3.444

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

18	STUD 2 NUTS M20X110	8	3.712
19	ELBOW LR 90DEG SS 1 1/2" SCH 40S BW ENDS	4	3.08
20	FLANGE SOW SS 1 1/2" CL 300 RAISED FACE	4	10.4
21	STUD 2 NUTS M20X90	16	6.64
22	ELBOW 90DEG SS 3/4" CL 3000 SW ENDS	5	2.85
23	FLANGE SOW SS 3/4" CL 300 RAISED FACE	4	5.2
24	STUD 2 NUTS M16X90	12	3.072
25	NUT HEX P M20-8	14	0.896
26	NUT HEX P M20-8	8	0.512
27	BOLT FDN M20X250-4.6	30	24.03
28	NUT HEX P M20-8	8	0.512
	TOTAL		328.005

2. TENTATIVE WEIGHT DETAILS EQUIPMENTS SUPPLIED FROM BHEL PE&SD HYDERABAD FOR THE ENTIRE PACKAGE

1	CEP	6.000	SET	30,000.000
2	SPECIAL TOOLS AND TACKLES FOR NMDC	1.000	SET	500.000
3	CS PIPE ASTM A672 GR B60 1626.4X9.53THK	220.000	M	83,600.000
4	NMDC PIPE PKG-PE.MP.534	1.000	SET	20,623.000
5	NMDC PIPE PKG-PE.MP.535	1.000	SET	20,316.000
6	NMDC PIPE PKG-PE.MP.538	1.000	SET	4,772.000
7	NMDC PIPE PKG-PE.MP.539	1.000	SET	2,656.000
8	NMDC PIPE PKG-PE.MP.541	1.000	SET	42,345.000
9	NMDC PIPE PKG-PE.MP.542	1.000	SET	3,595.000
10	NMDC PIPE PKG-PE.MP.547	1.000	SET	1,032.000
11	NMDC PIPE PKG-PE.MP.548	1.000	SET	25,350.000
12	PIPE(WELDED) NB50 HVY MS IS 1239	300.000	M	1,890.000
13	NMDC PIPE PKG-PE.MP.548	1.000	SET	25,350.000
14	NMDC PIPE PKG-PE.MP.547	1.000	SET	1,032.000
15	NMDC PIPE PKG-PE.MP.539	1.000	SET	2,656.000
16	PIPE(WELDED) NB50 HVY MS IS 1239	300.000	M	1,890.000
17	PIPE (WELDED) MS 50 NB HVY IS1239(GALV)	300.000	M	1,878.000
18	PIPE (WELDED) MS 25 NB HVY IS1239(GALV)	300.000	M	885.000
19	PIPE (WELDED) MS 15 NB HVY IS1239(GALV)	100.000	M	145.000
20	NMDC PIPE PKG-8(PE.MP.535)-WELDED PIPE	1.000	SET	13,500.000
21	PIPE (EFSW) 1626 X 9.53 CS A672GRB60	170.000	M	64,600.000
22	NMDC NAGARNAR-FORGED FITTINGS PKG	1.000	SET	2,000.000
23	NMDC NAGARNAR-BW FITTINGS PKG	1.000	SET	12,000.000
24	NMDC- BW FITTINGS PACKAGE -AS	1.000	SET	2,500.000
25	NMDC- BW FITTINGS PACKAGE -CS	1.000	SET	7,350.000
26	NMDC-FORGED FITTINGS PACKAGE - AS	1.000	SET	350.000
27	NMDC-FORGED FITTINGS PACKAGE - CS	1.000	SET	650.000

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/NGNRI-STG/1593
Technical Conditions of Contract

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

28	NMDC -FORGED FITTINGS PACKAGE- GI	1.000	SET	1,000.000
29	EQUAL TEE 64" OD 1626X9.53 THK- GR B60	1.000	EA	2,541.000
30	CRDCR CS 64ö X 38ö THK 9.53 X 9.53 BW	1.000	EA	839.000
31	64" TRIPLE ECC. BFLY VALVE-CS-150#/PN16	2.000	EA	18,000.000
32	FLANGE PACKAGE-1(PROJECT-NMDC NAGARNAR)	1.000	SET	1,200.000
33	GASKETS PACKAGE-1(PROJ:NMDC NAGARNAR)	1.000	SET	100.000
34	STUD NUTS PACKAGE-1(PROJ:NMDC NAGARNAR)	1.000	SET	750.000
35	STRAINER Y-TYPE 2" ANSI 800 SW CS	9.000	EA	90.000
36	CHNL CS 150,1*130.00M	2,184.000	KG	2,184.000
37	CHNL CS 200,1*170.00M	3,791.000	KG	3,791.000
38	BEAM CS 200,1*110.00M	2,794.000	KG	2,794.000
39	BEAM CS 300,1*75.00M	3,457.500	KG	3,457.500
40	CHNL CS 100,1*131.00M	1,205.200	KG	1,205.200
41	ANGLE CS 50X50X6,1*160.00M	720.000	KG	720.000
42	CHNL CS 100,1*760.00M	6,992.000	KG	6,992.000
43	ANGLE CS 50X50X6,1*1250.00M	5,625.000	KG	5,625.000
44	CHNL CS 100,1*200.00M	1,840.000	KG	1,840.000
45	PLT CS 12,6*2.50*6.30M	8,901.900	KG	8,901.900
46	PLT CS 16,4*2.50*6.30M	7,912.800	KG	7,912.800
47	ANGLE CS 75X75X6,1*180.00M	1,224.000	KG	1,224.000
48	ANGLE CS 65X65X6,1*50.00M	290.000	KG	290.000
49	PLT CS 6,1*1.60*6.00M	452.160	KG	452.160
50	ANGLE CS 75X75X8,1*100.00M	890.000	KG	890.000
51	ANGLE CS 90X90X8,1*100.00M	1,080.000	KG	1,080.000
52	PLT CS 20,4*2.50*9.00M	14,130.000	KG	14,130.000
53	NMDC-PIPE HANGER PACKAGE-1	1.000	SET	1,750.000
54	NMDC-PIPE HANGER PACKAGE-1(PEMC-06424)	1.000	SET	1,750.000
55	STEAMTRAP BALLFLOAT TYPE 2ö CS 800# SW	9.000	EA	252.000
56	TD STEAM TRAP CS(A105) 1" #300 RF	6.000	EA	36.000
57	AIR TRAP BALLFLOAT TYPE 1" CS 800# SW	6.000	EA	18.000
58	AIR TRAP BALLFLOAT TYPE 1" CS 800# NPT	6.000	EA	18.000
59	TD STEAM TRAP AS(F22) 1" #1500 SW	6.000	EA	2.400
60	MET EXP BELLOW 8" #150 RF (CEP SUCTION)	6.000	EA	168.000
61	AL CLADDING (IS737: GR 31000) 0.71MM THK	10,251.000	KG	10,251.000
62	AL CLADDING (IS737:GR 31000) 1.22MM THK	3,075.000	KG	3,075.000
63	25MM THK ROCKWOOL MATTRESS (150KG/CU.M)	1,710.000	M2	6,412.500
64	40MM THK ROCKWOOL MATTRESS (150KG/CU.M)	1,674.000	M2	10,044.000
65	50MM THK ROCKWOOL MATTRESS (150KG/CU.M)	616.000	M2	4,620.000
66	75MM THK ROCKWOOL MATTRESS (150KG/CU.M)	4,604.000	M2	51,795.000
67	PIPING INSUL ANCILLARIES-NMDC NAGARNAR	1.000	SET	11,000.000

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

68	50MM THK ROCKWOOL MATTRESS (150KG/CU.M)	300.000	M2	2,250.000
69	ONLINE TUBE CLEANING SYSTEM_NMDC TB	3.000	SET	5,100.000
70	SUPERVISION AND E & C OF OLTCS_NMDC	3.000	SET	3.000
71	CONTROL VALVE PACKAGE FOR NMDC TB	1.000	SET	1,000.000

ABOVE WEIGHTS & DIMENSIONS ARE TENTATIVE AND MAY VARY. ALL EQUIPMENTS & AUX. ARE TO BE HANDLED & ERECTED AS DISPATCHED FROM MANUFACTURING UNITS & RECEIVED AT SITE. PAYMENT SHALL BE MADE ON THE BASIS OF MATERIAL SPECIFICATION OF ACTUAL MATERIAL RECEIVED AND ERECTED AT SITE.

SUMMARY OF TENTATIVE WEIGHT SCHEDULE OF SYSTEMS INVOLVED IN THIS TENDER SPECIFICATION PER UNIT FOR 3 X TURBO-BLOWER SETS.

SUMMARY			
SL NO.	DESCRIPTION	TENTATIVE WEIGHT INVOLVED PER UNIT (MT)	TENTATIVE TOTAL WEIGHT INVOLVED (MT)
1	CONDENSER, HOT WELL ETC	80	240
2	TURBINE AND ASSOCIATED COMPONENTS LIKE CONTROL VALVES, GOVERNING OIL CONSOLE ETC	110	330
3	TURBO BLOWER	68	206
4	PUMPS and AUXILIARIES (CEP, MOP, JOP, EOP, AOP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILLIARIES etc)	15	45
5	HEATERS and COOLERS (GSC, SJE, Drain Coolers, Oil Coolers etc)	15	45
6	TURBINE AUX/INTEGRAL PIPING (COOLING WATER, LUBE OIL, JACKING OIL, OIL VAPOUR EXTRACTION, CONTROL OIL, SEAL STEAM, CONDENSATE SPRAY/EXHAUST HOOD SPRAY, CONTROL STATIONS, TURBINE WATER DRAINAGE, AIR PIPING, INSTRUMENT AIR PIPING ETC)	30	90
7	INSULATION AND CLADDING MATERIAL	33.33	100
8	COLD BLAST/ STB INTERCONNECTION PIPING (INCLUDES ALL BLOWER AUXILIARIES LIKE VALVES & SILENCER, SUCTION FILTER, SUCTION DUCT, BLOW OFF SILENCER)	103.33	310
9	MS PIPING AND SUPPORT	13.33	40
	TOTAL		1404

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Tentative Scope of Equipments/ Systems and Estimated Weights for Various Systems in Scope of Work

NOTES:

1. BESIDES PRODUCT GROUPS INDICATED HEREIN, THERE IS LIKELIHOOD OF ADDITION OF NEW PRODUCT GROUPS BY BHEL'S UNIT FOR RELEASE OF SOME ITEMS, INTEGRAL TO THIS WORK. TENDERER'S QUOTED UNIT RATES SHALL BE APPLICABLE FOR SUCH PRODUCT GROUPS ALSO.
 2. THE WEIGHTS GIVEN AGAINST PGMA'S LISTED ABOVE ARE TENTATIVE. IT MAY CHANGE AFTER DETAILED ENGINEERING IS DONE. RATE QUOTED BY THE CONTRACTOR SHALL NOT CHANGE DUE TO VARIATION IN WEIGHT.
 3. BHEL'S DECISION WITH REGARD TO CLASSIFICATION OF A PARTICULAR PRODUCT GROUP FOR APPLICABLE RATE CATEGORY SHALL BE FINAL & BINDING ON THE CONTRACTOR.
 4. BESIDES THE ABOVE, WEIGHT OF ALL TEMPORARY PIPING, VALVES, PUMPS, TANKS AND OTHER MISCELLANEOUS EQUIPMENTS ETC AS STATED ELSEWHERE WILL GET ADDED.
 5. ALL ABOVE WEIGHT DETAILS GIVEN ARE ONLY TENTATIVE AND LIKELY TO VARY. THE ERECTION, TESTING, COMMISSIONING HAS TO BE CARRIED OUT FOR ALL THE EQUIPMENTS/AUXILIARIES/ITEMS COVERED UNDER THIS TENDER SPECIFICATION THAT ARE NECESSARY FOR COMPLETION OF THE TOTAL SYSTEM.
 6. SITE WELD JOINTS FOR TG INTEGRAL PIPING AND EXTERNAL SYSTEM PIPING BOTH FOR IBR AND NON-IBR FOR PIPING (C.S., A.S. AND S.S. PIPING) SHALL BE AS PER DRAWING REQUIREMENT AND TO SUIT THE SITE REQUIREMENT.
 7. NDT INCLUDING RADIOGRAPHY AND POST/PREHEAT TREATMENT FOR PIPING SHALL ALSO BE AS SPECIFIED IN THE RELEVANT ERECTION DOCUMENTS & BY BHEL ENGINEER AT SITE.
-

TECHNICAL CONDITIONS OF CONTRACT (TCC)
**Chapter –XI: Tentative Scope of Equipments/ Systems and Estimated
Weights for Various Systems in Scope of Work**

PAINTING SCHEDULE - WILL BE ISSUED DURING EXECUTION

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

12.1 COMMON TO ALL WORK OF ERECTION TESTING AND COMMISSIONING

12.1.1

THE INTENT OF SPECIFICATION IS TO PROVIDE SERVICES ACCORDING TO THE MOST MODERN AND PROVEN TECHNIQUES AND CODES. THE OMISSION OF SPECIFIC REFERENCE TO ANY METHOD, EQUIPMENT OR MATERIAL NECESSARY FOR PROPER AND EFFICIENT EXECUTION OF THIS WORK SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING SUCH FACILITIES TO COMPLETE THE WORK WITHOUT ANY EXTRA COMPENSATION.

12.1.2

THE TERMINAL POINTS DECIDED BY BHEL SHALL BE FINAL AND BINDING ON THE CONTRACTOR FOR DECIDING THE SCOPE OF WORK AND EFFECTING PAYMENT FOR THE WORK DONE.

12.1.3

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

12.1.4

THE WORK COVERED UNDER THIS SPECIFICATION IS OF HIGHLY SOPHISTICATED NATURE, REQUIRING THE BEST QUALITY WORKMANSHIP, SUPERVISION, ENGINEERING AND CONSTRUCTION MANAGEMENT. THE CONTRACTOR SHOULD ENSURE PROPER PLANNING AND SUCCESSFUL & TIMELY COMPLETION OF THE WORK TO MEET THE OVERALL PROJECT SCHEDULE. THE CONTRACTOR MUST DEPLOY ADEQUATE QUANTITY OF TOOLS & PLANTS, MODERN / LATEST CONSTRUCTION AIDS ETC. HE MUST ALSO DEPLOY ADEQUATE TRAINED, QUALIFIED AND EXPERIENCED SUPERVISORY STAFF AND SKILLED PERSONNEL.

12.1.5

CONTRACTOR SHALL ERECT AND COMMISSION ALL THE EQUIPMENTS AND AUXILIARIES AS PER THE SEQUENCE & METHODOLOGY PRESCRIBED BY BHEL DEPENDING UPON THE TECHNICAL REQUIREMENTS. AVAILABILITY OF MATERIALS AND FRONTS WILL DECIDE THIS. BHEL ENGINEER'S DECISION REGARDING CORRECTNESS OF THE WORK AND METHOD OF WORKING SHALL BE FINAL AND BINDING ON THE CONTRACTOR. NO CLAIMS FOR EXTRA PAYMENT FROM THE CONTRACTOR WILL BE ENTERTAINED ON THE GROUND OF DEVIATION FROM THE METHODS / SEQUENCE ADOPTED IN ERECTION OF SIMILAR SETS ELSEWHERE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

12.1.6

ALL NECESSARY CERTIFICATES AND LICENSES, PERMITS & CLEARANCES REQUIRED TO CARRY OUT THIS WORK FROM THE RESPECTIVE STATUTORY/ LOCAL AUTHORITIES ARE TO BE ARRANGED BY THE CONTRACTOR AT HIS COST IN TIME TO ENSURE SMOOTH PROGRESS OF WORK.

12.1.7

THE WORK SHALL CONFIRM TO DIMENSIONS AND TOLERANCES SPECIFIED IN THE VARIOUS DRAWINGS / DOCUMENTS THAT WILL BE PROVIDED DURING VARIOUS STAGES OF ERECTION. IF ANY PORTION OF WORK IS FOUND TO BE DEFECTIVE IN WORKMANSHIP, NOT CONFORMING TO DRAWINGS OR OTHER STIPULATIONS DUE TO CONTRACTOR'S FAULT, THE CONTRACTOR SHALL DISMANTLE AND RE-DO THE WORK DULY REPLACING THE DEFECTIVE MATERIALS AT HIS COST, FAILING WHICH THE WORK WILL BE GOT DONE BY BHEL AND RECOVERIES WILL BE EFFECTED FROM THE CONTRACTOR'S BILLS TOWARDS EXPENDITURE INCURRED INCLUDING COST OF MATERIALS AND DEPARTMENTAL OVERHEADS OF BHEL.

12.1.8

THE CONTRACTOR SHALL PERFORM ANY SERVICES, TESTS ETC, WHICH MAY NOT BE SPECIFIED BUT NEVERTHELESS, REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

12.1.9

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

12.1.10

THE CONTRACTOR SHALL EXECUTE THE WORK IN THE MOST SUBSTANTIAL AND WORKMAN LIKE MANNER.

12.1.12

BHEL RESERVES RIGHT TO RECOVER FROM THE CONTRACTOR ANY LOSS WHICH ARISES OUT OF UNDUE DELAY / DISCREPANCY / SHORTAGE / DAMAGE OR ANY OTHER CAUSES DUE TO CONTRACTOR'S LAPSE DURING ANY STAGE OF WORK. ANY LOSS TO BHEL DUE TO CONTRACTOR'S LAPSE SHALL HAVE TO BE MADE GOOD BY THE CONTRACTOR.

12.1.12

ALL CRANES, TRANSPORT EQUIPMENT, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MANPOWER, SUPERVISORS/ENGINEERS, CONSUMABLES ETC, EXCEPT OTHERWISE SPECIFIED AS BHEL SCOPE OF FREE ISSUE, REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY CONTRACTOR UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES. THE CONTRACTOR'S QUOTED RATES SHOULD BE INCLUSIVE OF ALL SUCH CONTINGENCIES.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

12.1.12

DURING THE COURSE OF ERECTION, TESTING AND COMMISSIONING CERTAIN REWORK / MODIFICATION / RECTIFICATION / REPAIR / FABRICATION ETC MAY BECOME NECESSARY ON ACCOUNT OF FEED BACK / REVISION OF DRAWING ETC. THIS WILL ALSO INCLUDE MODIFICATIONS / RE-WORKS SUGGESTED BY BHEL / CUSTOMER / OTHER INSPECTION GROUP. CONTRACTOR SHALL CARRY OUT SUCH REWORK / MODIFICATION / RECTIFICATION / FABRICATION / REPAIR ETC PROMPTLY AND EXPEDITIOUSLY. DAILY LOG SHEETS SIGNED BY BHEL ENGINEER AND INDICATING THE DETAILS OF WORK CARRIED OUT, MAN-HOURS ETC SHALL BE MAINTAINED BY THE CONTRACTOR FOR SUCH REWORKS. CLAIM OF CONTRACTOR IF ANY, FOR SUCH WORKS WILL BE GOVERNED BY RELEVANT CLAUSES OF 'GENERAL CONDITIONS OF CONTRACT'.

12.1.14

ALL WORKS SUCH AS CLEANING, LEVELING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF STRUCTURES, TUBES AND PIPES AS PER GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEER'S INSTRUCTIONS AT SITE, CUTTING, GOUGING, WELD DEPOSITING, GRINDING, STRAIGHTENING, CHAMFERING, FILING, CHIPPING, DRILLING, REAMING, SCRAPPING, LAPPING, FITTING UP ETC AS MAY BE APPLICABLE IN SUCH ERECTION WORKS AND WHICH ARE TREATED INCIDENTAL TO THE ERECTION WORKS AND NECESSARY TO COMPLETE THE WORK SATISFACTORILY, SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK WITHIN THE QUOTED RATES.

12.1.15

THE CONTRACTOR SHALL MAKE ALL FIXTURES, TEMPORARY SUPPORTS, STEEL STRUCTURES REQUIRED FOR JIGS & FIXTURES, ANCHORS FOR LOAD AND GUIDE PULLEYS REQUIRED FOR THE WORK. CONTRACTOR SHALL ARRANGE NECESSARY STEEL FOR SUCH USAGE.

12.1.16

THE CONTRACTOR SHALL TAKE DELIVERY OF THE COMPONENTS, EQUIPMENTS, CHEMICALS, AND LUBRICANTS ETC FROM THE BHEL STORES/ STORAGE AREA AFTER GETTING THE APPROVAL OF BHEL ENGINEER ON STANDARD INDENT FORMS OF BHEL. COMPLETE AND DETAILED ACCOUNT OF THE MATERIALS AND EQUIPMENTS AFTER USAGE SHALL BE SUBMITTED TO THE BHEL AND RECONCILED PERIODICALLY.

12.1.17

THE DISTANCE BETWEEN STORAGE AREA AND ERECTION SITE IS APPROX 1.5 TO 2 KM. CONTRACTOR SHALL PLAN AND TRANSPORT EQUIPMENTS, COMPONENTS FROM STORAGE TO ERECTION SITE AND ERECT THEM IN SUCH A MANNER AND SEQUENCE THAT MATERIAL ACCUMULATION AT SITE DOES NOT LEAD TO CONGESTION AT SITE OF WORK. MATERIALS SHALL BE STACKED NEATLY, PRESERVED AND STORED IN THE CONTRACTOR'S SHED AND AT WORK AREAS IN AN ORDERLY MANNER. IN CASE IT IS NECESSARY TO SHIFT AND RE-STACK THE MATERIALS KEPT AT WORK AREAS/ SITE TO ENABLE

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

OTHER AGENCIES TO CARRY OUT THEIR WORK OR FOR ANY OTHER REASON, SAME SHALL BE DONE BY CONTRACTOR MOST EXPEDITIOUSLY AS INCIDENTAL TO WORK.

12.1.18

PLANT MATERIALS SHOULD NOT BE USED FOR ANY TEMPORARY SUPPORTS / SCAFFOLDING/ PREPARING PRE-ASSEMBLY BED ETC.

12.1.19

THE DETAILS OF EQUIPMENTS TO BE ERECTED UNDER THIS CONTRACT ARE GENERALLY AS PER THE SCHEDULE GIVEN IN RELEVANT APPENDICES. THESE DETAILS ARE APPROXIMATE AND MEANT ONLY TO GIVE A GENERAL IDEA TO THE TENDERER ABOUT THE MAGNITUDE OF THE WORK INVOLVED. ACTUAL QUANTUM AND TYPE OF EQUIPMENTS WILL BE BASED ON THE RELEVANT ERECTION DOCUMENTS WHICH WILL BE FURNISHED TO THE CONTRACTOR IN DUE COURSE OF ERECTION AND THE WEIGHT AND QUANTITY AS PER THE RELEVANT ENGINEERING DOCUMENTS WILL ONLY BE ADMISSIBLE FOR THE BILLING PURPOSE.

12.1.20

HANGERS & SUSPENSIONS, SUPPORTS ETC FOR TUBES, PIPING, & DUCTS ETC WILL BE SUPPLIED IN RUNNING / RANDOM LENGTHS / SIZES WHICH SHALL BE CUT TO SUITABLE SIZES AND ADJUSTED AS REQUIRED.

12.1.21

SPRING SUSPENSION / CONSTANT LOAD HANGERS MAY HAVE TO BE PRE-ASSEMBLED FOR REQUIRED LOAD AND ERECTION CARRIED OUT AS PER INSTRUCTIONS OF BHEL. ADJUSTMENTS, REMOVAL OF TEMPORARY ARRESTS/LOCKS, CUTTING OF EXCESS THREAD LENGTH OF HANGER TIE-ROD ETC HAVE TO BE CARRIED OUT AS AND WHEN REQUIRED. LOAD SETTING OF SPRING HANGERS, AS PER BHEL'S DOCUMENTS/INSTRUCTIONS, DURING VARIOUS STAGES OF ERECTION & TESTING AND AFTER FLOATING OF PIPING/DUCTING DURING COLD AND HOT CONDITION WILL HAVE TO BE DONE AS PART OF WORK. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

12.1.22

LAYOUT OF FIELD ROUTED/ SMALL BORE PIPING SHALL BE DONE AS PER SITE REQUIREMENT. NECESSARY SKETCH FOR ROUTING THESE LINES SHOULD BE GOT APPROVED FROM BHEL BY THE CONTRACTOR. THERE IS A POSSIBILITY OF SLIGHT CHANGE IN ROUTING THE ABOVE PIPE LINES EVEN AFTER COMPLETION OF ERECTION.

17.1.23

INSTALLATION AND WELDING OF NECESSARY INSTRUMENTATION TAPPING POINTS, & MEASUREMENT DEVICES, WILL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR AND WILL BE DONE AS PER THE INSTRUCTIONS OF BHEL SITE ENGINEER. THE INSTALLATION OF ALL THE ABOVE ITEMS WILL BE CONTRACTOR'S RESPONSIBILITY EVEN IF THE:

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

I. ITEMS ARE NOT SPECIFICALLY INDICATED UNDER THE RESPECTIVE PRODUCT GROUPS AS GIVEN IN THE TECHNICAL SPECIFICATIONS.

II. ITEMS ARE SUPPLIED BY AN AGENCY OTHER THAN BHEL.

NDE, AND POST WELD HEAT TREATMENT FOR ABOVE SHALL BE DONE AS PER THE SPECIFICATIONS AS PART OF WORK.

12.1.24

ACTUATORS/DRIVES OF VALVES, DAMPERS, GATES, POWERED VANES ETC MAY HAVE TO BE SERVICED, LUBRICATED, BEFORE ERECTION, DURING PRE-COMMISSIONING & COMMISSIONING, INCLUDING CARRYING OUT MINOR ADJUSTMENTS REQUIRED AS INCIDENTAL TO THE WORK.

12.1.25

ALL ELECTRICAL MOTORS HAVE TO BE TESTED FOR IR & PI VALUES PRIOR TO THE TRIAL RUN. WHERE REQUIRED, DRY OUT MAY HAVE TO BE CARRIED OUT BY USING EXTERNAL HEATING SOURCE. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS IN THIS REGARD AND COMPLETE THE WORK AS INSTRUCTED. BHEL WILL PROVIDE THE MOTORIZED INSULATION TESTERS.

12.1.26

IN INSTALLATION OF VARIOUS EQUIPMENTS IT MAY BECOME NECESSARY TO INSTALL THESE ON TEMPORARY SUPPORTS/ HANGER DUE TO VARIOUS REASONS INCLUDING NON-AVAILABILITY OF SUSPENSION MATERIALS. CONTRACTOR SHALL INSTALL SUCH TEMPORARY SUSPENSIONS/HANGERS AND LATER ON SHIFT THE RELEVANT EQUIPMENTS TO THEIR RESPECTIVE PERMANENT HANGERS/ SUSPENSIONS/ SUPPORTS AS INCIDENTAL TO WORK. REQUISITE MATERIALS FOR SUCH TEMPORARY ARRANGEMENTS WILL BE PROVIDED BY BHEL ON FREE -RETURNABLE BASIS WHICH SHALL BE RETURNED TO BHEL AFTER THE USE.

12.1.27

THE WORK SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE TO THE "FIELD QUALITY PLAN" APPROVED BY BHEL/CLIENT. CONTRACTOR, JOINTLY WITH BHEL, SHALL PREPARE ALL NECESSARY RECORDS OF MEASUREMENTS/READINGS/ PROTOCOLS ETC.

12.1.28

ALL WORKS SUCH AS CLEANING, LEVELLING, ALIGNING, TRIAL ASSEMBLY, DISMANTLING OF CERTAIN EQUIPMENTS / COMPONENTS FOR CHECKING AND CLEANING, SURFACE PREPARATION, FABRICATION OF SHEETS, TUBES AND PIPES AS PER THE GENERAL ENGINEERING PRACTICE AND AS PER BHEL ENGINEERS INSTRUCTIONS AT SITE, CUTTING, WELD DESPOSING, GRINDING, STRAIGHTENING, CHAMFERING, FILING, CHIPPING, DRILLING, REAMING, SCRAPING, LAPPING, FITTING UP ETC AS MAY BE APPLICABLE IN SUCH ERECTION WORKS AND WHICH ARE TREATED INCIDENTAL TO THE ERECTION

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

WORK AND NECESSARY TO COMPLETE THE WORK SATISFACTORILY SHALL BE CARRIED OUT BY THE CONTRACTOR AS PART OF THE WORK.

12.1.29

INTERCONNECTION/ HOOKUP, IF ANY, WITH THE EXISTING SYSTEM SHALL FORM PART OF WORK. SUCH INTERCONNECTIONS, HOOKUPS MAY REQUIRE SHUT DOWN OF RUNNING PLANT AND THE RELEVANT WORK HAVE TO BE COMPLETED WITHIN SUCH PLANNED SHUTDOWNS. THIS MAY CALL FOR WORKING WITH ENHANCED RESOURCES AND ON EXTENDED HOURS. CONTRACTOR'S OFFER SHALL COVER ALL SUCH CONTINGENCIES.

12.1.30

CONTRACTOR SHALL REGULATE FLOW OF MATERIAL TO AND FROM SITE IN SUCH A MANNER AND SEQUENCE THAT MATERIAL ACCUMULATION AT SITE DOES NOT LEAD TO CONGESTION AT SITE. IN CASE IT IS NECESSARY TO SHIFT AND RESTACK THE MATERIALS KEPT AT WORK AREAS / SITE TO ENABLE OTHER AGENCIES TO CARRY OUT THEIR WORK OR FURTHER ANY OTHER REASON, IT SHALL BE DONE BY THE CONTRACTOR MOST EXPEDITIOUSLY. NO CLAIM FOR EXTRA PAYMENT FOR SUCH WORK WILL BE ENTERTAINED.

12.1.31

IT MAY SO HAPPEN THAT CERTAIN COMPONENTS LIKE MANHOLE DOORS, HANGER ETC MAY BE SUPPLIED IN LOOSE ITEMS. THEY NEED TO BE ASSEMBLED AS PER RELEVANT DRAWINGS OR AS PER ADVICE OF BHEL ENGINEER PRIOR TO ERECTION. THIS FORMS THE PART OF THE SCOPE OF WORK.

12.1.32

THE CONTRACTOR SHALL HAVE TOTAL RESPONSIBILITY FOR ALL EQUIPMENT AND MATERIALS IN HIS CUSTODY AT CONTRACTOR'S STORES, LOOSE, SEMI-ASSEMBLED, ASSEMBLED OR ERECTED BY HIM AT SITE. HE SHALL EFFECTIVELY PROTECT THE FINISHED WORKS FROM ACTION OF WEATHER AND FROM DAMAGES OR DEFACEMENT AND SHALL ALSO COVER THE FINISHED PARTS IMMEDIATELY ON COMPLETION OF WORK AS PER BHEL ENGINEER'S INSTRUCTIONS. THE MACHINE SURFACES/FINISHED SURFACES SHOULD BE GREASED AND COVERED.

12.1.33

BHEL IS OPERATING WEB BASED COMPUTERIZED SITE OPERATION MANAGEMENT SYSTEM (SOMS) THAT INCLUDES, INTER-ALIA, ISSUE OF MATERIALS, DAILY PROGRESS REPORTING, CONTRACTOR'S RUNNING MONTHLY BILLING AND MATERIAL RECONCILIATION THROUGH A COMPUTERIZED DATA MANAGEMENT SYSTEM. CONTRACTOR SHALL INSTALL NECESSARY HARDWARE TO HOOK-UP WITH THE BHEL'S SYSTEM AND USE THE SAME FOR HIS SCOPE OF WORK.

IN THE EVENT THE COMPUTERIZED SOMS IS INOPERATIVE FOR ANY REASONS, THE CONTRACTOR SHALL TAKE DELIVERY OF MATERIALS FROM THE STORAGE AREA/SHEDS OF BHEL/CUSTOMER AFTER GETTING THE APPROVAL OF THE ENGINEER/CUSTOMER ON STANDARD INDENT FORMS TO BE

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

SPECIFIED BY BHEL/CUSTOMER. ALL THESE RECORDS HOWEVER SHALL BE UPDATED IN THE SOMS AS AND WHEN THE SOMS IS REACTIVATED/ NORMALIZED.

12.1.34

GASES LIKE ARGON, OXYGEN, ACETYLENE ETC THAT ARE REQUIRED FOR ERECTION RELATED ACTIVITIES SHALL BE ARRANGED BY THE CONTRACTOR AT HIS COST. FOR T-91 MATERIAL SITE WELD JOINTS ARGON AS PER GRADE-3 OF IS 5760: 1998 WITH OXYGEN AND WATER VAPOUR RESTRICTED TO MAX 6 PPM EACH AND WITH ARGON PURITY LEVEL OF MINIMUM 99.99% SHALL BE ARRANGED AND USED BY THE CONTRACTOR. THE SUPPLY SHOULD ACCOMPANY TEST CERTIFICATE FOR THE BATCH INDICATING INDIVIDUAL ELEMENT 'PPM' LEVEL AND OVERALL PURITY LEVEL.

12.1.35

ALL LUBRICANTS AND CHEMICALS REQUIRED FOR TESTING, PRESERVATION, CHEMICAL CLEANING / ACID CLEANING, OIL FLUSHING, AND THE LUBRICANTS FOR TRIAL RUNS OF THE EQUIPMENTS AND TRIAL OPERATION OF THE UNIT WILL BE SUPPLIED BY BHEL FREE OF CHARGES.

12.1.36

CONTRACTOR SHALL USE HIS OWN LIFTING TOOLS & TACKLES / CRANE OF SUITABLE CAPACITY WITH OTHER REQUIRED ARRANGEMENTS FOR THE ENTIRE SCOPE OF WORK. HOWEVER BHEL'S CUSTOMER IS HAVING ELECTRIC OVERHEAD TRAVELLING (EOT) CRANE WITHIN THE TURBINE HALL AND FACILITY OF THIS EOT CRANE WILL BE EXTENDED FREE OF HIRE CHARGES FOR THE ERECTION OF TURBINES AND TURBO BLOWER EQUIPMENTS UNDER THIS TENDER SPECIFICATION DEPENDING ON AVAILABILITY, LIFTING CAPACITY, APPROACH & ACCESSIBILITY. NO CLAIMS ON ACCOUNT OF NON-AVAILABILITY OF BHEL/CLIENT'S CRANE SHALL BE ENTERTAINED AT ANY POINT OF TIME.

12.1.37

FOR HEAVIER CONSIGNMENTS WEIGHING BETWEEN 55 – 70 MT I.E. SURFACE CONDENSER, BLOWER, DRIVE TURBINE ETC, CONTRACTOR HAS TO MAKE HIS OWN ARRANGEMENTS FOR SHIFTING OF THESE EQUIPMENTS FROM STORE YARD TO ERECTION SITE

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

12.2 PREPARATION OF FOUNDATIONS, AND GROUTING OF EQUIPMENT

12.2.1

BUILDING FOUNDATIONS AND OTHER NECESSARY CIVIL WORKS FOR SUPPORTING STRUCTURES, EQUIPMENTS ETC WILL BE PROVIDED BY BHEL / CUSTOMER. THE CHECKING OF DIMENSIONAL ACCURACY, AXES, ELEVATION, LEVELS ETC, WITH REFERENCE TO BENCH MARKS OF FOUNDATIONS AND ANCHOR BOLT PITS HAVE TO BE CHECKED AND LOGGED BY THE CONTRACTOR. THE PERMANENT BENCHMARK / REFERENCE MARKS WILL HAVE TO BE TRANSFERRED TO NEW LOCATIONS WITH SUFFICIENT CARE TO MAINTAIN THE ACCURACY AND PROTECTED / PRESERVED WITH ADEQUATE CARE (TO ENABLE RECHECKING AT LATER DATES) AS PER BHEL INSTRUCTION.

MINOR ADJUSTMENT OF FOUNDATION LEVEL, DRESSING AND CHIPPING OF FOUNDATION SURFACES AND BLUE-MATCHING (WHEREVER REQUIRED) FOR OF ALL EQUIPMENTS AS PER BHEL ENGINEERS INSTRUCTIONS, SHOULD BE DONE BY THE CONTRACTOR AS PART OF THE WORK. CONTRACTOR/BHEL SHALL PREPARE PROTOCOLS BEFORE TAKING OVER THE FOUNDATIONS. DRESSING AND CHIPPING OF FOUNDATIONS UPTO 35MM FOR ACHIEVING PROPER LEVELS WILL BE WITHIN THE SCOPE OF WORK/SPECIFICATION.

12.2.2

ALL TEMPORARY FOUNDATIONS AND ANCHOR POINTS REQUIRED FOR INSTALLING ERECTION EQUIPMENTS AND WINCHES, FOUNDATIONS FOR PUMPS, TANKS ETC ARE IN THE SCOPE OF CONTRACTOR. ALL BUILDING MATERIALS LIKE CEMENT, STEEL INCLUDING RE-INFORCEMENT BARS, GRITS CEMENTS ETC FOR SUCH TEMPORARY FOUNDATIONS SHALL HAVE TO BE ARRANGED BY THE CONTRACTOR WITHIN THE QUOTED RATES. ALL SUCH FOUNDATIONS SHALL BE DEMOLISHED AND NORMAL GROUND CONDITIONS RESTORED AFTER THE USAGE.

12.2.3

CONTRACTOR SHALL CARRY OUT SCRAPPING AND BLUE MATCHING OF EMBEDDED PLATES/ PACKERS. CHIPPING AND THE LEVELING OF CONCRETE SURFACES, FINE DRESSING UP TO THE EXTENT REQUIRED TO OBTAIN CONTACT BETWEEN PACKER AND CONCRETE, IS ALSO COVERED IN THE SCOPE OF THIS WORK. SCRAPPING, CHIPPING AND MATCHING SHALL BE DONE SO AS TO ACHIEVE PRESCRIBED PERCENTAGE OF CONTACT BETWEEN THE TWO SURFACES.

12.2.4

BHEL WILL PROVIDE FREE OF COST ONLY THE SHIMS AND PACKER PLATES (EITHER MACHINED OR PLAIN) WHICH GO AS PERMANENT PART OF THE EQUIPMENT. CERTAIN PACKER PLATES AND SHIMS OVER AND ABOVE THE QUANTITY RECEIVED AS A PART OF SUPPLIES FROM MANUFACTURING UNITS OF BHEL WILL HAVE TO BE CUT OUT FROM STEEL PLATES / STEEL SHEETS AT SITE TO MEET SITE REQUIREMENT. CONTRACTOR SHALL CUT AND PREPARE PACKERS AND SHIMS BY GAS CUTTING / CHISELING / GRINDING AND DE-BURR THE SAME. HOWEVER, MACHINING OF THE PACKERS WHEREVER NECESSARY SHALL BE ARRANGED BY CONTRACTOR.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter–XII: GENERAL REQUIREMENTS

12.2.5

COMPLETE GROUTING OF STRUCTURES EQUIPMENTS, INCLUDING ANCHOR/ FOUNDATION BOLTS, BENEATH BASE, BASE HOLLOWES ETC, AS MAY BE APPLICABLE, IS INCLUDED IN THE SCOPE OF CONTRACTOR. ARRANGING ALL LABOUR, BUILDING MATERIALS INCLUDING CEMENT, ORDINARY PORTLAND AS WELL AS QUICK SETTING – FREE FLOW - NON-SHRINK GROUT MIX (E.G. CONBEXTRA GP1/GP2), FORM WORK, SHUTTERING, AND ANY OTHER REQUIREMENTS IS IN THE CONTRACTOR'S SCOPE. CONTRACTOR SHALL OBTAIN APPROVAL OF BHEL FOR CEMENT (ORDINARY PORTLAND ASWELL-AS QUICK SETTING – FREE FLOW- NON-SHRINK GROUT MIX) PRIOR TO USE. CLEANING OF FOUNDATION SURFACES, POCKET HOLES AND ANCHOR BOLT PITS AND DE-WATERING AND MAKING THEM FREE OF OIL, GREASE, SAND AND OTHER FOREIGN MATERIALS BY SODA WASHING, WATER WASHING, COMPRESSED AIR AND OTHER APPROVED METHODS ARE WITHIN THE SCOPE OF THIS SPECIFICATION/ WORK.

12.2.6

AFTER THE GROUTING HAS FINALLY SET AND CURED, ALIGNMENT OF EQUIPMENTS INVOLVED SHALL BE CHECKED AGAIN TO VERIFY FOR ANY DISTURBANCE OR ANY OTHER REASON. IF REQUIRED, DE-COUPLING OF EQUIPMENTS HAS TO BE DONE FOR CONDUCTING THE VERIFICATION. IN CASE ANY DISTURBANCE IS NOTICED THE CAUSE, IF ANY, SHALL BE REMOVED AND RE-ALIGNMENT DONE AS PART OF WORK.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

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

WELDING

12.3.1

INSTALLATION OF EQUIPMENT INVOLVES GOOD QUALITY WELDING, NDE CHECKS, POST WELD HEAT TREATMENT ETC. CONTRACTOR'S PERSONNEL ENGAGED SHOULD HAVE ADEQUATE QUALIFICATION ON THE ABOVE WORKS.

12.3.2

THE METHOD OF WELDING (VIZ) ARC, TIG OR OTHER METHOD WILL BE INDICATED IN THE DETAILED DRAWING/DOCUMENTS. BHEL ENGINEER WILL HAVE THE OPTION OF CHANGING THE METHOD OF WELDING AS PER SITE REQUIREMENT.

12.3.3

WELDING OF HIGH PRESSURE JOINTS SHALL BE DONE BY IBR CERTIFIED HIGH PRESSURE WELDERS WHO HAVE BEEN PERMITTED BY CIB OF STATE CONCERNED FOR DEPLOYMENT AT THE SITE OF WORK.

12.3.4

WELDING OF ALL ATTACHMENTS TO PRESSURE PARTS, PIPING SHALL BE DONE ONLY BY THE QUALIFIED AND APPROVED WELDERS.

12.3.5

BEFORE ANY WELDER IS ENGAGED ON WORK, HE SHALL BE TESTED AND QUALIFIED BY BHEL/CUSTOMER, THOUGH THEY MAY POSSESS THE IBR/OTHER CERTIFICATE. BHEL RESERVES THE RIGHT TO REJECT ANY WELDER WITHOUT ASSIGNING ANY REASON. ALL THE EXPENDITURE IN TESTING/QUALIFICATION OF THE CONTRACTOR'S WELDER SHALL BE BORNE BY CONTRACTOR.

12.3.6

UNSATISFACTORY AND CONTINUOUS POOR PERFORMANCE MAY RESULT IN DISCONTINUATION OF CONCERNED WELDER.

12.3.7

THE WELDED SURFACE SHALL BE CLEANED OF SLAG AND PAINTED WITH PRIMER PAINT TO PREVENT RUSTING, CORROSION. FOR THIS CONSUMABLES LIKE PAINT /PRIMER ETC WILL BE IN THE CONTRACTOR'S SCOPE.

12.3.8

HP JOINT FIT-UPS, SHOULD BE PROTECTED, WHERE REQUIRED, BY USE OF TAPES/PROTECTIVE PAINT AS MAY BE PRESCRIBED BY BHEL. THE CONTRACTOR SHALL SUPPLY PROTECTIVE PAINTS/TAPES ETC

12.3.9

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

THE CONTRACTOR SHALL MAINTAIN WELDING RECORDS IN THE FORM AS PRESCRIBED BY BHEL CONTAINING ALL NECESSARY DETAILS, AND SUBMIT THE SAME TO THE BHEL ENGINEER AS REQUIRED. INTERPRETATION OF THE BHEL ENGINEER REGARDING ACCEPTABILITY OF THE WELDS SHALL BE FINAL.

12.3.10

PREHEATING, INTER-PASS HEATING, POST WELD HEATING AND STRESS RELIEVING AFTER WELDING ARE PART OF ERECTION WORK AND SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH BHEL ENGINEER'S INSTRUCTIONS. NORMALLY THE ELECTRIC RESISTANCE HEATING METHOD WILL BE ADOPTED. CONTRACTOR SHALL ARRANGE TO SUPPLY HEATING EQUIPMENT WITH AUTOMATIC RECORDING DEVICES. ALSO THE CONTRACTOR SHALL HAVE TO ARRANGE FOR LABOUR, ALL HEATING ELEMENTS, THERMOCOUPLES AND ATTACHMENT UNITS, GRAPH SHEETS, THERMAL CHALKS, & INSULATING MATERIALS LIKE MINERAL WOOL, ASBESTOS CLOTH, CERAMIC BEADS, ASBESTOS ROPES ETC, REQUIRED FOR ALL HEATING AND STRESS RELIEVING WORKS.

12.3.11

ALL THE RECORDED GRAPHS FOR HEAT TREATMENT WORKS SHALL BE THE PROPERTY OF BHEL AND SHALL BE HANDED OVER TO BHEL SITE IN-CHARGE WHEN DEMANDED.

12.3.13

JOINT FIT UP WILL BE A STAGE OF INSPECTION. WHERE REQUIRED, JOINTS SHALL BE OFFERED FOR VISUAL INSPECTION AFTER ROOT RUN. SUBSEQUENT WELDING SHOULD BE MADE ONLY AFTER THE APPROVAL OF ROOT RUN.

SOCKET WELDING

IN EXECUTION OF THIS WORK, CONSIDERABLE NUMBER OF SOCKET WELD JOINTS IS INVOLVED. THE EXACT QUANTITY OF SUCH SOCKET WELDS OR PROBABLE VARIATION IN THE QUANTUM CANNOT BE FURNISHED. THE TENDERER SHALL TAKE NOTICE OF THIS WHILE QUOTING AS NO EXTRA CLAIM ON THIS ACCOUNT WILL BE ENTERTAINED.

12.3.14

WELDING ELECTRODES HAVE TO BE STORED IN ENCLOSURES HAVING TEMPERATURE AND HUMIDITY CONTROL ARRANGEMENTS. THIS ENCLOSURE SHALL MEET BHEL SPECIFICATIONS.

12.3.15

WELDING ELECTRODES, PRIOR TO THEIR USE, CALL FOR BAKING FOR SPECIFIED PERIOD AND WILL HAVE TO BE HELD AT SPECIFIED TEMPERATURE FOR SPECIFIED PERIOD. ALSO, DURING EXECUTION, THE WELDING ELECTRODES HAVE TO BE CARRIED IN PORTABLE OVENS.

12.3.16

THE PIPING WORK COMING UNDER IBR PURVIEW (E.G. WELDING, HEAT TREATMENT OF HP JOINTS) HAS TO BE EXECUTED AS PER THE LATEST VERSION OF INDIAN BOILER REGULATION AND AMENDMENTS THEREOF. BHEL WILL FURNISH IBR DOCUMENTS AND DRAWINGS FOR PIPING &

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

FITTINGS AND FURTHER APPROVALS OF IBR/ STATUTORY AUTHORITIES FOR DRAWINGS, PRE-ASSEMBLY & ERECTION AND OTHER WORKS SHALL BE TAKEN BY CONTRACTOR.

HEAT TREATMENT:

12.3.17

FOR THE PURPOSE OF TEMPERATURE RECORDING OF STRESS RELIEVING PROCESS WHEREVER APPLICABLE, THERMOCOUPLES HAVE TO BE ATTACHED TO THE WELD JOINT. THE NUMBER OF TEMPERATURE MEASURING POINTS AND LOCATIONS SHALL BE AS PER THE STANDARDS OF BHEL. THERMOCOUPLES HAVE TO BE ATTACHED USING CAPACITOR DISCHARGE TYPE PORTABLE THERMOCOUPLE ATTACHMENT UNIT. CONTRACTOR SHALL ARRANGE SUFFICIENT NUMBER OF THERMOCOUPLE ATTACHMENT UNITS.

12.3.18

CONTRACTOR SHOULD PROVIDE TEMPERATURE INDICATOR / TEMPERATURE RECORDER FOR MEASURING TEMPERATURE DURING PRE-HEATING FOR WELDING OR FOR CONTROLLING TEMPERATURE OF METAL FOR HOT CORRECTION ETC. THE TEMPERATURE RECORDERS SHOULD BE PREFERABLY OF SOLID STATE TYPE.

12.3.19

HEAT TREATMENT MAY BE REQUIRED TO BE CARRIED OUT AT ANY TIME (DAY OR NIGHT) TO ENSURE THE CONTINUITY OF THE PROCESS. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS INCLUDING LABOURER REQUIRED FOR THE SAME AS PER DIRECTIONS OF BHEL.

12.3.20

IN CERTAIN CASES ONLY THE PRE-HEATING OF WELD JOINTS MAY BE CALLED FOR.

12.3.21

FOR WELD JOINTS OF HEAVY STRUCTURAL SECTIONS, IF HEAT TREATMENT IS REQUIRED, THE SAME SHALL BE CARRIED OUT AS PART OF THE WORK.

12.3.22

CHECKING EFFECTIVENESS OF STRESS RELIEVING BY HARDNESS TESTS (BY DIGITAL HARDNESS TESTER OR OTHER APPROVED TEST METHODS AS PER BHEL ENGINEER'S INSTRUCTION) INCLUDING NECESSARY TESTING EQUIPMENTS IS WITHIN THE SCOPE OF THE WORK / SPECIFICATION.

12.3.23

ALL THE RECORDED GRAPHS FOR HEAT TREATMENT SHALL BE HANDED OVER TO BHEL/ IBR AUTHORITIES AND DUE CLEARANCES OBTAINED.

12.3.24

RESULTS OF THESE PROCESSES SHALL BE VERIFIED/ VALIDATED AS PER REQUIREMENTS OF BHEL/CLIENT.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

NON DESTRUCTIVE EXAMINATION:

12.3.25

CONTRACTOR SHALL PROVIDE ALL RESOURCES AND MAKE ALL ARRANGEMENTS FOR THE RADIOGRAPHIC EXAMINATION OF WELDS FOR THIS WORK FOR REASONS OF SAFETY; INVARIABLY THE RADIOGRAPHY WORK WILL BE CARRIED OUT AFTER THE NORMAL WORKING HOURS AND CLOSE OF OTHER SITE ACTIVITIES ONLY. IN THIS REGARD, THE CONTRACTOR HAS TO ADHERE TO THE SAFETY RULES / REGULATIONS LAID BY BARC AUTHORITIES FROM TIME TO TIME.

12.3.26

RADIOGRAPHY INSPECTION OF WELDS SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS AND RECOMMENDATION OF BHEL ENGINEER. THE MINIMUM QUANTUM OF RADIOGRAPHIC INSPECTION SHALL BE AS PER PROVISION OF IBR/BHEL'S ERECTION DOCUMENTS. THEY MAY, HOWEVER BE INCREASED DEPENDING UPON THE PERFORMANCE OF THE INDIVIDUAL WELDER AT THE DISCRETION OF BHEL ENGINEER/BOILER INSPECTING AUTHORITY. BIDDER SHALL ALSO ARRANGE THE UT EQUIPMENT WITH RECORDING FACILITY AT HIS OWN COST. USAGE OF UT EQUIPMENT SHALL BE AS PER DIRECTION OF BHEL ENGINEER. RECORDS OF UT SHALL BE PRODUCED AS PER SITE REQUIREMENT.

12.3.27

ALL X-RAY / GAMMA RAY FILMS OF WELD JOINTS SHALL BE PRESERVED PROPERLY AND BE HANDED OVER TO BHEL AND REQUISITE CLEARANCES SHALL BE OBTAINED BY THE CONTRACTOR.

12.3.28

THE FIELD WELDED JOINTS SHALL BE SUBJECT TO DYE-PENETRANT/MPT/RT/ OTHER NON-DESTRUCTIVE EXAMINATION AS SPECIFIED IN THE RESPECTIVE ENGINEERING DOCUMENTS/ AS INSTRUCTED BY BHEL.

12.3.29

WHEREVER REQUIRED, SURFACE PREPARATION, LIKE SMOOTH GRINDING OF WELDED AREA, PRIOR TO RADIOGRAPHY SHALL BE DONE. IT MAY ALSO BECOME NECESSARY TO ADOPT INTER-LAYER RADIOGRAPHY/MPT/UT DEPENDING UPON THE SITE/ TECHNICAL REQUIREMENT NECESSITATING INTERRUPTIONS IN CONTINUITY OF THE WORK AND MAKING NECESSARY ARRANGEMENTS FOR CARRYING OUT THE ABOVE WORK. THE CONTRACTOR SHALL TAKE ALL THIS INTO ACCOUNT IN HIS OFFER. THE REQUIRED NDT METHOD/PROCEDURE WILL BE DECIDED BY BHEL ENGINEER AT SITE.

12.3.30

TENDERER SHALL NOTE THAT 100% RADIOGRAPHY SHALL BE TAKEN ON ALL HIGH PRESSURE WELDING TILL SUCH TIME THE WELDERS' PERFORMANCE IS FOUND BY BHEL ENGINEERS TO BE SATISFACTORY. SUBSEQUENTLY, SUBJECT TO CONSISTENCY IN WELDER'S PERFORMANCE, THE PERCENTAGE OF RADIOGRAPHY WILL BE BASED ON BHEL'S STANDARD PRACTICE/CODE REQUIREMENT. THE DEFECTS SHALL BE RECTIFIED IMMEDIATELY AND TO THE SATISFACTION OF BHEL ENGINEER. THE DECISION OF BHEL ENGINEER REGARDING ACCEPTANCE / REJECTING THE JOINTS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.3.31

100% RADIOGRAPH OF CERTAIN SIZES IN PIPING HAVE TO BE TAKEN AS PER BHEL STANDARDS/ DRAWINGS.

12.3.32

FOR CARRYING OUT ULTRASONIC TESTING OF WELDING JOINTS OF LARGE SIZE TUBES AND PIPES, IT WILL BE NECESSARY TO PREPARE SURFACE BY GRINDING AND BUFFING A SMOOTH FINISH AND CONTOUR AS NECESSARY. THE CONTRACTOR'S SCOPE OF WORK INCLUDES SUCH PREPARATION AS INCIDENTAL TO WORK.

12.3.33

CONTRACTOR MAY HAVE TO UNDERTAKE RADIOGRAPHY WITH COBALT-60 ISOTOPE CAMERA IN CERTAIN CASES. HOWEVER, FOR ANY REASON IF USE OF COBALT-60 IS NOT POSSIBLE THEN THESE JOINTS SHALL BE CHECKED BY RADIOGRAPHY AFTER COMPLETION OF WELDING UP TO SUITABLE PART OF THICKNESS WITH IR-192 OTHER SUITABLE SOURCE SUBSEQUENTLY AFTER COMPLETING THE JOINT UT TO BE DONE. FOR THIS CONTRACTOR HAS TO DEPLOY LEVEL-II OPERATOR CERTIFIED BY BARC.

12.3.34

NO SEPARATE PAYMENT FOR ANY NDE ACTIVITIES (INCLUDING RADIOGRAPHY) WILL BE MADE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.4 CONDENSER INSTALLATION

12.4.1

SURFACE CONDENSER WEIGHING ABOUT 58 MT HAS BEEN RECEIVED FROM BHEL MANUFACTURING UNIT IN ASSEMBLED CONDITION. CONTRACTOR SHALL HAVE TO CARRY OUT FURTHER WORKS LIKE LOCAL TRANSPORTATION UP TO FOUNDATION, HANDLING, LIFTING, POSITIONING & PLACEMENT, FIXING AND ALIGNMENT ETC. HOWEVER OTHER PARTS LIKE CONDENSER TUBES, HOT WELL ASSY, DOME ASSY, STRAND PIPES, SURGE PIPES, COLLAR/SLEEVE PIPE, TOP CONNECTING PIECE, STAINLESS STEEL BELLOWS, FOUNDATION PARTS, AIR EXTRACTION PIPES, ETC–WILL BE SENT LOOSE. THE ASSEMBLED CONDENSER SHELL ASSY IS TO BE HANDLED AT SITE INCLUDING UNLOADING FROM THE TRAILER, TRANSPORTATION TO SITE OF WORK, LIFTING, POSITIONING & PLACEMENT ON FOUNDATION IN TURBINE HALL BY CONTRACTOR USING HIS OWN REQUIRED CAPACITY CRANE/ SUITABLE ARRANGEMENT. ASSEMBLY AND WELDING OF OTHER LOOSE PARTS LIKE HOT-WELL, COLLAR/SLEEVE, SS BELLOWS STAND/SURGE PIPES, TOP CONNECTING PIPE TO TURBINE EXHAUST HOOD COUNTER FLANGE, INSERTION, EXPANSION, FLARING OF CONDENSER TUBES SHALL BE CARRIED OUT AT SITE. WELDING OF TOP CONNECTING PIPE TO COUNTER FLANGE OF TURBINE EXHAUST HOOD WILL BE CARRIED OUT AFTER FINAL ALIGNMENT AND LEVELLING OF TURBINE, & AS PER THE SEQUENTIAL WELDING PROCEDURE.

12.4.2

IT WILL REQUIRE CLEANING OF WATER SIDE SURFACE, OPENING OF MANHOLE/WATER BOX COVERS & RETIGHTEN THE SAME AFTER REPLACEMENT OF PACKING/GASKETS, CARRY OUT HYDRAULIC TEST & WATER FILL TEST ON STEAM SIDE AND WATER SIDE SPACE. ALL ABOVE SHALL BE CARRIED BY CONTRACTOR INCLUDING ATTENDING THE LEAKAGES (IF ANY) AS PART OF WORK UNDER THIS TENDER SPECIFICATION.

12.4.3

ALL WATER SIDE SURFACES OF WATER CHAMBERS SHALL BE PAINTED ONLY AFTER COMPLETION OF WORK AND WATER FILL TEST/ HYDRO TEST. WELDING & INTERFACING OF CONDENSER COOLING WATER CONNECTION FROM CUSTOMER TERMINAL POINT WILL BE DECIDED BY BHEL ENGINEER AT SITE AND SHALL BE BINDING ON CONTRACTOR.

12.4.4

FOR SURFACE PREPARATION, THE WATER BOXES ETC., MAY HAVE TO BE SAND/SHOT BLASTED TO REMOVE ALL TRACES OF SHOP COAT OF PRIMER. THE SPECIFIED PRIMER & PROTECTIVE PAINT AS SPECIFIED (QUALITY AND FINAL DRY FILM THICKNESS) IN ERECTION DOCUMENTS SHALL BE APPLIED. PRIMER AND PAINT SHALL BE PROVIDED BY THE CONTRACTOR.

12.5 TURBO BLOWER INSTALLATION

BLOWER OF EACH UNIT WEIGHING ABOUT 65 MT HAS BEEN RECEIVED FROM BHEL MANUFACTURING UNIT (MAN TURBO SUPPLY) IN FULLY ASSEMBLED CONDITION ON PERMANENT BASE FRAME. CONTRACTOR SHALL HAVE TO CARRY OUT FURTHER WORKS LIKE LOCAL TRANSPORTATION UP TO

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

FOUNDATION, HANDLING, LIFTING, POSITIONING & PLACEMENT, FIXING AND ALIGNMENT ETC OF THE TURBO BLOWER ON FOUNDATION IN TURBINE HALL AND FURTHER ERECTION, TESTING & COMMISSIONING ACTIVITIES.

CONTRACTOR SHALL USE HIS OWN LIFTING TOOLS & TACKLES / CRANE OF SUITABLE CAPACITY WITH OTHER REQUIRED ARRANGEMENTS FOR THE ENTIRE SCOPE OF WORK. HOWEVER BHEL'S CUSTOMER IS HAVING ELECTRIC OVERHEAD TRAVELLING (EOT) CRANE WITHIN THE TURBINE HALL AND FACILITY OF THIS EOT CRANE WILL BE EXTENDED FREE OF HIRE CHARGES FOR THE ERECTION OF TURBINES AND TURBO BLOWER EQUIPMENTS UNDER THIS TENDER SPECIFICATION DEPENDING ON AVAILABILITY, LIFTING CAPACITY, APPROACH & ACCESSIBILITY. NO CLAIMS ON ACCOUNT OF NON-AVAILABILITY OF BHEL/CLIENT'S CRANE SHALL BE ENTERTAINED AT ANY POINT OF TIME

12.6 STEAM TURBINES INSTALLATION

12.6.1

STEAM TURBINES ALONG WITH CASING, ROTOR, BEARINGS, BASE FRAME ETC. TOTAL WEIGHING ABOUT 57 MT FOR EACH UNIT WILL HAS BEEN RECEIVED FROM BHEL MANUFACTURING UNIT IN FULLY ASSEMBLED CONDITION. CONTRACTOR SHALL HAVE TO CARRY OUT FURTHER WORKS LIKE LOCAL TRANSPORTATION UP TO FOUNDATION, HANDLING, LIFTING, POSITIONING & PLACEMENT, FIXING AND ALIGNMENT ETC. THE SERVICES OF CUSTOMERS EOT CRANE WILL BE EXTENDED FREE OF CHARGES SUBJECT TO ITS AVAILABILITY, ACCESSIBILITY, SUITABILITY AND APPROACHABILITY. THE KEEPING IN VIEW THE MARGINAL LIFTING & HANDLING CAPACITY OF CUSTOMER EOT CRANE FOR LIFTING OF STEAM TURBINE, CONTRACTOR MAY HAVE TO DISMANTLE THE TURBINE BASE FRAME, TOP COVER, BEARINGS ETC. CONTRACTOR SHALL CARRY OUT THIS JOB BY USING HIS OWN T&P AND FABRICATE SUITABLE TEMPORARY FIXTURE/SUPPORTS BY PROVIDING REQUIRED QUANTITY STEEL MATERIALS LIKE ISMB BEAM/ANGLES SECTIONS TO KEEP STEAM TURBINE ON THIS TEMPORARY SUPPORTS/FIXTURE AND RE-ASSEMBLE THE TURBINE ON DISMANTLED PERMANENT BASE FRAME AFTER THEIR LIFTING AND PLACEMENT ON FOUNDATION. CONTRACTOR SHALL UTMOST CARE TO DISMANTLE, FABRICATE TEMPORARY SUPPORT/FIXTURE AND RE-ASSEMBLE THE STEAM TURBINE AND ALL THESE WORKS SHALL BE THE PART OF SCOPE OF ERECTION. CONTRACTOR SHALL HAVE TO CARRY OUT FURTHER WORKS LIKE HANDLING, LIFTING, POSITIONING & PLACEMENT OF THE STEAM TURBINE ON FOUNDATION IN TURBINE HALL AND FURTHER ERECTION, TESTING & COMMISSIONING WORKS.

12.6.2

GEAR BOX, FOUNDATION PARTS/BASE PLATES, TURBO-VISORY INSTRUMENTS LIKE PROXIMITORS/PROBES AND OTHER ASSOCIATED ITEMS/AUXILIARIES WILL BE SENT LOOSE SEPARATELY. CONTRACTOR SHALL CARRY OUT ERECTION, ASSEMBLY, PROVIDING PROTECTIVE FLEXIBLE CONDUIT AS REQUIRED FOR SUCH INSTRUMENTS LIKE PROXIMITORS/PROBES, RTDS ETC AND TESTING.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.7 OTHER ROTATING MACHINES INSTALLATION

12.7.1

ALL ROTATING MACHINERY AND EQUIPMENTS SHALL BE CLEANED, LUBRICATED, CHECKED FOR THEIR SMOOTH ROTATION, IF NECESSARY, BY DISMANTLING AND RE-FITTING BEFORE ERECTION. IF IN THE OPINION OF BHEL ENGINEER, THE EQUIPMENT IS TO BE CHECKED FOR CLEARANCES, TOLERANCES AT ANY STAGE OF THE WORK OR DURING TESTING, PRE-COMMISSIONING, FACILITIES FOR DISMANTLING, CLEANING, LUBRICATING AND RE-FITTING SHALL BE PROVIDED BY THE CONTRACTOR. ALL ROTATING MACHINES SHAFT SHALL BE ROTATED PERIODICALLY TO AVOID BOWING OF SHAFTS.

12.7.2

TRIAL RUN OF THE DRIVE IN UN-COUPLED STATE AND THEN COUPLED WITH EQUIPMENT HAS TO BE DONE AFTER NECESSARY ALIGNMENT ETC

12.7.3

FORCED LUBE OIL SYSTEMS OF MOTORS AND/OR ROTATING EQUIPMENTS FORM THE PART OF WORK UNDER THIS SPECIFICATION

12.7.4

PERFORMANCE OF HYDRO TEST OF OIL COOLERS AND AIR COOLERS OF ROTATING MACHINES, IF ANY, IS INCLUDED IN THE SCOPE OF WORK.

12.7.5

DURING CHARGING OF SYSTEM IF ANY LEAKAGE IS FOUND IN OIL COOLER, AIR COOLER, SAME SHALL BE ATTENDED BY CONTRACTOR. BHEL WILL PROVIDE NECESSARY GASKETS ETC.

12.7.6

CERTAIN ROTATING MACHINERY AFTER, INITIAL RUNS AND COMMISSIONING OF THE EQUIPMENT, MAY HAVE TO BE HOT ALIGNED.

12.7.7

PROTECTIVE LUBRICANT COATS/FILL PROVIDED ON THE CRITICAL AREA OF EQUIPMENTS HAVE TO REMOVED AT APPROPRIATE STAGE AND REGULAR LUBRICANTS, AFTER REMOVAL/CLEANING OF PROTECTIVE COAT/FILL, AS PER SPECIFICATIONS SHOULD BE FILLED/APPLIED. CLEANING/FLUSHING AGENTS/OILS WILL BE PROVIDED BY BHEL.

12.7.8

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 RE-SETTING / RE-ALIGNMENT / HOT-ALIGNMENT. CONTRACTOR WILL HAVE TO ARRANGE LABOUR FOR DISCONNECTING CONTROL AND POWER CABLING AS PER BHEL ENGINEER'S INSTRUCTIONS AND CLEARANCE AND RECONNECT THE CONTROL AND POWER CABLING AFTER RE-ALIGNMENT, QUOTED TONNAGE RATE SHALL BE INCLUSIVE OF THE ABOVE.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.7.9

EVEN THOUGH ROTATING MACHINES MAY BE GROUTED TO FOUNDATION USING NON-SHRINK GROUT MIX, BLUE MATCHING OF PACKER PLATES/SHIMS WITH FOUNDATION/BETWEEN PACKERS/EQUIPMENT BASE SHOULD BE DONE WHEREVER INSTRUCTED BY BHEL ENGINEER.

24.0.10

VITAL CLEARANCES OF SHOP ASSEMBLED ROTATING MACHINES SHOULD BE CHECKED AT SITE AND ADJUSTED IF REQUIRED.

12.8 TESTING, PRE-COMMISSIONING, COMMISSIONING AND PG TEST

12.8.1

TESTING, PRE-COMMISSIONING, & COMMISSIONING WILL INVOLVE, THOUGH NOT LIMITED TO THESE, VARIOUS TESTING, TRIAL RUNS OF VARIOUS EQUIPMENTS ERECTED AND SYSTEMS INSTALLED, FLUSHING OF THE LINES BY AIR, OIL OR STEAM AS THE CASE MAY BE, CHEMICAL CLEANING OF VARIOUS SYSTEMS & PIPING, OIL-FLUSHING, STEAM BLOWING OF THE PIPE LINES, STEAM ROLLING, COMBINED OPERATION, TRIAL OPERATION ETC, ARE SOME OF THESE ACTIVITIES. ALL THE ACTIVITIES FOR COMMISSIONING OF THE SET, AS INFORMED BY BHEL FROM TIME TO TIME SHALL BE COMPLETED.

12.8.2

ALL THE ABOVE TESTS MAY HAVE TO BE REPEATED TILL ALL THE EQUIPMENTS SATISFY THE REQUIREMENT/ OBLIGATIONS OF BHEL TO THEIR CLIENT AND ALSO THE RELEVANT STATUTORY AUTHORITY.

12.8.3

FOR THE PURPOSE OF CHEMICAL CLEANING, STEAM BLOWING, OIL FLUSHING & HYDRAULIC TEST OF PIPING, CONTRACTOR SHALL LAY/INSTALL NECESSARY TEMPORARY PIPING, VALVES FOR CONDUCT OF HYDRAULIC TEST, OIL FLUSHING, CHEMICAL CLEANING, STEAM BLOWING ETC THIS MAY INVOLVE CUTTING OF SOME PORTION OF EXISTING PIPING/VALVES, PLACING OF RUBBER WEDGES/ BLANKS IN THE VALVES AND OTHER OPENINGS, INSTALLATION OF TEMPORARY TANKS FOR CHEMICAL MIXING, TEMPORARY ACCESS PLATFORMS TO MIXING TANKS ETC WHERE REQUIRED, BENDS HAVE TO BE FABRICATED AT SITE FROM RUNNING LENGTH OF PIPE. TEMPORARY INSTALLATION ITSELF HAS TO BE TESTED, TRIED, AND SUBJECT TO NON-DESTRUCTIVE EXAMINATIONS AS PER THE INSTRUCTIONS OF BHEL AS PART OF WORK.

12.8.4

ALL MATERIALS, EQUIPMENTS NECESSARY FOR INSTALLATION OF TEMPORARY SYSTEM AS ABOVE WILL BE SUPPLIED BY BHEL IN RANDOM SIZES/LENGTHS. HOWEVER, SERVICING, FABRICATION, ERECTION, DISMANTLING OF THE SAME AFTER COMPLETION OF THE PROCESS, AND HANDING OVER BACK TO BHEL STORES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL TEMPORARY DUMMY/BLANK FLANGES, FITTINGS & FIXTURES AND TEMPORARY SUPPORTS REQUIRED TO CARRY OUT STEAM BLOWING, CHEMICAL CLEANING, OIL FLUSHING AND HYDRAULIC TEST WILL BE ARRANGED BY CONTRACTOR.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.8.5

FABRICATION, FIT-UP, WELDING, AND POST-WELD-HEAT TREATMENT IF ANY, OF REQUISITE BLANKS FOR CONDUCT OF HYDRAULIC TEST IS PART WORK. SIMILARLY, REMOVAL OF BLANKS, RESTORATION AND NORMALISATION OF THE CONCERNED SYSTEM/LINE IS TO BE DONE AS PART OF WORK. BHEL WILL PROVIDE THE MATERIAL FOR BLANKS FREE OF CHARGE. NO SEPARATE PAYMENT IS ENVISAGED FOR THESE ACTIVITIES.

12.8.6

OVERHAULING, CLEANING, SERVICING OF TANKS, PUMPS, EQUIPMENTS, VALVES, DURING ERECTION AND COMMISSIONING STAGES ARE IN THE SCOPE OF WORK. GASKETS, PACKING FOR REPLACEMENT WILL BE PROVIDED BY BHEL.

12.8.7

AFTER CHEMICAL CLEANING/PICKLING OF LUBRICATING SYSTEM (INCLUDING OIL PIPING, OIL TANK AND OTHER FITTINGS) OF STEAM TURBINES, TURBO BLOWERS, ROTATING MACHINES ETC, OIL FLUSHING FOR LUBRICATING SYSTEMS AS PER INSTRUCTIONS OF BHEL ENGINEER SHALL BE CARRIED OUT. CLEANING OF OIL TANK OF LUBRICATING OIL SYSTEM BEFORE AND AFTER OIL FLUSHING IS IN THE SCOPE OF WORK.

12.8.8

BHEL PSWR WILL PROVIDE OIL FOR FLUSHING, FRESH OIL FOR FILLING & TOPPING, UP TO TRAIL OPERATION COMPLETION. RECEIPT & HANDLING AT STORE/STORAGE YARD AND TAKING THE DELIVERY OF FLUSHED OIL, FRESH OIL BARRELS FROM STORES/STORAGE YARD FOR ENTIRE OPERATIONS OF FLUSHING, FILLING & TOPPING UP, RETURNING OF FLUSHED OIL, FRESH OIL EMPTY/UNUSED/PARTLY USED BARRELS ETC. TO BHEL STORES AFTER COMPLETION OF OPERATIONS SHALL BE THE PART THE SCOPE OF WORK. NO SEPARATE PAYMENT ON THIS ACCOUNT WILL BE MADE. SIMILARLY, FOR VARIOUS PRE-COMMISSIONING/ COMMISSIONING ACTIVITIES / PROCESSES MENTIONED IN VARIOUS CLAUSES, TRANSPORT OF CHEMICALS FROM BHEL/ CUSTOMER'S STORES, CHARGING OF CHEMICALS INTO THE SYSTEM AND RETURNING OF REMAINING AND/OR THE EMPTY CONTAINERS OF THE CHEMICALS TO CUSTOMER/BHEL STORES IS THE RESPONSIBILITY OF THE CONTRACTOR.

12.8.9

DURING PRE-COMMISSIONING/ COMMISSIONING, REPLACING/ CHANGING MECHANICAL/ OTHER SEALS OF EQUIPMENTS, PUMPS, REMOVAL AND CLEANING/REPLACING OF FILTERS ETC IS WITHIN THE SCOPE OF WORK. ITEMS REQUIRED FOR REPLACEMENT/CHANGE WILL BE PROVIDED BY BHEL.

12.8.10

IN CASE ANY DEFECT IS NOTICED DURING TESTS, TRIAL RUNS OF STEAM TURBINES AND TURBO-BLOWER SETS & ITS AUXILIARIES SUCH AS LOOSE COMPONENTS, UNDUE NOISE OR VIBRATION, STRAIN ON CONNECTED EQUIPMENT ETC, THE CONTRACTOR SHALL IMMEDIATELY ATTEND TO THESE DEFECTS AND TAKE NECESSARY CORRECTIVE MEASURES. IF ANY READJUSTMENT AND REALIGNMENT

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

ARE NECESSARY, THE SAME SHALL BE DONE AS PER BHEL ENGINEER'S INSTRUCTIONS. CLAIM, IF ANY, FOR THESE WORKS FROM THE CONTRACTOR SHALL BE GOVERNED AS PER RELEVANT CLAUSES OF GCC

12.8.11

CONTRACTOR SHALL CUT/OPEN WORK, IF NEEDED, AS PER BHEL ENGINEER'S INSTRUCTIONS DURING COMMISSIONING FOR INSPECTION, CHECKING AND MAKE GOOD THE WORKS AFTER INSPECTION IS OVER.

I)

SIMILARLY, DURING THE COURSE OF ERECTION, IF CERTAIN PORTION OF EQUIPMENT'S ERECTED BY THE CONTRACTOR HAS TO BE UNDONE FOR ENABLING OTHER CONTRACTORS/AGENCIES OF BHEL/CUSTOMER TO CARRY OUT THEIR WORK, CONTRACTOR SHALL CARRY OUT SUCH JOBS EXPEDITIOUSLY AND PROMPTLY AND MAKE GOOD THE JOB AFTER COMPLETION OF WORK BY OTHER CONTRACTOR'S/ AGENCIES OF BHEL/CUSTOMER AS PER BHEL ENGINEER'S/AGENCIES OF BHEL/CUSTOMERS INSTRUCTIONS. CLAIMS, IF ANY, IN THIS REGARD SHALL BE GOVERNED AS PER RELEVANT CLAUSES OF GCC

12.8.12

DURING THIS PERIOD, THOUGH BHEL/ CLIENT'S STAFF WILL ALSO BE ASSOCIATED IN THE WORK, THE CONTRACTOR'S RESPONSIBILITY WILL BE TO ARRANGE FOR COMPLETE REQUIREMENT OF MEN AND REQUIRED TOOLS AND PLANTS, CONSUMABLES, SCAFFOLDING AND APPROACHES ETC, TILL SUCH TIME THE COMMISSIONED UNIT IS TAKEN OVER BY BHEL'S CLIENT.

12.8.13

COMMISSIONING ACTIVITIES WILL CONTINUE TILL THE COMPLETION OF TRIAL RUN/PG TEST FOR ERECTION WORKS. DURING THIS PERIOD CONTRACTOR SHALL MAKE AVAILABLE THE SERVICES OF SEPARATE DEDICATED LABOUR-FORCE COMPRISING OF SUITABLE SKILLED AND SEMI/UN-SKILLED HANDS ALONG WITH NECESSARY TOOLS AND PLANTS, CONSUMABLES ETC

12.8.14

IT SHALL BE SPECIFICALLY NOTED THAT THE CONTRACTOR MAY HAVE TO WORK ROUND THE CLOCK DURING THE PRE-COMMISSIONING AND COMMISSIONING PERIOD ALONG WITH BHEL ENGINEERS AND HENCE CONSIDERABLE OVERTIME PAYMENT IS INVOLVED. THE CONTRACTOR'S QUOTED RATES SHALL BE INCLUSIVE OF ALL THESE FACTORS.

12.8.15

THE CONTRACTOR SHALL CARRY OUT ANY OTHER TESTS AS DESIRED BY BHEL ENGINEER ON ERECTED EQUIPMENT COVERED UNDER THE SCOPE OF THIS CONTRACT DURING TESTING, PRE-COMMISSIONING AND COMMISSIONING, TO DEMONSTRATE THE COMPLETION OF ANY PART OR WHOLE OF WORK PERFORMED BY THE CONTRACTOR.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.8.16

ASSISTANCE FOR PG TEST

THE CONTRACTOR SHALL PROVIDE ASSISTANCE FOR CONDUCTING PERFORMANCE GUARANTEE (PG) TEST TO BHEL AS A PART OF HIS REGULAR SCOPE OF WORK. THIS SHALL INCLUDE MANPOWER ASSISTANCE, SMALL T&P, PROVIDING ACCESS PLATFORMS/ SCAFFOLDING/LADDERS, LIGHTING ARRANGEMENTS AND OTHER ENABLING FACILITIES ASSOCIATED WITH TYPICAL PG TEST ACTIVITY.

12.9 PAINTING

12.9.1

COMPONENTS OF THE STEAM TURBINES & TURBO-BLOWER BOILERS WITH ASSOCIATED AUXILIARIES, PIPING AND OTHER EQUIPMENTS WITH ACCESSORIES ETC. WILL IN GENERAL BE SUPPLIED BY BHEL WITH ONE COAT OF PRIMER AND TWO COATS OF FINISH PAINT APPLIED AT THE MANUFACTURING SHOP; CONTRACTOR SHALL APPLY ONE COAT OF FINISH PAINT ON ALL SUCH COMPONENTS (WHICH ARE NOT INSULATED) AFTER ERECTION AT SITE UNLESS AND OTHERWISE THE SHOP COATING IS DAMAGED IN THE MEANWHILE. THE TENTATIVE TYPES OF PAINTS INVOLVED FOR FINAL PAINTING ARE SYNTHETIC ENAMEL, EPOXY, HEAT RESISTANT ALUMINIUM, CHLORINATED RUBBER PAINTS ETC. HOWEVER, THE FINAL TYPE OF PAINTS AND THICKNESS OF COATS SHALL BE AS PER DRAWINGS & CUSTOMER REQUIREMENTS AT SITE.

12.9.2

IN ADDITION TO COMPONENTS/EQUIPMENT AS ABOVE, THERE COULD BE LIMITED FEW WITHOUT ANY PRIOR PROTECTIVE COATING. SUCH COMPONENTS SHALL FIRST BE THOROUGHLY CLEANED OF ALL DIRT, RUST, SCALE, GREASE, OIL AND OTHER SURFACE DEPOSITS BY WIRE BRUSHING, SCRAPING, WASHING, WIPING WITH SOLVENT OR ANY APPROPRIATE METHOD AND THE SAME BEING INSPECTED AND APPROVED BY BHEL FOLLOWED BY APPLICATION OF ONE COAT OF PRIMER. AFTERWARDS, THE ABOVE PARTS SHALL BE OVER-COATED WITH TWO LAYERS OF SPECIFIED PAINT AS PER APPLICATION PROCEDURE PRESCRIBED BY THE PAINT MANUFACTURER.

12.9.3 TOUCH-UP PAINTING ON DAMAGED AREAS -

- a) FOR COATINGS DAMAGED UP TO METAL SURFACE

SURFACE PREPARATION SHALL BE CARRIED OUT BY MANUAL CLEANING. MINIMUM 6 INCHES ADJOINING AREA WITH EXISTING COATING SHALL BE ROUGHENED BY WIRE BRUSHING, EMERY PAPER RUBBING ETC., FOR BEST ADHESION OF PATCH PRIMER.

PRIMER COAT OF TOUCH-UP PRIMER TO BE APPLIED BY BRUSH IMMEDIATELY AFTER THE SURFACE PREPARATION.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

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.

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.

12.9.4

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.

12.9.5

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. APPLICABLE PAINTS AND PRIMER SHALL BE SUPPLIED BY BHEL.

12.9.6

ALL EXPOSED METAL PARTS OF THE EQUIPMENT INCLUDING PIPING, STRUCTURES, HAND RAILING, GRATING ETC SHALL BE THOROUGHLY CLEANED OFF DUST, RUST, SCALES AND OTHER FOREIGN MATERIALS BY MANUAL OR MECHANIZED WIRE BRUSHING, SCRAPPING, SAND BLASTING ETC AND THE SAME BEING INSPECTED AND APPROVED BY BHEL/CUSTOMER ENGINEER BEFORE APPLICATION OF PRIMER. AFTERWARDS, THE ABOVE PARTS SHALL BE FINISH PAINTED WITH SPECIFIED NUMBER OF COATS AS PER SPECIFICATION.

12.9.7

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.9.8

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.

12.9.9

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. BHEL WILL MAKE AVAILABLE ONLY THE PRIMER AND PAINTS FREE OF ANY CHARGE TO CONTRACTOR.

12.9.10

SPECIFIED DRYING TIME SHALL BE PERMITTED FROM ONE TO ANOTHER COAT.

12.9.11

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.

12.9.12

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.

12.9.13

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.

12.9.14

IN GENERAL, PAINTING OF STRUCTURAL PARTS AND COLOUR BANDS, LETTERING, MARKING OF DIRECTION OF FLOW/ROTATION ETC WILL BE CARRIED OUT BY BRUSH PAINTING. HOWEVER, AREAS/EQUIPMENTS INACCESSIBLE FOR MANUAL PAINTING HAVE TO BE PAINTED BY SPRAY PAINTING. THE DECISION OF BHEL ENGINEER, IN THIS REGARD, SHALL BE FINAL AND BINDING ON THE CONTRACTOR. 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.

12.9.15

THE CONTRACTOR SHALL PROVIDE ALL THE NECESSARY SCAFFOLDING MATERIALS, TEMPORARY STRUCTURES AND NECESSARY SAFETY DEVICES ETC, DURING EXECUTION OF THE WORK.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.9.16

FINAL PAINTING WORK SHALL BE STARTED AFTER OBTAINING CLEARANCE FROM BHEL ENGINEERS AND AS PER HIS INSTRUCTIONS.

PRIMER AND PAINTS FOR FINAL PAINTING

ALL PRIMER AND PAINTS REQUIRED FOR FINAL PAINTING SHALL BE SUPPLIED BY BHEL FREE OF CHARGES.

THE CONTRACTOR, HOWEVER, SHALL PROVIDE ACCOUNT OF ALL THE ITEMS ISSUED TO HIM AND RETURN ALL PRIMER, PAINTS ETC REMAINING EXTRA OVER THE NORMAL REQUIREMENT WITH PROPER IDENTIFICATION TAGS IN A PACKED CONDITION TO BHEL STORES. IN CASE OF ANY MISUSE OR EXCESS USE OVER THE NORMAL REQUIREMENT, BHEL RESERVES THE RIGHT TO RECOVER THE COST OF SUCH MISUSE/ EXCESS USE. DECISION OF BHEL ENGINEER IN THIS REGARD WILL BE FINAL AND BINDING ON THE CONTRACTOR.

12.10 GENERAL RESPONSIBILITY OF THE CONTRACTOR

THE CONTRACTOR SHALL HAVE TOTAL RESPONSIBILITY FOR ALL EQUIPMENT AND MATERIALS IN HIS CUSTODY AT CONTRACTOR'S STORES, LOOSE, SEMI-ASSEMBLED, ASSEMBLED OR ERECTED BY HIM AT SITE. HE SHALL EFFECTIVELY PROTECT THE FINISHED WORKS FROM ACTION OF WEATHER AND FROM DAMAGES OR DEFACEMENT AND SHALL ALSO COVER THE FINISHED PARTS IMMEDIATELY ON COMPLETION OF WORK AS PER BHEL ENGINEER'S INSTRUCTIONS. THE MACHINE SURFACES/FINISHED SURFACES SHOULD BE GREASED AND COVERED.

12.11 PRESERVATION & PROTECTION OF COMPONENTS

12.11.1

AT ALL STAGES OF WORK, EQUIPMENTS/MATERIALS IN THE CUSTODY OF CONTRACTOR, INCLUDING THOSE ERECTED, WILL HAVE TO BE PRESERVED AS PER THE INSTRUCTIONS OF BHEL. NECESSARY PRESERVATION AGENTS INCLUDING THE PRIMER & PAINT, FOR THE ABOVE WORK SHALL BE PROVIDED BY THE CONTRACTOR.

12.11.2

THE CONTRACTOR SHALL MAKE SUITABLE SECURITY ARRANGEMENTS INCLUDING EMPLOYMENT OF SECURITY PERSONNEL AND ENSURE PROTECTION OF ALL MATERIALS/ EQUIPMENT IN THEIR CUSTODY AND INSTALLED EQUIPMENTS FROM THEFT/FIRE/PILFERAGE AND ANY OTHER DAMAGES AND LOSSES.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.11.3

CONTRACTOR SHALL COLLECT ALL SCRAP MATERIALS PERIODICALLY FROM VARIOUS AREA OF WORK SITE, DEPOSIT THE SAME AT ONE PLACE EARMARKED AT SITE OR SHIFT THE SAME TO A PLACE EARMARKED IN BHEL/ CLIENT'S STORES. IN CASE OF FAILURE OF CONTRACTOR IN COMPLIANCE OF THIS REQUIREMENT, BHEL WILL MAKE SUITABLE ARRANGEMENT AT CONTRACTOR'S RISK AND COST.

12.11.4

THE ENTIRE SURPLUS, DAMAGED, UNUSED MATERIALS, PACKAGING MATERIALS / CONTAINERS, SPECIAL TRANSPORTING FRAMES, GUNNY BAGS, ETC SHALL BE RETURNED TO BHEL STORES BY THE CONTRACTOR.

12.11.5

THE CONTRACTOR SHALL NOT WASTE ANY MATERIALS ISSUED TO HIM. IN CASE IT IS OBSERVED AT ANY STAGE THAT THE WASTAGE/EXCESS UTILISATION OF MATERIALS IS NOT WITHIN THE PERMISSIBLE LIMITS, RECOVERY FOR THE EXCESS QUANTITY USED OR WASTED WILL BE EFFECTED WITH DEPARTMENTAL CHARGES FROM THE CONTRACTOR. DECISION OF BHEL ON THIS WILL BE FINAL AND BINDING ON THE CONTRACTOR.

12.11.6

FOR ANY CLASS OF WORK FOR WHICH NO SPECIFICATIONS HAVE BEEN LAID DOWN IN THESE SPECIFICATIONS, WORK SHALL BE EXECUTED AS PER THE INSTRUCTIONS OF BHEL.

12.12 COMMON REQUIREMENTS

12.12.1

ALL WELDED JOINTS SHOULD BE PAINTED WITH ANTICORROSIVE PAINT IMMEDIATELY AFTER COMPLETION OF RADIOGRAPHY AND STRESS RELIEVING WORKS. NECESSARY PAINTS AND OTHER CONSUMABLES FOR THE ABOVE WORK ARE IN THE SCOPE OF THE CONTRACTOR.

12.12.2

SUSPENSIONS/SUPPORTS FOR TUBES/PIPING, ETC, WILL BE SUPPLIED IN RUNNING/ RANDOM LENGTHS/ SIZES WHICH SHALL BE CUT TO SUITABLE SIZES AND ADJUSTED AS REQUIRED.

12.12.3

SPRING SUSPENSION/CONSTANT LOAD HANGERS MAY HAVE TO BE PRE-ASSEMBLED FOR REQUIRED LOAD AND ERECTION CARRIED OUT AS PER INSTRUCTIONS OF BHEL. ADJUSTMENTS, REMOVAL OF TEMPORARY ARRESTS/LOCKS, CUTTING OF EXCESS THREAD LENGTH OF HANGER TIE-ROD ETC, HAVE TO BE CARRIED OUT AS AND WHEN REQUIRED. LOAD SETTING OF SPRING HANGERS, AS PER BHEL'S DOCUMENTS/INSTRUCTIONS, DURING VARIOUS STAGES OF ERECTION & TESTING AND AFTER FLOATING OF PIPING/DUCTING DURING COLD AND HOT CONDITION WILL HAVE TO BE DONE. THIS EXERCISE MAY HAVE TO BE REPEATED TILL SATISFACTORY RESULTS ARE ACHIEVED.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.12.4

LAYOUT OF FIELD ROUTED/ SMALL BORE PIPING SHALL BE DONE AS PER SITE REQUIREMENT. NECESSARY SKETCH FOR ROUTING THESE LINES SHOULD BE GOT APPROVED FROM BHEL BY THE CONTRACTOR. THERE IS A POSSIBILITY OF SLIGHT CHANGE IN ROUTING THE ABOVE PIPE LINES EVEN AFTER COMPLETION OF ERECTION.

12.12.5

WELDING OF NECESSARY INSTRUMENTATION TAPPING POINTS, THERMOCOUPLE PADS, ROOT VALVES, CONDENSING VESSELS, FLOW METERING & MEASUREMENT DEVICES, AND CONTROL VALVES TO BE PROVIDED ON STEAM TURBINES, TURBO-BLOWERS & ITS AUXILIARIES, INTEGRAL & EXTERNAL PIPE LINES COVERED WITHIN THE SCOPE OF THIS SPECIFICATION, WILL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DONE AS PER THE INSTRUCTIONS OF BHEL SITE ENGINEER. THE INSTALLATION OF ALL THE ABOVE ITEMS WILL BE CONTRACTOR'S RESPONSIBILITY EVEN IF THE :

- I. ITEMS ARE NOT SPECIFICALLY INDICATED UNDER THE RESPECTIVE PRODUCT GROUPS AS GIVEN IN THE TECHNICAL SPECIFICATIONS.
- II. ITEMS ARE SUPPLIED BY AN AGENCY OTHER THAN BHEL.

NDE, AND POST WELD HEAT TREATMENT FOR ABOVE SHALL BE DONE AS PER THE SPECIFICATIONS AS PART OF WORK.

12.12.6

FIXING AND SEAL WELDING OF THERMO-WELLS & PLUGS BEFORE HYDRO TEST/ STEAM BLOWING OF EQUIPMENT OR OTHER PIPING SYSTEM IS WITHIN THE SCOPE OF WORK. CONTRACTOR SHALL ALSO REMOVE THE SEAL WELDED PLUGS BY PROCESS OF GRINDING AND FIX AND SEAL WELD THERMO-WELLS AFTER HYDRO TEST/STEAM BLOWING OF LINES AS PART OF WORK.

12.12.7

ACTUATORS/DRIVES OF VALVES, DAMPERS, GATES, POWERED VANES ETC. MAY HAVE TO BE SERVICED, LUBRICATED, BEFORE ERECTION, DURING PRE-COMMISSIONING & COMMISSIONING, INCLUDING CARRYING OUT MINOR ADJUSTMENTS REQUIRED AS INCIDENTAL TO THE WORK.

12.12.8

ALL ELECTRICAL MOTORS HAVE TO BE TESTED FOR IR&PI VALUES PRIOR TO THE TRIAL RUN. WHERE REQUIRED, DRY OUT MAY HAVE TO BE CARRIED OUT BY USING EXTERNAL HEATING SOURCE. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS IN THIS REGARD AND COMPLETE THE WORK AS INSTRUCTED. BHEL WILL PROVIDE THE MOTORIZED INSULATION TESTERS.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.13 INSULATION –

APPLICATION OF WOOL INSULATION, SHEET METAL CLADDING, WELDING OF STUDS/HOOKS/SUPPORTS FOR EQUIPMENTS, TANKS/VESSELS AND PIPINGS ETC. TO HOLD INSULATION COVERED UNDER THIS CONTRACT SHALL INCLUDE, BUT NOT LIMITED TO, THE FOLLOWING :-

12.13.1

REMOVABLE TYPE OF INSULATION TO BE PROVIDED FOR VALVES, EXPANSION JOINTS, ETC AS PER THE DRAWINGS OR AS DIRECTED BY BHEL ENGINEER.

12.13.2

WOOL INSULATION IS RECEIVED AT SITE AS BONDED AND UN-BONDED MATTRESSES IN STANDARD SIZES. THESE ARE TO BE DRESSED/CUT TO SUIT WORK

12.3.3

APPLICATION OF INSULATION WORK AND SHEET METAL CLADDING AS GIVEN IN VARIOUS DRAWINGS/ SPECIFICATIONS OF BHEL. THE DOCUMENTS FOR FURTHER DETAILS OF INSULATION OF EQUIPMENTS LIKE SJAE, GSC, FLASH TANK, STEAM TURBINES ETC. WILL BE FURNISHED AT SITE.

12.13.4

ALUMINIUM/GI SHEET CLADDING BY FABRICATION OF ALUMINIUM/GI SHEETS TO THE SIZES AND SHAPES SPECIFIED IN DRAWINGS, BEADING, SWAGING, BEVELLING OF SHEETS, CROWNING THE SHEETS, IF NECESSARY, FIXING THE SAME TO SUPPORTS, OVER WOOL INSULATION WITH SCREWS/RETAINERS AS SPECIFIED IN BHEL DRAWINGS OR AS INSTRUCTED BY BHEL ENGINEER.

12.13.5

WELDING OF STUDS/HOOKS/SUPPORTS ON EQUIPMENT AND PIPING TO SUPPORT WOOL INSULATION, AS PER THE DRAWINGS OR AS INSTRUCTED BY BHEL ENGINEERS.

12.13.6

PAINTING THE INNER SIDE OF ALUMINIUM CLADDING, WITH ANTI-CORROSIVE PAINT AS SPECIFIED. THE REQUIRED PAINT AND THINNER & OTHER ACCESSORIES/ CONSUMABLES FOR PAINTING, CLEANING THE SURFACES ETC SHALL BE ARRANGED BY THE CONTRACTOR.

12.13.7

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, AND INSTRUMENTS. THESE GAPS WILL HAVE TO BE FINISHED AS PER DRAWINGS AT A LATER DATE BY THE CONTRACTOR AT NO EXTRA COST TO BHEL.

12.13.8

A LOG BOOK SHALL BE MAINTAINED BY THE CONTRACTOR FOR TAKING CLEARANCE OF THE LOCATION FOR APPLICATION OF REFRACTORY AND INSULATION.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

I) **WASTAGE ALLOWANCE FOR INSULATION & CLADDING**

WASTAGE ALLOWANCE ON NET ISSUED QUANTITY FOR REFRACTORY & INSULATION SHALL BE AS FOLLOWS:

I)	WOOL MATTRESSES AND CLADDING SHEETS	2%
II)	IRON & OTHER RETAINERS/FASTENERS COMPONENTS	2%

NET ISSUED QUANTITY IS THE GROSS QUANTITY ISSUED LESS THE USEABLE QUANTITY RETURNED TO BHEL. ACCEPTANCE OF ANY MATERIAL AS USEABLE WILL BE AT ABSOLUTE DISCRETION OF BHEL ENGINEER.

J) EXCLUSION: SPRAY INSULATION OF TURBINES (IF APPLICABLE) IS EXCLUDED FROM THE SCOPE OF CONTRACTOR.

12.14 PIPING INSTALLATION

12.14.1

THE WORK ON PIPING SYSTEMS (AIR, WATER, OIL, STEAM, GAS ETC.) WILL INCLUDE FABRICATION, LAYING, EDGE PREPARATION, FIXING & WELDING OF THE ELBOWS/FITTINGS/ VALVES ETC ON THE LINE, FIXING & ADJUSTMENT OF SUPPORTS/ANGLES SHOCK ABSORBERS AND CARRYING OUT ALL OTHER ACTIVITIES/WORK TO COMPLETE THE ERECTION AND ALSO CARRYING OUT ALL PRE-COMMISSIONING/COMMISSIONING OPERATIONS MENTIONED IN THE SPECIFICATION AS PER BHEL ENGINEERS INSTRUCTIONS AND/OR AS PER APPROVED DRAWINGS/DOCUMENTS.

12.14.2

FITTINGS LIKE BENDS TEES, ELBOWS, REDUCERS, FLANGES ETC, WILL BE SUPPLIED AS LOOSE ITEMS WHICH SHALL BE MATCHED WITH THE CORRESPONDING PIPING. BENDS OF TUBE SIZE UP TO OD 65MM WILL HAVE TO BE FABRICATED AT SITE AT NO EXTRA COST.

12.14.3

ALL PIPES & TUBES SHALL BE SENT FROM UNITS IN COMMERCIALY AVAILABLE LENGTHS. CERTAIN ADJUSTMENTS IN LENGTH MAY BE NECESSARY WHILE ERECTING PIPELINES. THE CONTRACTOR SHOULD REMOVE THE EXTRA LENGTHS/ADD EXTRA LENGTHS TO SUIT THE FINAL LAYOUT AFTER PREPARING EDGES BOTH FOR IBR & NON-IBR PIPES AND ADOPTING SPECIFIED HEAT TREATMENT PROCEDURE AT NO EXTRA COST.

12.14.4

MINOR ADJUSTMENTS LIKE REMOVAL OF OVALITY IN PIPES AND OPENING AND CLOSING OF THE BENDS OF PIPE BY PROCESS OF HEAT OR CORRECTION OF ANY OTHER METHOD APPROVED BY BHEL ENGINEER TO SUIT THE LAYOUT, WITH SPECIFIED HEAT TREATMENT PROCEDURE, ARE IN THE SCOPE OF WORK.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII GENERAL REQUIREMENTS

12.14.5

FLAME CUTTING OF PIPING, WHERE REQUIRED SHALL BE DONE AS PER BHEL ENGINEERS INSTRUCTIONS.

12.14.6

ALL DRAINS/ VENTS/ RELIEF/ ESCAPE/ SAFETY VALVE PIPING TO VARIOUS TANKS/ SEWAGE/ DRAIN CANAL/ FLASH BOX / SUMP / ATMOSPHERE ETC FROM THE STUBS ON THE PIPING AND EQUIPMENTS ERECTED BY THE CONTRACTOR IS COMPLETELY COVERED IN THE SCOPE OF WORK.

12.14.7

CONNECTION (EITHER FLANGED/BOLTED OR WELDED) OF PIPING TO THE TERMINAL POINTS/EQUIPMENTS ETC IS IN THE SCOPE OF WORK EVEN THOUGH SUCH TERMINAL POINT/EQUIPMENT MAY NOT FORM PART OF THIS WORK. ALL NDE INCLUDING RADIOGRAPHY OF JOINTS SO MADE, POST-WELD-HEAT-TREATMENT IF ANY, IS ALSO WITHIN THE SCOPE OF WORK/SPECIFICATION. TERMINAL POINTS WORKS OF VARIOUS PIPING SCHEMES WITH CUSTOMER LINES AND OTHER CONTRACTOR'S LINES. THE TERMINAL POINTS WORK IS INCLUSIVE OF CUTTING OF EXISTING LINES, EDGE PREPARATION, WELDING/BLANKING AND HOOK UP WORK.

12.14.8

ERECTION, WELDING & UT/RADIOGRAPHY TEST OF BHEL SUPPLIED FLOW NOZZLES IN CUSTOMER TERMINAL/TAPPING POINTS IS THE PART OF SCOPE OF WORKS. SAME WILL BE CARRIED OUT AS PER BHEL ENGINEER'S INSTRUCTION AT SITE AND SHALL BE BINDING ON CONTRACTOR.

12.14.9

DRILLING, WELDING OF STUBS FOR DRAINS, VENTS, INSTRUMENT TAPPING POINTS, WELDING OF ATTACHMENTS FOR SUPPORTS ETC IS PART OF THE WORK. NO ADDITIONAL PAYMENT IS ENVISAGED FOR THIS WORK.

12.14.10

ERECTION AND INSTALLATION OF MOTORISED VALVES & CONTROL VALVES SHALL BE TREATED AS PART OF PIPING WORK. NO SEPARATE RATE ON THIS ACCOUNT WILL BE PAYABLE.