

TENDER SPECIFICATION

SI No	Tender Specification Number	Unit Number & Project
1	BHE/PW/PUR/MADT1-STG U-3/1217	Unit 3 of 2x660 MW STG Set
2	BHE/PW/PUR/MADT1-STG U-4/1218	Unit 4 of 2x660 MW STG Set

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER, DEARATORS, TANKS & VESSELS, PUMPS & AUXILIARIES, HANGERS & SUPPORTS, INSULATION, AND FINAL PAINTING ETC FOR Unit # 3 & Unit # 4 of 2X660 MW NTPC MOUDA STPP STAGE II.

At

**NATIONAL THERMAL POWER CORPORATION LIMITED (NTPC),
MOUDA
District: Nagpur
MAHARASHTRA**

VOLUME – I-Technical Bid

CONSISTING OF:

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



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

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At

**NATIONAL THERMAL POWER CORPORATION LIMITED (NTPC),
MOUDA
District: Nagpur
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EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR Refer Notice Inviting Tender

TENDER SUBMISSION .

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

M/s.

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PLEASE NOTE:

THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

ADDITIONAL GENERAL MANAGER (Purchase)

Place: Nagpur

Date :

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NIL	Notice Inviting Tender	25	(Part of <u>Vol-IA-1217-1218</u>)
I-A	Technical Conditions of Contract	101	Vol-IA-1217-1218
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1217-
1218

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



Ref: BHE/PW/PUR/MADT1-STG /1217-1218

Date: 07/01/2014

NOTICE INVITING TENDER (NIT)

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

=====

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION
i	TENDER NUMBER	BHE/PW/PUR/MADT1-STG U-3/1217: Unit 3 of 2x660 MW STG Set BHE/PW/PUR/MADT1-STG U-4/1218: Unit 4 of 2x660 MW STG Set
ii	Broad Scope of job	JOB: FOR COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER, DEARATORS, TANKS & VESSELS, PUMPS & AUXILIARIES, HANGERS & SUPPORTS, INSULATION, AND FINAL PAINTING ETC FOR Unit # 3 & Unit # 4 of 2X660 MW NTPC MOUDA STPP STAGE II At NATIONAL THERMAL POWER CORPORATION LIMITED (NTPC), MOUDA District: Nagpur MAHARASHTRA (UNIT-3 and UNIT-4 shall be awarded to 2 separate agencies)
iii	DETAILS OF TENDER DOCUMENT	
a	Volume-IA	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc</i> Applicable
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i> Applicable
c	Volume-IC	<i>General Conditions of Contract (GCC)</i> Applicable
d	Volume-ID	<i>Forms and Procedures</i>
e	Volume-II	<i>Price Schedule (Absolute value).</i> Applicable
iv	Issue of Tender Documents	1. <u>Sale from BHEL PS Regional office at :</u> Start : 24/01/2014 , Closes: 07/02/2014 , Time : 16.00 Hrs 2. From BHEL website (www.bhel.com) Tender documents will be available for downloading from website till due date of submission Applicable/ Not applicable
v	DUE DATE & TIME	Date : 10/02/2014, Time 15.00 Hrs Applicable

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	OF SUBMISSION	Place : <u>BHEL PS Regional office at :Nagpur</u> Tenders being submitted through representative shall be submitted at dispatch section of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: Pratish Gee Varghese/Sr Engineer(Purchase) Shivkesh Meena / Engineer (Purchase)	
vi	OPENING TENDER	1 hours after the latest due date and time of Offer submission <i>Notes:</i> (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)	Shri Kanwarjit Singh, IRS (Retd.) D-6/11, Ground Floor, Vasant Vihar, New Delhi - 110 057 E-mail address (kanwarfeb@gmail.com)	Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) and not in the newspapers . Bidders to keep themselves updated with all such information	

- 2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**
- 3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at Nagpur, Sundays and second/ last Saturdays
- 4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.

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

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

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

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

	PART-I B	
	ENVELOPE – II superscribed as:	

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

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

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

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

- 7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.
- 8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 Assessment of Capacity of Bidders:

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

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

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

- i). Total number of Packages

Total number of Packages in hand = P

Where

- 'P' is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced, 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 (ie $P_T = P_1 + P_2 + P_3 + P_4 + \dots P_N$)
- 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 (ie $T_T = T_1 + T_2 + T_3 + T_4 + \dots T_N$)
- 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 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 ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots S_N$ ')
- 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):

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No of similar packages for all Regions = 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.

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- 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.I)

IV. Explanatory note:

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

Table-1

	Civil	Electrical & CI	Mechanical
	i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations	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

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iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	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)
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- 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.

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.

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

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- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:
- 23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.
- 23.2 'Stand alone' bidder cannot become a 'Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.
- 23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR
- 23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work
- 23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder" as specified in clause 9.0
- 23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'
- 23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified
- 23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.
- 23.9 Prime Bidder shall be responsible for the overall execution of the contract
- 23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats
- 23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.
- 23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.
- 23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.
- 23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

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- 23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also
- 24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.
- 25.0 The bidder may have to produce original document for verification if so decided by BHEL.
- 26.0 Order of Precedence
In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:
- a. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
 - b. Notice Inviting Tender (NIT)
 - c. Price Bid
 - d. Technical Conditions of Contract (TCC)—Volume-1A
 - e. Special Conditions of Contract (SCC) —Volume-1B
 - f. General Conditions of Contract (GCC) —Volume-1C
 - g. Forms and Procedures —Volume-1D

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

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

1. Annexure-1: Pre Qualifying criteria.
2. Annexure-2: Check List .
3. Annexure-3: INTEGRITY PACT
4. Annexure-4: Important Information .
5. Other Tender documents as per this NIT.

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ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	FOR COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD; TRANSPORTATION TO SITE; ERECTION, TESTING & COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF TURBINE AND GENERATOR SET AND ITS AUXILIARIES, HP/LP HEATER, DEARATORS, TANKS & VESSELS, PUMPS & AUXILIARIES, HANGERS & SUPPORTS, INSULATION, AND FINAL PAINTING ETC FOR Unit # 3 & Unit # 4 of 2X660 MW NTPC MOUDA STPP STAGE II At NATIONAL THERMAL POWER CORPORATION LIMITED (NTPC), MOUDA District: Nagpur MAHARASHTRA. (Unit 3 & Unit 4 shall be awarded to 2 separate agencies)
TENDER NO	BHE/PW/PUR/MADT1-STG U-3/1217: Unit 3 of 2x660 MW STG Set BHE/PW/PUR/MADT1-STG U-4/1218: Unit 4 of 2x660 MW STG Set

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)	APPLICABLE	
B	<u>Technical</u> Bidder must have, Executed Erection, Testing and Commissioning (Up to Synchronization of the Unit or beyond) of One set of Steam Turbine Generator (STG) of 400 MW or higher rating in last seven years as on the latest date of offer Submission.	APPLICABLE	
C-1	<u>Financial TURNOVER</u> Bidders must have achieved an average annual financial turnover (Audited) of Rs 300 Lakhs or more over last three Financial Years (FY) i.e. 2010-2011, 2011-12 & 2012-13	APPLICABLE	
C-2	<u>NETWORTH</u> (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	<u>PROFIT</u> 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	APPLICABLE	By BHEL

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	the work as per sl no 9 of NIT (if applicable)		
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
F	Technical Tie up criteria (if applicable)	NOT APPLICABLE	
<u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u> - 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. - 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:- Bidder should have executed similar work of any one of the following:- 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 Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works Electrical works in respect of 'ELECTRICAL' CI works in respect of 'CI' Works Material Handling and/or Management works in respect of 'MM' works - 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 '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 - Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means: "BOILER LIGHT UP" in respect of Boiler & Aux and ESP "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG "STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping "HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping "CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears "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. Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works 'Readiness for coal Filling" in respect of Bunker Structure Work. Boiler means HRSG or WHRB or any other types of Steam Generator			

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	10. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines 11. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation. 12. In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR. 13. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine unless otherwise specifically indicated in the PQR. 14. In case the tendered scope is not a Pulverised Fuel Boiler, experience of Oil/Gas Fired Boilers also can be considered unless otherwise specifically indicated in the PQR. 15. The value of work (Experience submitted against PQR B) shall be updated as per the PVC indices for "All India Avg. Consumer Price Index for Industrial Workers" with base month as date of execution (completion of contract/work) and indexed upto two months prior to bid opening month.
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BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

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ANNEXURE - 2

CHECK LIST

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

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

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

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Annexure-3

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House" Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context of meaning hereof shall include its successors or assigns of the ONE PART

And

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

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- 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- 2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and execution from future contracts

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per separate “Guidelines on for Suspension of Business Dealings with Suppliers/ Contractors” framed by the Principal.

Section 4 – Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-Contractors

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section -7 Criminal Charges against violating Bidders/ Contractors/ Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Sub-contractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section – 8 Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

- 9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.
- 9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.
- 10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- 10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- 10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On Behalf of the Principal
(Office Seal)

For & On Behalf of the Bidder/ Contractor
(Office Seal)

IMPORTANT INFORMATION

1. The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -> List of Banned Firms)
2. All Statutory Requirements as applicable for this project shall be complied with.
3. Please take note of following Revised Tender Clauses:
 - i. Notice Inviting Tender: SI No 9
 - ii. General conditions of Contract: Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5
4. Following Notes are added to Form F- 15 of Volume I D 'Forms & procedures'
 - i. It is only indicative and shall be as per the online format issued by BHEL time to time.
 - ii. No request will be entertained after specified date of the current month w.r.t the changes requested in the scores of immediate previous month.
5. This is a combined tender for E & C of 2 units of 660 MW STG Package (Unit 3 & 4 at NTPC Mauda Ph II).
 - i. Tender specification (Volume I) is common for both units (Unit 3 & 4).
 - ii. Unit 3 & Unit 4 shall be awarded to separate agencies.
 - iii. L-1 Bidder shall be considered for award of Unit-3.
 - iv. For award of UNIT-4, next bidder in the order of their price competitiveness (i.e L-2, then L-3 and hence forth) shall be given an option to match their Lumpsum price for E&C of STG U # 3 (item No 1 of price bid), with the Awarded/Finalised Lumpsum Price of E&C of STG U # 3. However Unit # 4 shall be awarded at the price 0.95 times the Unit # 3 awarded price of E&C of STG (item No 1 of price bid).

6. 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 + Period extended for the reasons due to Force Majeure Condition). Schedule Completion date shall be the actual start date plus contract period as defined in Chapter VI 'Vol IA TCC'

7. OVER RUN COMPENSATION

Modification in Price Variation Compensation Clause no. 2.12 of Vol I C GCC:

Clause No. 2.12 of Vol IC GCC is Revised as below:-

IF THE CONTRACT IS EXTENDED BEYOND THE CONTRACT PERIOD FOR ANY REASON OTHER THAN THOSE ATTRIBUTABLE TO THE CONTRACTOR OR FORCE MAJEURE CONDITIONS, THE CONTRACTOR WILL BE COMPENSATED BY PAYMENT OF OVERRUN CHARGES AT THE RATE OF **RS.100000/- (One Lakh Only)** PER MONTH. OVERRUN COMPENSATION WILL BE PAID FOR THE EXTENSION ATTRIBUTABLE TO BHEL ONLY. NO OVERRUN COMPENSATION WILL BE PAYABLE FOR THE EXTENSION ON ACCOUNT OF REASONS ATTRIBUTABLE TO CONTRACTOR AND/OR FORCE MAJEURE CONDITIONS. OVERRUN COMPENSATION FOR ELIGIBLE PERIOD SHALL BE IN PROPORTION TO THE PROGRESS ACHIEVED AGAINST THE PLAN FOR RESPECTIVE PERIOD.

8. 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:

- 8.1. 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).
- 8.2. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids. In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid“ in the Reverse Auction. Non-submission of „online sealed bid“ by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 8.3. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

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- 8.4. 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.
- 8.5. 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.
- 8.6. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 8.7. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 8.8. 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.
- 8.9. 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.
- 8.10. Reverse auction will be conducted on scheduled date & time.
- 8.11. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
- 8.12. 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.
- 8.13. 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.
- 8.14. 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.
- 8.15. 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.
- 8.16. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
- 8.17. 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.

1217-
1218

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-I : Project Information

SI No	DESCRIPTION	Chapter	No. OF PAGES
Volume-IA	Part-I: Contract specific details		
1	Project Information	Chapter-I	2
2	Scope of Works	Chapter-II	6
3	Facilities in the scope of Contractor/BHEL (Scope Matrix)	Chapter-III	7
4	T&Ps and MMDs to be deployed by Contractor	Chapter-IV	2
5	T&Ps to be deployed by BHEL free of hire charges on sharing basis	Chapter-V	1
6	Time Schedule	Chapter-VI	2
7	Terms of Payment	Chapter-VII	6
8	Taxes and other Duties	Chapter-VIII	2
9	Specific Inclusion	Chapter-IX	3
10	Specific Exclusion	Chapter-X	1
	Annexures		
	Tentative list of packages, weight details, dimensions etc of equipment/ system	Annexure I A	31
	Summery Weight Details(for both Units)	Annexure I B	1
11	General	Chapter-XI	5
12	Civil Works, Foundation, Grouting	Chapter-XII	2
13	Equipments Installation	Chapter-XIII	1
14	Piping Installation	Chapter-XIV	2
15	Condenser Installation	Chapter-XV	1
16	Generator, Installation & Handling Heavier equipments	Chapter-XVI	2

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-I : Project Information

17	Hydrostatic Testing Preservation & other tests	Chapter-XVII	2
18	Pre Commissioning Tests, Commissioning, Post Commissioning	Chapter-XVIII	4
19	Welding, Heat Treatment, Radiography	Chapter-XIX	4
20	Acid cleaning/alkali flushing/steam blowing/oil flushing	Chapter-XX	2
21	Tools and tackles, measuring and monitoring devices	Chapter-XXI	2
22	Painting	Chapter-XXII	1
23	Lining and Insulation	Chapter-XXIII	3
24	Final painting	Chapter-XXIV	2

List of drawing & documents as a part of tender:

1. Cross Section TG Hall
2. TG Equipment layout plan at 0 m.
3. TG Equipment layout plan at 8.5 m.
4. TG Equipment layout plan at 17 m.
5. TG Equipment layout plan at 24 m, 32.8m, 38m.
6. Laydown space for Turbine components

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-I : Project Information

1.0	Project Information
1.1	1. Purchaser / Owner : M/s National Thermal Power Corporation Limited. (NTPC) 2. Project Title : 2X660 MW NTPC Mouda (Extension of 2x500 MW PHASE-I) <u>LOCATION AND APPROACH :</u> 1. Location : Village-Mouda, Dist- Nagpur State–Maharashtra, India. 2. Address Details : 2X660 MW NTPC Mouda. Village – Mouda Taluka – Mouda Dist.- Nagpur Pin Code- Maharashtra State, India" 3. Nearest Port : Mumbai 4. Nearest Air Port : Nagpur/ 50 KM from Mouda town 5. Approach Road : Mouda site is connected to Mouda town by 04 KM long all weather roads. Mouda town is 40 KM from Nagpur on NH-6. 6. Railway Approach : Nearest Railway Station Chacher 8 Kms away from site on Nagpur-Kolkata Broad Gauge section of South Eastern Railway (main line) 7. Data of Seismic Design : As per IS 1893 8. Ambient air temperature (Average) : a) Maximum : 50 degree centigrade b) Minimum : 6 degree centigrade 11: Average Relative Humidity: 60 % 12: Wind speed : 44 m/s at ten meters above the ground level as per

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-I : Project Information

	IS 875 (Part-3). 13. Geographical condition: Latitude- 21-10-50 N Longitude -79-23-52 E The Bidder shall visit site and get acquainted himself with the conditions prevailing at site before submission of the bid. The information's given here in under are for general guidance and shall not be contractually binding on BHEL/ Owner. All relevant site datas/informations as may be necessary shall have to be obtained /collected by the Bidder.
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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:

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

1. Main Turbine (HP, IP, LP) with all auxiliaries.
2. Generator and Auxiliaries.
3. Generator Stator unloading, placement to TG floor with the help of EOT crane.
4. Condenser with extraction steam piping and air extraction piping inside condenser steam space up to condenser walls, **Condenser water box handling arrangement.**
5. The contractor shall make arrangement to unload Generator Rotor, LP Rotor, HP Turbine, IP Turbine, directly from the trailer /wagon [inside project premises] and transport the same to stores/place of work etc. as directed by Engineer. Subsequent re-handling, if required will also be under the scope of work. Detailed weight schedule is as per appendix – I.
6. Drive Turbine & Boiler Feed Pumps (BFP- Turbo-driven & Motor Driven).
7. Condensate Extraction Pumps (CEP) along with suction pipe from hot well to CEPs suctions inlet flanges and other fittings.
8. **MISC pumps including ACW Pumps, ECW Pumps, Sump pumps, Condensate Transfer Pumps etc.**
9. Gland Steam Condenser, Drain Cooler, LP Heaters, HP Heaters.
10. Condenser on load tube cleaning systems and self-cleaning strainers.
11. Dearator & Feed Storage Tank with platform and accessories.
12. Misc. Water Pumps packages with their accessories.
13. Misc. Hoists (Mechanical & electrical)
14. Plate Type Heat Exchangers.
15. Auxiliaries of Turbine, Generator, BFPs and other systems
16. TG Valves (PCP valves, Root Valves, HP Bypass system, TIP valves, RHID, LP Valves) pertaining to Trichy Valves scope of supply. Total no of valves will be approximately 1750 nos. **per unit.**
17. Vacuum pumps with connected piping and other integral piping.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

18. Various TG Piping systems as per relevant annexure including erection of valves, fittings and other associated instruments.
19. MS, HRH Strainers, Coolers, CRH-NRVs, Extraction NRVs with associated pipelines.
20. Turbine lub oil, governing oil, Generator seal oil system, gas system, Jacking oil system, control fluid system, Primary Water system, dirty/waste fluid system, Gland steam system-for main turbine and drive turbines of BFPs Water drainage system, Turbine Governing System with Valves and their servomotors, LP Bypass System with Valves, servomotors and other systems tanks and equipment's.
21. Chemical cleaning and associated testing plus related activities of different system and Normalization.
22. Setting and commissioning of governing system.
23. Flushing, steam blowing , related testing, pre-commissioning, commissioning activities of lub oil system, governing oil, gas systems, water lines and other systems of Turbine, Generator, Condenser, BFP and other auxiliaries. This includes preparation for flushing, hydro-test, chemical cleaning, steam blowing, other cleaning activities , actual execution of the activities, normalization etc.
24. Grouting, painting of all equipment's along with supply of required materials, machineries and other resources as required to carry out the job.
25. Completion of punch points, Assistance in PG Test, and handing over of Unit.

of Unit # 3 & Unit # 4 of 2X660 MW NTPC MOUDA STPP STAGE II.

Detail scope of work:

(A) STEAM TURBINE

1. High Pressure(HP), intermediate pressure(IP) and low pressure(LP) steam turbines complete with sole plates, foundation holding down bolts, bearing, bearing pedestals, rotors, couplings, steam gland seals, electric/hydraulic turning gear and hand barring gear.
2. Emergency stop(ESV) and control valves(CV), reheat stop, interceptor and control valves with their servomotors, steam strainers (including its housing & blanking arrangement) for main and reheat steam lines etc., LP bypass stop and control valves along with their servomotors
3. Cold reheat and extraction NRVs along with their servomotors, necessary supports and secondary structure if required.
4. Complete Installation of necessary blanking to protect the valves and turbine internals during hydraulic testing and steam blowing. If required

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

CRH NRV may have to be dismantled and replace with a spool during steam blowing. It will be reinstalled after completion of steam blowing.

5. **Electro –hydraulic governing system** for the turbine including governing control rack, LP bypass control, rack, valve test devices and racks, turbine gland sealing system complete with converters, associated piping, valves and fittings, specialties, fire protection valves and devices, hangers and supports to make the system complete in all respects.
6. Lube Oil System consists of main oil tank, oil coolers, centrifuge, 2x100 %MOP, 2x100% AOP, 02 nos. JOP, 01 no. DC driven EOP, Leak & Dirty oil tank with pumps, Duplex Filter, vapour fans and auxiliaries, clean oil tank, oil, connected oil piping, valves, H&S etc.,
7. Control oil system: 2x100% Control oil pumps, control oil tank, filters, control oil purification system etc.

(B) GENERATOR Hydrogen Cooled Main Generator Consisting of the following:

- Stator
- Rotor
- End Shields & Bearing
- Exciter
- Seal Oil System
- Primary Water System
- H₂ Cooling System
- CO₂ System
- Seal Oil Tank
- PW Tank & Alkaliser Unit
- Generator package piping
- Other Accessories

(C) CONDENSER Condenser mainly comprising of the following parts:

- Bottom Plate
- Hot Well
- Turbine & generator End side plate
- Dome Walls
- Front & Rear Water Boxes with Tube Plates
- Tube Support Plates
- Springs
- Steam Throw -off device
- Air Extraction Pipe & Baffle
- Stiffening/Support Pipes/Rods, Bars etc.,
- Misc Fittings & Loose items
- Instruments
- Condenser Tubes- (**SS- 304, Approx. 29668Nos**)

D) AUXILIARIES

- Flash tanks and all other misc. tanks with drains & vents.
- Deaerator & feed storage tank (in sections), complete with ladders platform and

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

other accessories.

- Drain coolers along with fittings, piping, steam traps and gland steam condensers and air exhausters with motor and fittings, associated piping, hangers and supports etc. to make the system complete in all respects.
- LP and HP heaters, fittings, group protection device, stand pipes along with fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
- RE Joints along with in built CW pipes, flanges and tie rods and spool pieces, H&S etc. to make system complete in all respect.
- Suction strainers for boiler feed and condensate extraction pumps along with supports and other fixtures.
- Turbine oil coolers, gland steam condenser, drain coolers, seal oil coolers, steam jet main ejectors, along with stand pipes and fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
- Oil strippers, strainers, oil injectors and duplex oil filters.
- Main oil, drain oil and dirty oil tanks along with fittings including gauge glasses for level indication, to make the equipment complete in all respects.
- Coolers , Tank , Filters etc. of Control Fluid System
- Hydraulic coupling, working oil and lubricating oil coolers of Boiler feed pumps.
- Seal oil storage tank, seal oil unit, pre-chambers, gauge glasses along with stand pipes, gauge glasses for level indication etc. etc. to make the system complete in all respects.
- Hydrogen cooling system, nitrogen and carbon dioxide systems including H₂ dryers, gas control units and gas stands, racks and distributors to make the system complete in all respects.
- Exciter air cooler.
- Turbine oil purification system consisting of clean oil storage tank, dirty oil storage tank, central oil purifier, dirty & clean oil transfer pumps, drain oil return pumps, oil unloading vessel & interconnecting piping.

PUMPS & MOTORS:

- Boiler Feed Pumps (2 Motor Driven & 2 Turbo Driven)
- 2 Drive Turbine for TD BFP Consists of
 - Turbine Assembly
 - Governing Valve Assembly
 - Oil Pumps
 - Lube Oil Console
 - Gear Box
 - Connecting Couplings
 - Oil Coolers etc.,
 - Motor for MD BFP
 - Booster Pumps for BFP
- Lube Oil Piping, Cooling Systems & other Accessories for

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

- BFP, Drive Turbine & Motor-2nos
- Condensate Extraction Pump-3nos
- Motors for CEP-3nos
- Air evacuation pumps, including priming pumps for maintaining condenser vacuum, along with motors and its accessories, to make the equipments complete in all respects.
- A.C. and DC motor driven lubricating oil pumps including DC motors starters along with resistance box.
- Seal oil pumps with drives and fittings to make the system complete in all respects
- Pumps of Control Fluid System

(E) BOUGHT OUT ITEMS: Turbine Integral Piping Consists of

- Lube Oil Piping
- Control Oil Piping
- Seal Oil Piping
- Gland Seal Piping
- Equipment Drains & Vents
- Cross Around Piping
- Air & Gas System Piping
- ACW piping for H2 Coolers
- Other Misc System Piping Etc.,
- Vacuum Pumps & Air evacuation System
- Oil Centrifuge & Associated System
- CF Purification Unit with pumps, Vapour exhaustor etc.,
- 3 Way Control Valves
- Drain Valves
- Hangers & Supports
- Pumps with Accessories (JOP, AOP, EOP)
- Springs & Hanger supports
- Dampers(Vacuum Breaking Device)
- H2 & CO2 Cylinders, N2 Cylinders
- Fixing of Pick-Ups, Probes & Accessories for Vibration Monitoring System
- Bearing Vapour Exhaustor
- Coupling Covers
- RE Joints & Stretching Bolt Assembly
- Flash Tanks
- Butterfly Valves
- ME Bellows
- LP dosing sys for ECW
- Portable Lube Oil Purification Unit
- Misc pumps
- Control valves
- Rota meter

(F) PEM supplied Packages to erected & commissioned under this scope of work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

- Plate heat Exchangers (PHEs)
- Condenser on load tube cleaning system
- Aux. PRDS
- Simplex strainers
- Misc. Pumps
- Sump pumps
- Miscellaneous electric hoists/Cranes and Chain Pulley Blocks(Mech. & Electrical)
- Lube Oil Pumps.
- LP valves, air traps, B. F. valves, etc.
- LP Chemical Dosing & oxygen dosing system

The detail shown above is for indicative purpose. The item details under this scope of work has been indicated in detail in Appendix I (Weight Detail) & Appendix II (Summary of weight details).

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	

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	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	ELECTRICITY			
3.2.1	Electricity For construction purposes only of Voltage 415/440 V			FREE
a	Single point source	Yes		At a distance of 1000 M from site (Distance is only estimated, it may vary upto any extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	Electricity for the office, stores, canteen etc of the bidder			Free
a	Single point source	yes		At a distance of 1000 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	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc			
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:			
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.			

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	
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	<u>Water supply for Living Purpose</u>			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4.0	LIGHTING			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		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	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6.0	COMPRESSED AIR wherever required for the work		YES	
3.7.0	Demobilization of all the above facilities		YES	
3.8.0	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

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

Sl. No	Description	Scope / to be taken care by		<i>Remarks</i>
		BHEL	Bidder	
	PART II 3.9.0 ERECTION FACILITIES			
3.9.1	Engineering works for construction:			
a	Providing the erection drawings for all the equipments covered under this scope	Yes		
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		YES	"
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	"

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

Sl. No	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		<i>Remarks</i>
		BHEL	Bidder	
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of preassembly bed		Yes	
k	Arranging the materials required for preassembly		YES	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMDs to be deployed by Contractor

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

S.N.	DESCRIPTION	CAPACITY	QUANTITY
1	TYRE MOUNTED HYDRAULIC CRANES	14 MT	2 NOs
2	TRAILER WITH HORSE	30 TON	1 NO
3	TRAILER TROLLEY	20 TON	1 NO
4	WELDING GENERATOR SETS (ELECTRIC AS WELL AS DIESEL)		AS PER REQUIREMENT
5	3-PHASE COMPLETE SET UP FOR DRAWAL OF POWER		-DO-
6	RADIOGRAPHY ARRANGEMENT INCLUDING THE SOURCE AND FILM VIEWER		-DO-
7	TIG WELDING SET		-DO-
8	STRESS RELIEVING EQUIPMENT WITH TEMPERATURE RECORDERS		-DO-
9	ELECTRICAL BAKING OVEN – BIG		-DO-
10	ELECTRODE BAKING OVEN – PORTABLE		-DO-
11	MIXER FOR GROUTING OF EQUIPMENT FOUNDATIONS		-DO-
12	VACUUM CLEANER (INDUSTRIAL)		-DO-
13	PIPE CUTTING AND BEVELLING MACHINE		-DO-
14	PIPE BENDING M/C	ELECTRIC/ ELECTRO - HYDRAULIC - UPTO 4" SIZE	-DO-
15	AIR COMPRESSOR	120 CFM	01 NO
16	STEP DOWN TRANSFORMER	230V/24V	AS PER REQUIREMENT
17	CONDENSER TUBE EXPANDER SET		DO
18	ELECTRICALLY OPERATED WINCHES	3T/5T	DO
19	JACKING BOLTS / PRESSOUT BOLTS OF ALL SIZES (FOR ST. TURBINE ROLL CHECKS ETC.)		DO
20	HYDRAULIC JACKS OF VARIOUS CAPACITIES FOR ST. TURBINE AND GENERATOR :		
	A) - JACKS (WITH HAND OPERATED PUMPS)	100 MT	06 NOS.
	B) - JACKS (WITH HAND OPERATED PUMPS)	50 MT	06 NOS.
	GANG OPERATED JACKS CONSISTING OF THE FOLLOWING :		
	A) - JACKS (HAVING BROAD BASE ONE INCH LIFT)	100 MT	06 NOS.
	B) - JACKS (WITH 4-6 INCH LIFT , FOR GEN. END SHIELDS)	63 MT	04 NOS.
	C) - LONG HIGH PRESSURE HOSES (FOR GENERATOR ALIGNMENT)		12 NOS.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMDs to be deployed by Contractor

ABOVE JACKS FOR GENERATOR ALIGNMENT SHOULD HAVE SUITABLE COUPLING FOR JOINING THE TWO OR MORE HOSES TOGETHER TO GET DESIRED LENGTH OF HOSES, SHOULD HAVE HAND OPERATED PUMPS & ALSO SHOULD BE ABLE TO FIT WITH HYDRAULIC UNIT.

21	TORQUE WRENCH	0 TO 200 N-M	02 NO.
22	TORQUE WRENCH	UPTO 2000 N-M	02 NO.
23	SLINGS FOR LP TURBINE ROTOR		01SET
24	SLINGS FOR HP TURBINE MODULE		01SET
25	SLINGS FOR GENERATOR ROTOR		01SET
26	BOLT STRETCHING DEVICE (FOR TURBINE & GENERATOR FOUNDATION BOLTS)		AS PER REQUIREMENT
27	LONG FEELER GAUGE SET		AS PER REQUIREMENT
28	SPANNERS / EYE BOLTS (OF ALL SIZES)		AS PER REQUIREMENT
29	HYDRAULIC TEST PUMPS AND FILL PUMPS		AS PER REQUIREMENT

B: MEASURING AND MONITORING DEVICES (MMD):

To be finalized at site as per requirement.

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – V: T&Ps to be deployed by BHEL free of hire charges on sharing basis

SN	DESCRIPTION & CAPACITY OF T&P	QUANTITY	PURPOSE
01	EOT CRANE IN TG HALL	2	FOR HANDLING AND ERECTION WITHIN TG HALL ON SHARING BASIS AS AVAILABLE AND SUBJECT TO THEIR ACCESSIBILITY AND APPROACHABILITY. Stator lifting shall be done by tandem operation of EOT crane. Lifting beam for the above shall be provided by BHEL.
02	250 MT crane	1	For Dearator / FST and its related platform and structure erection on sharing basis.

NOTE:

1. There are 2 Nos. EOT crane in the TG hall of capacity of 200 MT.
2. Normally Operator for EOT crane will be provided BHEL for a limited working hours (2 shift). However additionally to meet the project schedule and as directed by BHEL engineer, the operator for EOT crane shall be arranged by contractor.
2. EOT crane will be used on **sharing basis** by other agencies working within the TG hall under the instruction of BHEL. The contractor shall extend the services of his operator to such other agencies as well on mutually agreed mode of cost sharing.
3. Above T&Ps will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL engineer in charge/ construction manager the date of actual use.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.1 MOBILIZATION, TIME SCHEDULE & CONTRACT PERIOD

6.1.1

INITIAL MOBILIZATION

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

6.1.2

MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.

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

6.1.3

COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

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

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

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

S.No	ACTIVITY	UNIT-3	UNIT-4
1	CONDENSOR ERECTION START	27- Feb-14	27-Aug-14
2	TG ERECTION START	28-Apr-14	28-Oct-14
2	TURBINE BOX UP	31-May-15	30-Nov-15
3	COMPLETION OF OIL FLUSHING	31-Jul-15	31-Jan-14
4	BARRING GEAR	31-Aug-15	28-Feb-16
5	SYNCHRONISATION & COAL FIRING	31-Dec-15	30-Jun-16

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6	Full Load operation	29-Feb-16	30-Aug-16
6	COMPLETION OF TRIAL OPERATION	30-Apr-16	30-Oct-16

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

6.1.4

DURATION

The total contract period for completion of entire work shall be **26 (Twenty Six) months from the start of erection for Unit-3 & 4 separately.**

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

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

		CND (1)	TUR (2)	GEN (3)	PMP & AUX/ EQ (4)	HEATERS AND DEAERATOR S (5)	MISCELLANEOU S ITEMS (6)	INTEGRA L PPG (7)	PIPIN G (8) ON PER MT BASIS
	Overall weightage for each area out of lumpsum value quoted for STG	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.	10%			--			--	
1.3	ASSEMBLY AND POSITIONING OF WATER CHAMBER, SIDE PLATES, BOTTOM PLATES, WELDING AND NDT INCLUDING HINGE ASSY	12%		--	--			--	
1.4	ASSEMBLY, ALIGNMENT AND WELDING & NDT OF TUBE SUPPORT PLATES AND INTERNALS LIKE BAFFLE PLATES, AIR EVACUATION PIPES ETC.	13%		--	--			--	
1.5	ASSEMBLY, WELDING & NDT OF DOME WALLS AND DOME STIFFENERS, EXTRACTION PIPING AND STEAM THROW DEVICE, LPH-1 SUPPORT ETC.	10%		--	--			--	
1.6	INSERTION, EXPANSION, CUTTING ETC. OF CONDENSER TUBES	15%		--	--			--	
1.9	HYDRO TEST OF STEAM AND WATER SIDE	10%		--	--			--	
1.10	WELDING OF CONDENSER NECK JOINT AND NDT& COMPLETION OF BALANCE WORKS	10%		--	--			--	
1.11	ERECTION, COMMISSIONING, LOAD TESTING OF CONDENSER WATER BOX HANDLING SYSTEM	3%		--	--			--	
	Subtotal for condenser	85%							

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

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

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Chapter-VII: Terms of Payment

	Subtotal for Steam Turbine		85%						
3	TURBO GENERATOR (15%)	--		--	--			--	
3.1	PREPARATION OF FOUNDATION, LEVELLING, MATCHING AND GROUTING OF FOUNDATION PLATES	--		5%				--	
3.2	LIFTING, LEVELLING AND ALIGNMENT OF STATOR (including erection and dismantling of portal crane if used for stator lifting)			23%				--	
3.3	FIXING OF END SHIELDS ON TO FOUNDATION BEAMS	--	--	6%				--	
3.4	ROTOR INSERTION	--	--	6%				--	
3.5	BOXING UP OF GENERATOR AND ASSEMBLY OF HYDROGEN SEALS	--	--	11%				--	
3.6	ALIGNMENT OF GENERATOR ROTOR WITH LP TURBINE ROTOR, RUN-OUT CHECKS AND REAMING, HONING OF COUPLING HOLES AND FIXING OF COUPLING BOLTS	--	--	9%				--	
3.7	ERECTION OF EXCITATION EQUIPMENTS & ALIGNMENT OF GEN-EXCITER ROTORS INCLUDING SWING CHECK AND COMPLETION OF BALANCE WORKS	--	--	10%				--	
3.8	INSTALLATION OF ENCLOSURES OF GENERATOR/EXCITER WITH ALL AUXILIARIES	--	--	5%				--	
3.9	GROUTING OF GEN BEARING PEDESTALS AND EXCITOR	--	--	5%				--	
3.1	FINAL GAS TIGHTNESS TEST OF STATOR WITH COMPLETE SYSTEM	--	--	5%				--	
	Subtotal for Generator			85%					
4	PUMPS AND AUXILIARIES (13 %)	--	--		--			--	
4.1	ERECTION / TESTING and commissioning OF MAIN OIL PUMP, JOP, EOP, AOP, CENTRALISED LUBE OIL PURIFICATION SYSTEM, ALONG WITH ALL AUXILIARIES	--	--		18%			--	
4.2	ERECTION / TESTING and commissioning OF TWO MOTOR DRIVEN BFP, ALONG WITH ALL AUXILIARIES				14%				
4.3	ERECTION / TESTING and commissioning of TWO NOS TURBINE DRIVEN BFP, ALONG WITH ALL AUXILIARIES				30%				

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

4.5	ERECTION, TESTING, GROUTING ETC. OF DMCW (BOILER & TG) PUMPS	--	--	--	13%			--	
4.6	ERECTION, TESTING, GROUTING ETC. OF CONDENSATE EXTRACTION PUMPS	--	--	--	10%			--	
	Subtotal for pumps and Auxiliaries				85%				
5	HEATERS AND DEAERATORS (11%)								
5.1	ERECTION, TESTING & COMMISSIONING OF HP & LP HEATERS	--	--	--		27%		--	
5.2	ERECTION, TESTING & COMMISSIONING OF GLAND STEAM CONDENSER, DRAIN COOLERS	--	--	--		12%		--	
5.3	ERECTION, TESTING & COMMISSIONING OF DE-AERATOR, FEED STORAGE TANK AND ASSOCIATED APPROACH PLATFORM WITH LADDERS ETC.	--	--	--		46%		--	
	Subtotal FOR HEATERS AND DEAERATORS	--	--	--		85%		--	
6	MISCELLANEOUS ITEMS (7%)								
6.1	DEBRIS FILTERS, RE JOINTS, ME BELLOWS, DIRTY, CLEAN OIL TANKS, ENCLOSURES, CO2/H2 CYLINDER RACKS ETC						20%		
6.2	ACW PUMPS, RELATED ITEMS	--	--	--			10%		
6.3	ERECTION, TESTING & COMMISSIONING OF CONTROL FLUID TANK, C.F. COOLERS, C.F. PUMPS, PURIFICATION UNIT ETC.	--	--	--			9%		
6.4	ERECTION, TESTING & COMMISSIONING OF FLASH TANKS & FLASH VESSELS	--	--	--			8%		
6.5	ERECTION, TESTING & COMMISSIONING OF PLATE HEAT EXCHANGER PACKAGE	--	--	--			10%		
6.6	ERECTION, TESTING & COMMISSIONING OF CONDENSER ON LOAD TUBE CLEANING PACKAGE	--	--	--			12%		
6.7	ERECTION, TESTING & COMMISSIONING OF SELF CLEANING STRAINER PACKAGE	--	--	--			8%		
6.8	ERECTION, TESTING & COMMISSIONING OF MISC. HOISTS & CHAIN PULLEY BLOCKS.						8%		
	Subtotal for MISCELLANEOUS ITEMS						85%		

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Chapter-VII: Terms of Payment

7	INTEGRAL PIPING (16%)	--	--	--				--	
7.1	Turbine Integral piping and Generator Integral piping consisting of Lube oil, Jacking oil, Oil vapour extraction, Seal Oil, Control oil, Seal steam, Condensate spray/Exhaust Hood spray, Turbine water drainage, Gas Piping, Primary Stator Water piping, etc including all accessories like thermowells, probes, orifices etc and hangers and supports (Erection and commissioning on prorata basis)	--	--	--				85%	
	Total for integral piping							85%	
8	PIPING								
8.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION TO BE PAID ALONG WITH PLACEMENT IN POSITION)								15%
8.2	PLACEMENT IN POSITION								20%
8.3	ALIGNMENT								15%
8.4	WELDING/BOLTING/FIXING								20%
8.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be clubbed with next activity)								5%
8.6	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG								5%
8.7	HYDRAULIC TEST/PNEUMATIC TEST WHERE EVER APPLICABLE								5%
	Total for Prorata (85%)	85%	85%	85%	85%	85%	85%	85%	85%
II	STAGE/MILESTONE PAYMENTS (15%)								
1	Boiler Light Up	0%	0%	0%	0%	0%	0%	0%	0%
2	ABO	0%	0%	0%	0%	0%	0%	0%	0%
3	Steam Blowing	0%	0%	0%	0%	0%	0%	0%	0%
4	Safety Valve Floating	0%	0%	0%	0%	0%	0%	0%	0%
5	Oil Flushing (TG)	1%	1%	1%	1%	1%	1%	1%	1%
6	Barring Gear (TG)	1%	1%	1%	1%	1%	1%	1%	1%
7	Rolling and Synchronisation	3%	3%	3%	3%	3%	3%	3%	3%
8	Coal Firing	0%	0%	0%	0%	0%	0%	0%	0%
9	Full Load	2%	2%	2%	2%	2%	2%	2%	2%
10	Trial Operation of Unit	2%	2%	2%	2%	2%	2%	2%	2%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Terms of Payment

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%

Terms of Payment for Item No 02 of Price bid shall be as below:

Payment for this item shall be made on pro rata basis as per following:

For Fabrication : 40 %

For Erection : 40 %

For welding : 20 %

Note-A:

1. Wherever application of 'Insulation' is part of scope of work, the same shall be covered under respective item/equipment for "Terms of payment"
2. The terms of Payment is only for enabling release of payments through RABs and is not indicative of the actual quantum or value of work

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

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

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: Taxes and Other Duties

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

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

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

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

8.2 'Enabling Works'

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

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

8.3 New Taxes/Levies

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

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: SPECIFIC INCLUSIONS

SPECIFIC INCLUSIONS

9.1

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

9.2

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

9.3

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

9.4

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

9.5

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

9.6

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

9.7

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

9.8

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: SPECIFIC INCLUSIONS

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

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

9.9

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

9.10

CONSUMABLES

The contractor shall provide all consumables required for carrying out the work covered under these specifications excepting those which are specifically indicated as BHEL scope.

TG special consumables like hylomar / golden hermetite / stag-b / molykote/ anabond compounds / rubber fixing compounds etc. will have to be arranged by the contractor.

9.11

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

9.12

PRIMERS & PAINTS

Supply & application of all required Primers and paints for all equipment's / items erected under this scope of work are in contractor's scope.

9.13

WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES

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

9.14

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-IX: SPECIFIC INCLUSIONS

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

9.15

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

9.16

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X : SPECIFIC EXCLUSIONS

10.0 EXCLUSIONS

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

- A) All cable connections, except those specified as scope of work.
- B) Measuring instruments, monitoring, relaying, protection and signaling equipments other than those supplied with the equipments by / on behalf of BHEL and which have been indicated as scope of work.
- C) Erection, testing and commissioning of electrical panels and starting resistors for DC JOP and DC EOP pumps
- D) Electrical testing of motors, turbo-generator. However erection of these items will be under the scope of this tender specification.
- E) Impulse piping and fittings from the tapping points of various equipments other than those specified as scope of work.
- F) Civil works to the extent not specifically provided for in this tender.
- G) Supply of materials for temporary piping (pipe, valve, structural steel etc.) required for hydraulic test, chemical cleaning, flushing or steam/air blowing of the pipelines.
- H) Supply of chemicals and lube oil for pre-commissioning and commissioning activities.
- I) Some sub-delivery items and electrical components such as push-buttons, junction boxes etc.
- J) E&C work of cable trays, cables and earthing etc.
- K) All electrical and control & instrumentation items except those specified elsewhere in these specifications.
- L) Pneumatic copper tubing and fittings thereof.
- M) Thermal insulation of BFPs and their Drive Turbine, Main Turbine.
- N) Erection of sound proof/acoustic enclosure for turbine.
- O) Electrical testing of Generator.
- P) PG Test Impulse piping from root valve, Cabling of field instruments for PG test. However all assistance of issue of materials, return after PG test, assistance during PG test is in the scope of TG vendor. System Isolation, flushing of root valves etc. during PG test is in the scope of TG vendor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

Unit # 3

Condenser (10815)

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
1	78004	8.465	8.465	BOTTOM PLATE(FRONT PART ASSLY)	8800X3600X910
2	78005	8.800	8.800	BOTTOM PLATE (REAR PART ASSLY)	8800X3600X1040
3	78006	7.230	7.230	BOTTOM PLATE(MID.PART ASSLY-I)	8800X3600X1080
4	78007	7.230	7.844	BOTTOM PLATE(MID.PART ASSLY-II)	8800X3600X1120
5	78008	7.286	7.286	BOTTOM PLATE(MID.PART ASSY-III)	8800X3600X1150
6	78010	2.170	1.982	LOOSE ITEMS (BOTTOM PLATE)	4150X1750X750
7	78014	0.920	0.840	LOOSE ITEM (COND.SUPPORT LOOSE ITEM (COND.SUPPORT	2700X1200X500
8	78018	1.540	1.385	LOOSE ITEMS(CONDENSER SUPPORT)	2060X1020X910
9	78019	3.300	3.054	LOOSE ITEMS(CONDENSER SUPPORT)	1740X1120X600
10	78020	7.725	7.475	FRONT WATER CHAMBER(GEN.END)	5330X4460X340
11	78022	17.800	17.550	FRONT WATER BOX(GEN.END)	5250X4460X3100
12	78023	7.725	7.475	FRONT WATER CHAMBER(TUR.END)	5330X4460X340
13	78025	17.800	17.550	FRONT WATER BOX(TUR.END)	5250X4460X3100
14	78026	7.715	7.605	REAR WATER CHAMBER(GEN.END)	5482X4460X340
15	78028	17.670	17.550	REAR WATER BOX (GEN.END)	5250X4460X3100
16	78029	7.715	7.605	REAR WATER CHAMBER(TUR.END)	5482X4460X340
17	78031	17.670	17.550	REAR WATER BOX (TUR.END)	5250X4460X3070
18	78032	2.301	2.301	PLATES(SIDE WALL-TUR.SIDE)	5390X1980X40
19	78033	6.285	6.285	PLATES(SIDE WALL-TUR.SIDE)	5390X2480X60
20	78034	6.285	6.285	PLATE ASSL(SIDE WALL-TUR.SIDE)	5390X2480X60
21	78038	1.200	1.100	LOOSE ITEMS(SIDE WALL-TUR.SIDE)	6100X470X200
22	78040	2.301	2.301	PLATES(SIDE WALL-GEN.SIDE)	5390X1980X40
23	78041	6.285	6.285	PLATES(SIDE WALL-GEN.SIDE)	5390X2480X60
24	78042	6.285	6.285	PLATE ASSL(SIDE WALL-GEN.SIDE)	5390X2480X60
25	78045	1.200	1.100	LOOSE ITEMS(SIDE WALL-GEN.SIDE)	6100X470X200
26	78046	0.350	0.280	LOOSE ITEMS (SHELL INTERNALS)	5934X150X40
27	78047	7.264	7.047	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
28	78048	7.264	7.047	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
29	78049	7.264	7.047	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
30	78050	7.264	7.047	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
31	78051	7.525	7.308	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
32	78052	7.525	7.308	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/MADT1-STG U-3 & U-4/1217-1218

Technical Conditions of Contract –Volume I A (Part I : Contract Specific Details)

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

33	78053	7.509	7.292	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
34	78054	7.497	7.280	SHELL INTERNAL STIFFENING RODSSHELL INTERNAL STIFFENING RODS	3616X1000X800
35	78055	2.220	1.970	ROD (SHELL INTERNAL)	3616X825X500
36	78056	2.220	1.970	ROD (SHELL INTERNAL)	3616X825X500
37	78057	2.228	1.978	ROD (SHELL INTERNAL)	3616X825X500
38	78058	2.318	2.168	AIR EXTRACTION PIPE	9200X900X900
39	78059	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
40	78060	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
41	78061	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
42	78062	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
43	78063	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
44	78064	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
45	78065	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
46	78066	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
47	78067	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
48	78068	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
49	78069	3.658	3.302	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
50	78070	3.832	3.482	SHELL INTERNAL DETILSSHELL INTERNAL DETAILS	1200X800X800
51	78071	5.045	4.745	LOOSE ITEMS (SHELL INTERNAL)	6300X900X600
52	78072	0.824	0.704	LOOSE ITEMS (SHELL INTERNAL)	1000X800X500
53	78073	1.990	1.840	LOOSE ITEMS (SHELL INTERNAL)	1300X1200X600
54	78074	1.600	1.480	LOOSE ITEMS (SHELL INTERNAL)	3616X825X500
55	78076	8.380	8.380	LOWER DOME WALL (TUR.END)- LOWER PART	13480X2706X400
56	78077	4.895	4.895	LOWER DOME WALL(TUR.SIDE)-UPPER PART	8175X3800X300
57	78078	0.625	0.525	LOOSE ITEMS (LOWER DOME WALL- TUR SIDE)	6000X1200X200
58	78079	4.832	4.832	LOWER DOME WALL(TUR.SIDE)- MIDDLE PART	8184X3800X600
59	78080	0.170	0.152	LOWER DOME WALL(TUR.SIDE)- SIDELOWER DOME WALL (TUR SIDE)- SIDE	1400X700X500
60	78104	10.225	10.225	LOWER DOME WALL (GEN.SIDE)- LOWER PART	13480X2710X730

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

61	78105	5.210	5.210	LOWER DOME WALL (GEN.SIDE)- UPPER PART	8184X3800X730
62	78106	0.970	0.870	LOOSE ITEMS (LOWER DOME WALLGEN.SIDE)	5300X1500X800
63	78107	4.931	4.931	LOWER DOME WALL(GEN.SIDE)MIDDLE PART	8175X3800X650
64	78108	0.170	0.152	LOWER DOME WALL(GEN.SIDE)SIDELOWER DOME WALL (GEN.SIDE)SIDE	1400X700X500
65	78110	7.086	7.086	LOWER DOME WALL (FWB SIDE)- LOWER PART	9200X3900X800
66	78111	6.261	6.261	LOWER DOME WALL (FWB SIDE)- UPPER PART	8300X3800X300
67	78112	0.720	0.600	LOOSE ITEMS (LOWER DOME WALLFWB SIDE)	2100X1200X800
68	78116	2.497	2.497	LOWER DOME WALL (RWB SIDE)LOWER PART	9200X1600X800
69	78117	5.004	5.004	LOWER DOME WALL (RWB SIDE)- UPPER PART	8000X2900X1100
70	78118	1.900	1.800	LOOSE ITEMS LOWER DOME WALL(RLOOSE ITEMS LOWER DOME WALL)	2600X2000X1700
71	78119	10.522	10.522	LOWER DOME WALL(RWB SIDE)MIDDLE PART	8810X3200X1530
72	78121	2.320	2.320	PIPES(DOME INTERNAL STIFFENINGPIPES(DOME INTERNAL STIFFENING	6000X600X600
73	78122	12.777	12.777	PIPES(DOME INTERNAL STIFFENINGPIPES(DOME INTERNAL STIFFENING	10500X4700X800
74	78123	4.196	4.196	PIPES(DOME INTERNAL STIFFENING)	10500X4600X300
75	78124	2.406	2.306	PIPES(DOME INTERNAL STIFFENING) PIPES(DOME INTERNAL STIFFENING)	3000X1000X900
76	78125	2.004	1.904	PIPES(DOME INTERNAL STIFFENING) PIPES(DOME INTERNAL STIFFENING)	3000X1300X1100
77	78126	10.969	10.869	PIPES(DOME INTERNAL STIFFENING) PIPES(DOME INTERNAL STIFFENING)	2500X2500X2000
78	78127	3.523	3.423	PIPES(DOME INTERNAL STIFFENING) PIPES(DOME INTERNAL STIFFENING)	2000X1500X1500
79	78129	3.332	2.982	LP HEATER NO-1 SUPPORT(LOOSE-LP HEATER NO-1 SUPPORT(LOOSE-	2350X1700X1070
80	78130	4.056	3.766	LP HEATER NO-1 SUPPORT(LOOSE-LP HEATER NO-1 SUPPORT(LOOSE-	9000X1200X580
81	78132	0.485	0.485	UPPER DOME WALL (TUR.SIDE)	10420X300X300
82	78133	0.485	0.485	UPPER DOME WALL (TUR.SIDE)	10420X300X300
83	78136	0.370	0.370	UPPER DOME WALL (TUR.SIDE)	7180X300X300
84	78137	0.250	0.207	LOOSE ITEMS(LOWER DOME WALL RWB SIDE)	1000X1000X1000
85	78139	0.370	0.370	UPPER DOME WALL (RWB SIDE)	7180X300X300

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

86	78140	0.120	0.095	LOOSE ITEMS(LOWER DOME WALL RWB SIDE)	650X650X650
87	78142	6.852	6.652	LOOSE ITEMS(W/BOX HINGEARRANGEMENT	2450X1650X800
88	78143	0.135	0.116	LOOSE ITEMS(W/BOX HINGE ARRANGEMENT	500X500X500
89	78144	1.650	1.558	SWIVEL PIPE ASSY (W/BOX HINGE ARRANGEMENT)	2500X600X750
90	78149	0.564	0.504	UPPER & LOWER BRG.BLOCK(W/BOXHINGE ARRANGEMENT	800X660X580
91	78150	0.914	0.914	FRONT & REAR W/BOX HINGE ARRANGEMENT	1670X1040X480
92	78151	0.914	0.914	FRONT & REAR W/BOX HINGE ARRANGEMENT	1670X1040X480
93	78157	1.000	0.850	LOOSE ITEMS (CONDENSER)	4500X1000X1000
94	78158	0.103	0.083	LOOSE ITEMS (CONDENSER)	800X600X500
95	78159	2.440	2.230	FASTENERS (CONDENSER	1200X1100X850
96	78162	0.180	0.150	LOOSE ITEMS (TOOLS & TACKLES)	300X350X450
97	78166	0.048	0.038	CONDENSER STAND PIPES NO.1 CONDENSER STAND PIPES NO.1	3500X600X600
98	78167	0.670	0.300	LOOSE ITEMS (CONDENSER STANDPIPES NO.1 &2)	3100X300X250
99	78169	0.048	0.038	CONDENSER STAND PIPES NO.2 CONDENSER STAND PIPES NO.2	3500X600X600
100	78301	1.610	1.510	GLAND STEAM CONDENSER GLAND STEAM CONDENSER	1750X1700X1700
101	78304	0.060	0.034	LOOSE ITEMS OF GSC	700X300X200
102	78305	0.035	0.010	LOOSE ITEMS OF GSC (FRAGILE)	600X500X350
103	78315	29.000	28.900	LP HEATER 1	14700X2200X200 0
104	78316	0.150	0.100	STAND PIPES OF LPH-1	2800X350X350
105	78317	0.135	0.110	LOOSE ITEMS OF LPH NO.1	500X400X400
106	78318	0.075	0.050	LOOSE ITEMS OF LP HEATER NO.1	700X400X400
107	78319	0.170	0.120	LOOSE ITEMS OF LPH -1(NFRAGILE	2100X500X400
108	78320	0.664	0.664	TROLLEY FOR LP HEATER NO.1	1350X800X200
	Total	505.378	492.865		

Unit # 4

Condenser (10816)

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
1	78004	8.465	8.465	BOTTOM PLATE(FRONT PART ASSLY)	8800X3600X910

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

2	78005	8.800	8.800	BOTTOM PLATE(REAR PART ASSLY)	8800X3600X1040
3	78006	7.230	7.230	BOTTOM PLATE(MID PART ASSLY-I)	8800X3600X1080
4	78007	7.844	7.844	BOTTOM PLATE(MID PART ASSLY-II)	8800X3600X1120
5	78008	7.286	7.286	BOTTOM PLATE(MID PART ASSLY-III)	8800X3600X1150
6	78010	2.170	1.982	LOOSE ITEMS (BOTTOM PLATE)	4150X1750X750
7	78014	0.920	0.840	LOOSE ITEM (COND.SUPPORT LOOSE ITEM (COND.SUPPORT	2700X1200X500
8	78018	1.540	1.385	LOOSE ITEMS(CONDENSER SUPPORT)	2060X1020X910
9	78019	3.300	3.054	LOOSE ITEMS(CONDENSER SUPPORT)	1740X1120X600
10	78020	7.725	7.475	FRONT WATER CHAMBER(GEN.END)	5330X4460X340
11	78022	17.800	17.550	FRONT WATER BOX(GEN.END)	5250X4460X3100
12	78023	7.725	7.475	FRONT WATER CHAMBER(TUR.END)	5330X4460X340
13	78025	17.800	17.550	FRONT WATER BOX(TUR.END)	5250X4460X3100
14	78026	7.715	7.605	REAR WATER CHAMBER(GEN.END)	5482X4460X340
15	78028	17.670	17.550	REAR WATER BOX (GEN.END)	5250X4460X3100
16	78029	7.715	7.605	REAR WATER CHAMBER(TUR.END)	5482X4460X340
17	78031	17.670	17.550	REAR WATER BOX (TUR.END)	5250X4460X3070
18	78032	2.301	2.301	PLATES(SIDE WALL-TUR.SIDE)	5390X1980X40
19	78033	6.285	6.285	PLATES(SIDE WALL-TUR.SIDE)	5390X2480X60
20	78034	6.285	6.285	PLATE ASSL(SIDE WALL-TUR.SIDE)	5390X2480X60
21	78038	1.190	1.090	LOOSE ITEMS(SIDE WALL-TUR.SIDE)	6100X470X200
22	78040	2.301	2.301	PLATES(SIDE WALL-GEN.SIDE)	5390X1980X40
23	78041	6.285	6.285	PLATES(SIDE WALL-GEN.SIDE)	5390X2480X60
24	78042	6.285	6.285	PLATE ASSL(SIDE WALL-GEN.SIDE)	5390X2480X60
25	78045	0.910	0.810	LOOSE ITEMS(SIDE WALL-GEN.SIDE)	6100X470X200
26	78046	0.350	0.280	LOOSE ITEMS (SHELL INTERNALS)	5934X150X40
27	78047	7.264	7.047	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X800
28	78048	7.264	7.047	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X801
29	78049	7.264	7.047	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X802
30	78050	7.264	7.047	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X803
31	78051	7.525	7.308	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X804
32	78052	7.525	7.308	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X805
33	78053	7.509	7.292	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X806
34	78054	7.497	7.280	SHELL INTERNAL STIFFENING RODS SHELL INTERNAL STIFFENING RODS	3616X1000X807
35	78055	2.220	1.970	ROD (SHELL INTERNAL)	3616X825X500
36	78056	2.220	1.970	ROD (SHELL INTERNAL)	3616X825X501
37	78057	2.228	1.978	ROD (SHELL INTERNAL)	3616X825X502
38	78058	2.318	2.168	AIR EXTRACTION PIPE	9200X900X900

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

39	78059	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
40	78060	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
41	78061	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
42	78062	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
43	78063	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
44	78064	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
45	78065	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
46	78066	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
47	78067	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
48	78068	6.960	6.604	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
49	78069	3.658	3.302	TUBE SUPPORT PLATETUBE SUPPORT PLATE	4650X4225X224
50	78070	3.832	3.482	SHELL INTERNAL DETILSSHELL INTERNAL DETILS	1200X800X800
51	78071	5.045	4.745	LOOSE ITEMS (SHELL INTERNAL)	6300X900X600
52	78072	0.824	0.704	LOOSE ITEMS (SHELL INTERNAL)	1000X800X500
53	78073	1.990	1.840	LOOSE ITEMS (SHELL INTERNAL)	1300X1200X600
54	78074	1.600	1.480	LOOSE ITEMS (SHELL INTERNAL)	3616X825X500
55	78076	8.380	8.380	LOWER DOME WALL (TUR.END)-LOWER PART	13480X2706X400
56	78077	4.895	4.895	LOWER DOME WALL (TUR.END)-UPPER PART	8175X3800X300
57	78078	0.625	0.525	LOOSE ITEMS (LOWER DOME WALL - TUR SIDE)	6000X1200X200
58	78079	4.832	4.832	LOWER DOME WALL (TUR.END)-MIDDLE PART	8184X3800X600
59	78080	0.170	0.152	LOWER DOME WALL(TUR.SIDE)- SIDELOWER DOME WALL(TUR.SIDE)-SIDE	1400X700X500
60	78104	10.225	10.225	LOWER DOME WALL (GEN.SIDE)LOWER PART	13480X2710X730
61	78105	5.210	5.210	LOWER DOME WALL (GEN.SIDE)UPPER PART	8184X3800X730
62	78106	0.920	0.820	LOOSE ITEMS (LOWER DOME WALL - GLOOSE ITEMS (LOWER DOME WALL-G	2410X1150X20
63	78107	4.931	4.931	LOWER DOME WALL(GEN.SIDE)MIDDLE PART	8175X3800X650
64	78108	0.170	0.152	LOWER DOME WALL(GEN.SIDE)SIDELOWER DOME	1400X700X500

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

				WALL(GEN.SIDE) SIDE	
65	78110	7.086	7.086	LOWER DOME WALL (FWB SIDE)-LOWER PART	9200X4700X800
66	78111	6.261	6.261	LOWER DOME WALL (FWB SIDE)-UPPER PART	8300X3800X300
67	78112	0.720	0.600	LOOSE ITEMS (LOWER DOME WALL FWB SIDE)	2500X2500X2000
68	78116	2.497	2.497	LOWER DOME WALL (RWB SIDE LOWER PART)	9200X1600X800
69	78117	5.004	5.004	LOWER DOME WALL (RWB SIDE)-UPPER PART	8000X2900X1100
70	78118	1.900	1.800	LOOSE ITEMS LOWER DOME WALL(FWB SIDE)	2000X2000X1700
71	78119	10.522	10.522	LOWER DOME WALL (RWB SIDE)-MIDDLE PART	8810X3200X1530
72	78121	2.320	2.320	PIPES(DOME INTERNAL STIFFENING)PIPES(DOME INTERNAL STIFFENING	6000X600X600
73	78122	12.777	12.777	PIPES(DOME INTERNAL STIFFENING)PIPES(DOME INTERNAL STIFFENING	10500X4700X800
74	78123	4.196	4.196	PIPES(DOME INTERNAL STIFFENING)	10500X4600X300
75	78124	2.306	2.306	PIPES(DOME INTERNAL STIFFENING)	3000X1000X900
76	78125	1.904	1.904	PIPES(DOME INTERNAL STIFFENING)	3000X1300X1100
77	78126	10.869	10.869	PIPES(DOME INTERNAL STIFFENING)PIPES(DOME INTERNAL STIFFENING	2500X2500X2000
78	78127	3.523	3.423	PIPES(DOME INTERNAL STIFFENING)PIPES(DOME INTERNAL STIFFENING	2000X1500X1500
79	78129	3.332	2.982	LP HEATER NO-1 SUPPORT(LOOSE-LP HEATER NO-1 SUPPORT(LOOSE-	2350X1700X1070
80	78130	4.056	3.766	LP HEATER NO-1 SUPPORT(LOOSE-LP HEATER NO-1 SUPPORT(LOOSE	9000X1200X580
81	78132	0.485	0.485	UPPER DOME WALL (TUR.SIDE)	10420X300X300
82	78133	0.485	0.485	UPPER DOME WALL(GEN.SIDE)	10420X300X300
83	78136	0.370	0.370	UPPER DOME WALL (FWB SIDE)	7180X300X300
84	78137	0.250	0.207	LOOSE ITEMS(UPPER DOME WALLFWB SIDE)	1000X1000X1000
85	78139	0.370	0.370	UPPER DOME WALL (RWB SIDE)	7180X300X300
86	78140	0.120	0.095	Loose Items (Upper Dome WallRWB SIDE)	650X650X650
87	78142	6.852	6.652	LOOSE ITEMS(W/BOX HINGE ARRANGEMENT	2450X1650X800
88	78143	0.135	0.116	LOOSE ITEMS(W/BOX HINGE ARRANGEMENT	500X500X500

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

89	78144	1.650	1.558	SWIVEL PIPE ASSY (W/BOX HINGE ARRANGEMENT)	2500X600X750
90	78149	0.564	0.504	UPPER & LOWER BRG. BLOCK(W/BOX HINGE ARRANGEMENT)	800X660X580
91	78150	0.914	0.914	FRONT & REAR W/BOX HINGE ARRANGEMENT	1670X1040X480
92	78151	0.914	0.914	FRONT & REAR W/BOX HINGE ARRANGEMENT	1670X1040X480
93	78157	1.000	0.850	LOOSE ITEMS (CONDENSER)	4500X1000X1000
94	78158	0.103	0.083	COND. LOOSE ITEMS (RUBBER CORDFOR BOTH CONDENSER)	800X600X500
95	78159	2.440	2.230	FASTENERS (CONDENSER)	1200X1100X850
96	78162	0.140	0.110	TOOLS & TACKLES(CONDENSER)TOOLS & TACKLES(CONDENSER)	300X350X200
97	78166	0.048	0.038	CONDENSER STAND PIPES NO.1CONDENSER STAND PIPES NO.1	3500X600X600
98	78167	0.670	0.300	LOOSE ITEMS (CONDENSER STANDPIPES NO.1 &2)	3100X300X250
99	78169	0.048	0.038	CONDENSER STAND PIPES NO.2 CONDENSER STAND PIPES NO.2	3500X600X600
100	78301	1.610	1.510	GLAND STEAM CONDENSER	1750X1700X1700
101	78304	0.060	0.034	LOOSE ITEMS OF GSC	700X300X200
102	78305	0.035	0.010	LOOSE ITEMS OF GSC (FRAGILE)	600X500X350
103	78315	29.000	28.900	LP HEATER 1	14700X2200X2000
104	78316	0.150	0.100	STAND PIPES OF LPH-1	2800X350X350
105	78317	0.135	0.110	LOOSE ITEMS OF LPH NO.1	500X400X400
106	78318	0.075	0.050	LOOSE ITEMS OF LP HEATER NO.1	700X400X400
107	78319	0.170	0.120	LOOSE ITEMS OF LPH -1(NFRAGILE	2100X500X400
108	78320	0.664	0.664	TROLLEY FOR LP HEATER NO.1	1350X800X200
109	78424	3.135	2.700	HYDROGEN COOLER	4600X1450X800
110	78425	3.135	2.700	HYDROGEN COOLER	4600X1450X800
111	78428	2.550	2.350	LOOSE ITEMS(HYDROGEN COOLER)	1300X100X600
112	78431	2.000	1.650	EXCITER AIR COOLER	XX
113	78432	2.000	1.650	EXCITER AIR COOLER	XX
	Total	518.122	503.525		

Unit # 3

Turbine (10815) Hardwar Supply

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
1	75001/1	1.260	0.960	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X1500X600

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

2	75001/2	1.280	1.020	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2600X600X600
3	75001/3	1.620	1.370	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X800X700
4	75001/4	0.955	0.715	ARRANGE.OF EMBED(ANCHOR POINT)-ANCHOR BOX TYPE-A	1880X920X1050
5	75001/5	0.955	0.715	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X800X600
6	75001/6	1.165	0.860	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2400X800X600
7	75001/7	1.015	0.740	ARRANGE.OF EMBED(ANCHOR POINT)-EMBED.FOR LPC GUIDE BOLT	1450X1375X1230
8	75001/8	0.920	0.650	ARRANGE.OF EMBED(ANCHOR POINT)-EMBED.FOR LPC GUIDE BOLT	1450X1370X1230
9	75001/9	1.340	1.140	ARRANGE.OF EMBED(ANCHOR POINT)-LOOSE ITEMS	1350X1150X950
10	75001/10	1.005	0.750	ARRANGE.OF EMBED(ANCHOR POINT)-ANCHOR RODS/NUTS (L=3000)	3300X700X700
11	75001/11	3.080	2.550	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2800X800X600
12	75102/0	22.101	21.901	CASING UPPER PART	10800X3600X3500
13	75103/0	22.250	22.050	CASING UPPER PART	10800X3600X3500
14	75104/0	0.884	0.584	RUPTURE DIAPHRAGM ASSEMBLY	1100X1100X1150
15	75107/0	9.400	9.300	CASING SIDE WALL (LEFT)	6700X5000X200
16	75108/0	9.400	9.300	CASING SIDE WALL (RIGHT)	6700X5000X200
17	75109/0	23.100	23.000	FRONT WALL (TS)	10800X5000X1400
18	75110/0	23.100	23.000	FRONT WALL (TS)	10800X5000X1400
19	75111/0	1.130	0.730	LP SHAFT SEAL CASING - TS	2000X1650X750
20	75112/0	1.130	0.730	LP SHAFT SEAL CASING - GS	2000X1650X750
21	75113/0	1.852	1.452	LP SHAFT SEAL COMPENSATOR (TS)	2800X2800X800
22	75114/0	1.852	1.452	LP SHAFT SEAL COMPENSATOR (GS)	2800X2800X800
23	75116/1	9.307	9.307	CASING FRAME SECTION	9000X1500X3600
24	75116/2	7.450	7.145	CASING FRAME SECTIONCASING FRAME SECTION	2500X1000X2000
25	75705/0	1.380	0.945	LP EXTRACTION A1	3050X1430X1430
26	75706/0	0.770	0.465	LP EXTRACTION A1	2490X1330X1120
27	75707/1	1.380	0.945	LP EXTRACTION A1	3050X1430X1430
28	75707/2	0.770	0.465	LP EXTRACTION A1	2490X1330X1120
29	75708/0	1.610	1.060	LP EXTRACTION A2	2850X1400X1400
30	75709/0	1.349	0.884	LP EXTRACTION A2	3200X1200X1600
31	75710/0	2.030	1.210	LP EXTRACTION A2	5630X1150X1150
32	75711/0	1.252	0.935	LP EXTRACTION A3	2860X1200X1200
33	75712/0	1.348	0.903	LP EXTRACTION A3	4620X1120X1120
34	75713/0	0.286	0.156	LP EXTRACTION A3	1580X930X810
35	75716/1	3.953	3.253	EXTRACTION PIPE SHEATHING A2	3000X1500X1000
36	75716/2	0.065	0.050	EXTRACTION PIPE SHEATHING A2	200X200X150

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

37	75716/3	2.410	1.910	EXTRACTION PIPE SHEATHING A3	3000X2000X1000
38	75716/4	0.070	0.058	EXTRACTION PIPE SHEATHING A3	300X350X300
39	75717/0	1.224	0.924	COMPENSATORS FOR CASING GUIDE	3000X2000X400
40	75723/1	0.950	0.700	LP CASING ASSEMBLY PARTS	7000X500X500
41	75723/2	0.870	0.770	LP CASING ASSEMBLY PARTS	1500X1000X800
42	75723/3	0.026	0.006	LP CASING ASSEMBLY PARTSLP CASING ASSEMBLY PARTS	500X500X400
43	75723/4	0.065	0.055	LP CASING ASSEMBLY PARTS	550X400X300
44	76301/1	1.836	0.986	SUSPENSION OF LPBP VALVE	3600X1700X800
45	76301/2	1.836	0.986	SUSPENSION OF LPBP VALVE	3600X1700X800
46	76412/0	0.515	0.515	LEAKAGE OIL TANK	1000X1000X3000
47	76413/0	0.515	0.515	WASTE OIL TANK	1000X1000X3000
48	76914/0	0.050	0.027	COMPENSATOR	600X600X900
	Total	174.111	160.144		

Unit # 3

Turbine (10815) Seimens Supply

S N	Component	Description	Pcs	Gross Wt. (In MT)	Length m	Width m	Height m
1	HP-Turbine	Turbine Section Assy. 10100000	1	118.5	8.03	3.88	3.4
2	IP-Turbine	Turbine Section Assy. 20100000	1	182.5	9.05	4.43	4.35
3	IP-Turbine	Supporting Arms	1	2.8	2.44	1.22	0.9
4	IP-Turbine	Extraction Connection	1	1.13	1.22	1.23	1.5
5	IP-Turbine	Extraction Connection	1	1.05	1.22	1.23	1.35
6	IP-Turbine	Flange	1	0.37	1.22	1.22	0.73
7	LP-Turbine	Turbine Rotor Assy. 34000000	1	112.5	10.2	4.45	4.63
8	LP-Turbine	Lower Part 32210000	1	92	6.66	6.76	4.43
9	LP-Turbine	Upper Part 32210000	1	48.2	6.86	5.13	4.67
10	LP-Turbine	Guide Blade Carrier	1	9.2	3.51	1.83	1.41
11	LP-Turbine	Guide Blade Carrier	1	9.2	3.51	1.83	1.41
12	LP-Turbine	Stationary Blade Ring	1	7.95	5.01	2.58	1.48
13	LP-Turbine	Stationary Blade Ring	1	7.85	5.01	2.58	1.48
14	Insulation for Turbine	Insulation for Turbine	1	7.9	6.06	2.44	2.59
15	Insulation for Turbine	Insulation for Turbine	1	5.3	6.06	2.44	2.59
16	Insulation for Turbine	Insulation for Turbine	1	5.1	6.06	2.44	2.59
17	Insulation for Turbine	Insulation for Turbine	1	3.4	6.06	2.44	2.59
18	Insulation for Turbine	Insulation for Turbine	1	2.5	3.48	1.69	1.99
19	Insulation for Turbine	Insulation for Turbine	1	1.8	2.85	2.2	2.2
20	Insulation for Turbine	Insulation for Turbine	1	1.5	1.94	1.38	1.67
21	Turbine Valves	Stop/Control Valve Assy. 28015100	1	51.4	6.21	4.87	3.6
22	Turbine Valves	Stop/Control Valve Assy. 28015200	1	51.4	6.21	4.87	3.6

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

23	Turbine Valves	Stop/Control Valve Assy. 18015200	1	35.8	4.64	4.51	3.03
24	Turbine Valves	Stop/Control Valve Assy.18015100	1	35.8	4.64	4.51	3.03
25	Turbine Valves	Valve	1	3.7	2.92	1.83	1.27
26	Turbine Accessories I	LIFTING DEVICE	1	9.8	7.25	1.88	2.48
27	Turbine Accessories I	BLOW-OUT DEVICE	1	6.45	4.34	1.82	1.38
28	Turbine Accessories I	ASSEMBLY FIXTURE	1	5.68	3.85	2.88	3.4
29	Turbine Accessories I	LIFTING DEVICE	1	4.93	8.85	2.03	1.48
30	Turbine Accessories I	BLOW-OUT DEVICE	1	4.44	3.26	1.32	1.65
31	Turbine Accessories I	CONTR.VALVE OPERATOR	1	3.72	2.49	1.35	2.51
32	Turbine Accessories I	CONTR.VALVE OPERATOR	1	3.68	2.49	1.35	2.01
33	Turbine Accessories I	SHAFT SUPPORT	1	3.56	3.7	1.13	2.15
34	Turbine Accessories I	STOP VALVE OPERATOR	1	3.36	2.49	1.35	2.46
35	Turbine Accessories I	ASSEMBLY FIXTURE	1	3.35	4.71	1.33	1.02
36	Turbine Accessories I	STOP VALVE OPERATOR	1	2.8	2.49	1.35	2.07
37	Turbine Accessories I	BLOW-OUT DEVICE	1	2.24	2.8	1.4	1.08
38	Turbine Accessories I	Seal Rings	1	2.06	2.44	1.23	1.34
39	Turbine Accessories I	JOINT COVERING	1	2.02	4.94	1.48	1.37
40	Turbine Accessories I	ASSEMBLY DEVICE	1	2	2.88	1.88	1.14
41	Turbine Accessories I	MEASURING FEELER	1	1.68	5.68	0.68	1.07
42	Turbine Accessories I	SHAFT SUPPORT	1	1.42	5.48	0.88	1.29
43	Turbine Accessories I	LIFTING SLING	1	1.31	2.35	1.43	1.45
44	Turbine Accessories I	JOINT COVERING	1	1.18	2.95	1.08	1.23
45	Turbine Accessories I	LIFTING SLING	1	1.002	1.45	1.38	1.16
46	Turbine Accessories I	LIFTING SLING	1	0.99	1.49	1.43	0.99
47	Turbine Accessories I	CONTR.VALVE OPERATOR	1	0.91	1.37	1.13	1.56
48	Turbine Accessories I	HYDRAULIC CYLINDER	1	0.89	1.81	1.08	1.16
49	Turbine Accessories I	JOINT COVERING	1	0.84	1.95	1.33	0.9
50	Turbine Accessories I	WRENCH	1	0.795	2.19	1.08	0.87
51	Turbine Accessories I	ASSEMBLY FIXTURE	1	0.793	1.5	1.03	1.35
52	Turbine Accessories I	ASSEMBLY FIXTURE	1	0.785	1.5	1.03	1.35
53	Turbine Accessories I	JOINT COVERING	1	0.71	1.57	1.13	1.13
54	Turbine Accessories I	HYDRAULIC SET	1	0.68	2.25	1.03	0.9
55	Turbine Accessories I	FRAME	1	0.677	1.76	1.28	1.42
56	Turbine Accessories I	THREADED STUD BOLT	1	0.666	1.35	0.88	0.73
57	Turbine Accessories I	LIFTING SLING	1	0.566	1.42	1.28	0.9
58	Turbine Accessories I	HEXAGON NUT	1	0.534	1.88	1.03	0.97
59	Turbine Accessories I	ASSEMBLY FIXTURE	1	0.515	0.93	0.68	1.25
60	Turbine Accessories I	RING BURNER	1	0.51	1.96	1.6	0.9
61	Turbine Accessories I	Coupling Bolts	1	0.4	1.22	0.89	0.75
62	Turbine Accessories I	Guide Bolts	1	0.39	1.6	1.22	0.73
63	Turbine Accessories I	LIFTING SLING	1	0.368	1.12	0.95	0.82
64	Turbine Accessories I	HYDRAULIC CYLINDER	1	0.36	1.4	0.88	1.06
65	Turbine Accessories I	LIFTING SLING	1	0.35	1.4	1.39	0.72
66	Turbine Accessories I	Seal Rings	1	0.33	1.22	0.89	0.75

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APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

67	Turbine Accessories I	Sheets	1	0.16	1.22	0.89	0.75
68	Turbine Accessories I	Wrenches	1	0.14	1.22	0.71	0.73
69	Turbine Accessories I	WRENCH	1	0.138	2.84	0.84	0.44
70	Turbine Accessories I	BLOW-OUT DEVICE	1	0.13	1.13	0.58	0.65
71	Turbine Accessories I	LIFTING SLING	1	0.113	0.88	0.88	0.44
72	Turbine Accessories I	SIGN	1	0.095	1.14	0.38	0.37
73	Turbine Accessories I	TENSIONER (TORQUE WRENCH AND TORQUE MULT	1	0.094	0.93	0.73	0.69
74	Turbine Accessories I	ASSEMBLY DEVICE	1	0.09	1.01	0.73	0.64
75	Turbine Accessories I	MOUNTING FRAME	1	0.088	1.05	0.3	0.59
76	Turbine Accessories I	HEATING DEVICE	1	0.084	0.89	0.54	0.7
77	Turbine Accessories I	MOUNTING FRAME	1	0.081	1.22	0.26	0.5
78	Turbine Accessories I	PIPE WRENCH	1	0.064	0.9	0.32	0.63
79	Turbine Accessories I	FLANGE	1	0.057	0.98	0.33	0.48
80	Turbine Accessories I	FLANGE	1	0.057	0.98	0.33	0.48
81	Turbine Accessories I	FLANGE	1	0.057	0.98	0.33	0.48
82	Turbine Accessories I	FLANGE	1	0.057	0.98	0.33	0.48
83	Turbine Accessories I	MOUNTING FRAME FOR BEARING SHEL AU DER LA	1	0.056	0.72	0.3	0.46
84	Turbine Accessories I	LIFTING SLING	1	0.054	0.67	0.67	0.53
85	Turbine Accessories I	LIFTING SLING	1	0.039	0.63	0.63	0.45
86	Turbine Accessories I	Terminal Box	1	0.032	0.48	0.38	0.44
87	Turbine Accessories I	HOLDER	1	0.019	0.54	0.47	0.21
88	Turbine Accessories I	CONNECTING HEAD	1	0.008	0.34	0.24	0.26
89	Turbine Accessories I	NECK PIPE	1	0.007	0.34	0.24	0.26
90	Turbine Accessories I	RATING PLATE	1	0.005	0.34	0.24	0.26
91	Turbine Accessories I	Varnish	1	0.004	0.37	0.27	0.33
92	Turbine Accessories I	Varnish	1	0.004	0.37	0.27	0.33
93	Turbine Accessories II	MOUNTING BRACKET	1	5.58	3.95	1.62	1.44
94	Turbine Accessories II	MOUNTING BRACKET	1	2.32	1.93	1.56	1.16
95	Turbine Accessories II	MOUNTING BRACKET	1	1.61	4.1	1.28	1.34
96	Turbine Accessories II	VALVE WITH ACTUATOR	1	0.68	2.09	1.2	1.29
97	Turbine Accessories II	PIPE	1	0.107	0.73	0.73	0.81
98	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	14.7	5.34	2.93	3.67
99	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	6.23	3.24	3.03	1.5
100	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	5.4	4.38	2.4	2.6
101	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	4.4	2.51	2.4	2.7
102	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	3.3	2.73	2.55	1.62
103	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2.5	6.38	0.88	0.99
104	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2.34	1.78	2.3	2.53
105	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	1.54	2.28	2.08	1.21
106	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	0.75	2.15	2.03	0.85
107	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	0.38	2.48	2.18	0.28
108	Non Return Valves	NON-RETURN FLAP	1	7.73	3.38	2.58	2.53
109	Non Return Valves	NON-RETURN FLAP	1	4.09	2.79	1.93	2.08
110	Non Return Valves	NON-RETURN FLAP	1	2.86	2.68	1.73	1.88

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

111	Non Return Valves	NON-RETURN FLAP	1	2.76	2.68	1.73	1.88
112	Non Return Valves	NON-RETURN FLAP	1	2.4	2.51	1.58	1.76
113	Non Return Valves	NON-RETURN FLAP	1	2.16	1.91	1.56	1.75
114	Non Return Valves	NON-RETURN FLAP	1	1.16	2.09	1.18	1.42
115	Non Return Valves	NON-RETURN FLAP	1	0.91	1.44	1.18	1.42
116	Non Return Valves	NON-RETURN FLAP	1	0.66	1.79	0.94	1.17
117	Non Return Valves	NON-RETURN FLAP	1	0.62	1.47	1.08	1.13
118	Special Tool f. Dis- /Assembly HP Turbine	BASE PLATE	1	21.55	4.45	3.03	1.64
119	Special tool for assembly of HP Turbine	Anchor Boxes NON-RETURN FLAP	1	8.9	2.65	2.53	2.39
120	Special Tool f. Dis- /Assembly HP Turbine	Impact Socket Wrench	1	0.013	0.34	0.24	0.26
121	Special Tool f. Dis- /Assembly HP Turbine	Compensator	1	0.007	0.41	0.31	0.31
122	Special Tool f. Dis- /Assembly HP Turbine	Bolt	1	0.007	0.31	0.16	0.17
Total				987.988			

Unit # 4

Haridwar Supply

Turbine (10816)

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
1	75001/1	1.260	0.960	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X1500X600
2	75001/2	1.280	1.020	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2600X600X600
3	75001/3	1.620	1.370	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X800X700
4	75001/4	0.955	0.715	ARRANGE.OF EMBED(ANCHOR POINT)- ANCHOR BOX TYPE-A	1880X920X1050
5	75001/5	0.955	0.715	ARRANGE.OF EMBED(ANCHOR POINT)- ARRANGE.OF EMBED(ANCHOR POINT)	1600X800X600
6	75001/6	1.165	0.860	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2400X800X600
7	75001/7	1.015	0.740	ARRANGE.OF EMBED(ANCHOR POINT)-EMBED.FOR LPC GUIDE BOLT	1450X1375X1230
8	75001/8	0.920	0.650	ARRANGE.OF EMBED(ANCHOR POINT)-EMBED.FOR LPC GUIDE BOLT	1450X1370X1230
9	75001/9	1.340	1.140	ARRANGE.OF EMBED(ANCHOR POINT)-LOOSE ITEMS	1350X1150X950
10	75001/10	1.005	0.750	ARRANGE.OF EMBED(ANCHOR POINT)-ANCHOR RODS/NUTS (L=3000)	3300X700X700

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

11	75001/11	3.080	2.550	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2800X800X600
12	75003/1	1.425	0.725	BASE PLATE ASSEMBLY	2500X2000X1500
13	75004/0	2.777	2.477	BASE PLATE ASSEMBLY	2200X1150X750
14	75102/0	22.101	21.901	CASING UPPER PART	10800X3600X3500
15	75103/0	22.250	22.050	CASING UPPER PART	10800X3600X3500
16	75104/0	0.884	0.584	RUPTURE DIAPHRAGM ASSEMBLY	1100X1100X1500
17	75107/0	9.400	9.300	CASING SIDE WALL (LEFT)	6700X5000X200
18	75108/0	9.400	9.300	CASING SIDE WALL (RIGHT)	6700X5000X200
19	75109/0	23.100	23.000	FRONT WALL (TS)	10800X5000X1400
20	75110/0	23.100	23.000	FRONT WALL (TS)	10800X5000X1400
21	75111/0	1.130	0.730	LP SHAFT SEAL CASING - TS	2000X1650X750
22	75112/0	1.130	0.730	LP SHAFT SEAL CASING - TS	2000X1650X750
23	75113/0	1.852	1.452	LP SHAFT SEAL COMPENSATOR (TS)	2800X2800X800
24	75114/0	1.852	1.452	LP SHAFT SEAL COMPENSATOR (GS)	2800X2800X800
25	75116/0	17.150	17.050	CASING FRAME SECTION	8700X1450X3500
26	75201/0	11.400	10.600	HP/IP BEARING PEDESTAL	4500X1800X2100
27	75202/0	0.350	0.250	HP/IP BEARING PEDESTAL (PARTS)	1000X600X600
28	75401/0	22.200	20.000	IP-LP BEARING PEDESTAL ASSLYIP-LP BEARING PEDESTAL ASSLY	7500X2000X2400
29	75402/0	1.400	1.000	BEARING PEDESTAL (PARTS)	2200X1700X600
30	75501/0	21.500	19.400	LP/GEN. PEDESTAL ASSEMBLY	7100X1800X2400
31	75502/0	0.710	0.400	BEARING PEDESTAL (PARTS)	2200X1500X500
32	75601/1	12.286	10.958	FRONT BEARING PEDESTAL	3400X1400X1600
33	75601/2	0.653	0.519	HYDRALLIC TURNING MOTOR	1300X800X1500
34	75601/3	0.350	0.250	FRONT BEARING PEDESTALS(PARTS)	1000X600X600
35	75705/0	1.380	0.945	LP EXTRACTION A1	3050X1430X1430
36	75706/0	0.770	0.465	LP EXTRACTION A1	2490X1330X1120
37	75707/1	1.380	0.945	LP EXTRACTION A1	3050X1430X1430
38	75707/2	0.770	0.465	LP EXTRACTION A1	2490X1330X1120
39	75708/0	1.610	1.060	LP EXTRACTION A2	2850X1400X1400
40	75709/0	1.349	0.884	LP EXTRACTION A2	3200X1200X1600
41	75710/0	2.030	1.210	LP EXTRACTION A2	5630X1150X1150
42	75711/0	1.252	0.935	LP EXTRACTION A3	2860X1200X1200
43	75712/0	1.348	0.903	LP EXTRACTION A3	4620X1120X1120
44	75713/0	0.286	0.156	LP EXTRACTION A3	1580X930X810
45	75716/1	3.953	3.253	EXTRACTION PIPE SHEATHING A2	3000X1500X1000
46	75716/2	0.065	0.050	EXTRACTION PIPE SHEATHING A2	200X200X150
47	75716/3	2.410	1.910	EXTRACTION PIPE SHEATHING A3	3000X2000X1000
48	75716/4	0.070	0.058	EXTRACTION PIPE SHEATHING A3	300X350X300
49	75717/0	1.224	0.924	COMPENSATORS FOR CASING GUIDE	3000X2000X400
50	75720/0	34.000	33.000	LP INNER CASING (U/H)	6150X4777X3820
51	75721/0	87.294	78.000	LP INNER CASING (L/H)	6812X6530X4360
52	75722/1	8.900	6.500	ASSEMBLY OF GUIDE BLADECARRIERS 2L & 3L	5000X2900X1600
53	75722/2	8.900	6.500	ASSEMBLY OF GUIDE BLADECARRIERS 2R & 3R	5000X2900X1600
54	75722/3	10.000	8.400	ASSEMBLY OF GUIDE BLADECARRIER LP 1L (U/H)	4700X1900X1500

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/MADT1-STG U-3 & U-4/1217-1218

Technical Conditions of Contract –Volume I A (Part I : Contract Specific Details)

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

55	75722/4	10.000	8.400	ASSEMBLY OF GUIDE BLADECARRIER LP 1R (U/H)	4700X1900X1500
56	75723/0	1.720	1.470	LP CASING ASSEMBLY PARTS	3000X2000X1200
57	75724/1	2.750	1.450	LP INNER CASING ASSEMBLY(PARTS	3300X1750X350
58	75724/2	1.490	0.890	LP INNER CASING ASSEMBLY(PARTS	600X600X500
59	75801/0	102.000	95.000	LP ROTOR	8174X4500X4456
60	75901/0	29.314	27.100	IP ROTOR	6090X1880X1700
61	75902/0	0.000	35.000	IP OUTER CASING (U/H)	6040X4320X2200
62	75903/0	39.220	38.220	IP OUTER CASING (L/H)	5300X5300X2200
63	75904/0	26.000	25.000	IP INNER CASING (U/H)	3600X3300X1650
64	75905/0	30.000	29.000	IP INNER CASING (L/H)	3600X3300X1650
65	75906/0	3.065	2.707	SUPPORTING ARMS-IP OUTERCASING	1560X1335X1330
66	75907/0	0.700	0.550	IP SHAFT SEALING	1400X1200X900
67	75908/0	8.650	6.900	IP TURBINE (PARTS)	3000X2500X1600
68	75909/0	0.475	0.365	I.P. TURBINE PARTS	1000X1000X750
69	76001/0	115.000	100.000	HP TURBINE	XX
70	76002/0	0.750	0.500	HP INLET ASSEMBLY	XX
71	76004/0	0.800	0.500	HP TURBINE PARTS	XX
72	76104/0	33.100	31.600	ESV & CV CASING WITH VALVESESV & CV CASING WITH VALVES	4700X4700X2700
73	76108/0	33.100	31.600	ESV & CV CASING WITH VALVESESV & CV CASING WITH VALVES	4700X4700X2700
74	76112/0	7.500	5.500	OVERLOAD VALVE CASINGWITH VALVE	3000X2000X1400
75	76201/0	1.600	1.000	SUSPENSION OF OVERLOAD VALVE	3800X3000X1000
76	76202/0	52.000	45.000	IV & CV CASING WITH VALVES	6210X4870X3600
77	76206/0	52.000	45.000	IV & CV CASING WITH VALVES	6210X4870X3600
78	76301/1	1.836	0.986	SUSPENSION OF LPBP VALVE	3600X1700X800
79	76301/2	1.836	0.986	SUSPENSION OF LPBP VALVE	3600X1700X800
80	76412/0	0.515	0.515	LEAKAGE OIL TANK	1000X1000X3000
81	76413/0	0.515	0.515	WASTE OIL TANK	1000X1000X3000
82	76601/0	3.600	3.200	COMPONENTS OF COP ASSEMBLY	3000X3000X2400
83	76602/0	3.692	3.267	COMPONENTS OF COP ASSEMBLY	3700X3000X2000
84	76603/0	5.400	5.000	COMPONENTS OF COP ASSEMBLY	3100X3100X1100
85	76604/0	2.400	2.100	COMPONENTS OF COP ASSEMBLY	2100X2200X2200
86	76605/0	12.450	11.500	COMPONENTS OF COP ASSEMBLY	5000X3300X3000
87	76606/0	3.100	2.700	COMPONENTS OF COP ASSEMBLY	2270X2270X1730
88	76607/0	1.900	1.720	COMPONENTS OF COP ASSEMBLY	6200X1000X300
89	76608/0	1.400	1.200	COMPONENTS OF COP ASSEMBLY(PARTS)	2200X2200X1000
90	76801/0	0.075	0.050	RATING,COLLABORATION ANDCOMPANY'S MONOGRAM	XX
91	76914/0	0.050	0.027	COMPENSATOR	600X600X900
	Total	981.989	921.679		

Unit #

3

Generator (10815)

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
3	603	2.170	1.670	FOUNDATION ITEMS	5800X1120X520
29	637	32.928	29.928	BRUSHLESS EXCITER SET	5750X2350X3400
30	640	1.741	0.860	EXCITER BED PLATE ACCESSORIES	3900X1250X1150
31	642	1.111	0.611	EXCITER ACCESSORIES	2200X1200X1100
32	642/1	0.592	0.392	EXCITER ACCESSORIES (DRY AIR BLOWER)	1800X1500X1100
33	643	0.775	0.695	EXCITER BED PLATE ACCESSORIES (NON TEST BED ITEMS)	1000X800X800
34	644	1.572	0.872	RR WHEEL AIR GUIDE COVER	2800X1500X2000
35	645	2.500	1.940	SEAL OIL STORAGE TANK	5000X1800X1700
36	646	7.065	4.550	PW PUMP AND FILTER UNIT	4000X4000X3000
37	648/1	5.300	4.300	SINGLE FLOW S.O.U.-PART I	3910X3100X3200
38	648/2	4.525	3.525	SINGLE FLOW S.O.U. -PART II	2510X2500X3300
39	649	0.660	0.460	LIQUID DETECTOR RACK	2000X600X2000
40	650	1.205	0.630	GAS UNIT	1980X1640X2420
41	651	0.250	0.170	CO2 VAPOURISER	1520X840X840
42	652	0.333	0.150	H2 DISTRIBUTOR	2400X900X2400
43	653	0.353	0.163	CO2 DISTRIBUTOR	3000X900X2400
44	654	0.143	0.060	N2 DISTRIBUTOR	1400X1240X440
45	655	0.139	0.089	DRAIN OIL COLLECTOR	2000X550X550
46	656	0.100	0.056	RESINS	1200X600X600
47	657	2.486	1.986	TG SYSTEM INTEGRAL PIPING (VALVES)	2750X1400X1400
48	658	0.222	0.172	TG SYSTEM INTEGRAL PIPING (INSTRUMENTS)	1000X940X900
	Total	66.17	53.279		

Unit # 3

Generator (10815) Seimens Supply

S N	Component	Description	Pcs	Gross Wt. (In MT)	Length m	Width m	Height m
1	Generator Rotor	Rotor compl. 1000	1	81.5	14.72	2.05	2.12
2	Generator Rotor	ROPES F. ROTOR	1	0.94	1.73	1.58	1.08
3	Generator Rotor	Spreader Beam	1	0.14	2.8	0.55	0.31
4	Generator (excl. Rotor)	Stator Assy.	1	326.5	12.38	4.45	4.37
5	Generator (excl. Rotor)	COVER ASSEMBLY	1	7	4.12	3.5	3.78
6	Generator (excl. Rotor)	ROPES F. STATOR	1	3	3.34	1.7	1.26
7	Generator (excl. Rotor)	Brush Carriers	1	2.5	2.52	1.91	1.61
8	Generator (excl. Rotor)	GENO parts	1	1.71	2.44	1.23	1.34
9	Generator (excl. Rotor)	Lifting Beams	1	1.15	1.6	1.22	1.35
10	Generator (excl. Rotor)	Assembly Device	1	1.14	1.6	1.22	1.35
11	Generator (excl. Rotor)	Frame + Bow	1	1.1	3.62	3.26	0.85
12	Generator (excl. Rotor)	HYDR.JACKS, PUMP A. ACCESS.	1	1.08	2.66	1.43	1.07
13	Foundation Accessories	FOUNDATION BEAM, -	1	12	6.25	2.18	1.07

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

		BASE FRAME					
14	Foundation Accessories	Geno Foundation	1	5.34	2.76	2.13	1.31
15	Foundation Accessories	FUNDAMENTBALKEN BUERSTENTRAEGER	1	2.58	4.33	1.58	0.67
16	Foundation Accessories	Foundation brush holder	1	1.8	2.14	1.53	1.09
17	Foundation Accessories	Water Connection	1	0.032	2	0.29	0.29
18	Foundation Accessories	03/12 Hardener	1	0.005	0.37	0.27	0.33
19	Foundation Accessories	03/12 Hardener	1	0.005	0.37	0.27	0.33
20	Foundation Accessories	03/12 Hardener	1	0.005	0.37	0.27	0.33
21	Foundation Accessories	03/12 Epoxy Resin	1	0.004	0.37	0.27	0.33
22	Foundation Accessories	03/12 Epoxy Resin	1	0.004	0.37	0.27	0.33
23	Foundation Accessories	03/12 Epoxy Resin	1	0.004	0.37	0.27	0.33
24	Foundation Accessories	03/12 Epoxy Resin	1	0.004	0.37	0.27	0.33
25	Foundation Accessories	03/12 Hardener	1	0.004	0.37	0.27	0.33
26	Foundation Accessories	03/12 Epoxy Resin	1	0.004	0.37	0.27	0.33
27	Foundation Accessories	03/12 Hardener	1	0.003	0.37	0.27	0.33
28	Foundation Accessories	Teflon-Spray	1	0.003	0.37	0.27	0.33
29	Foundation Accessories	Teflon-Spray	1	0.003	0.37	0.27	0.33
30	Generator	dangerous good class 2	1	0.0064	0.34	0.26	0.33
31	Generator	dangerous good class 9	1	0.048	0.8	0.6	0.59
32	Generator	dangerous good class 8	1	0.022	0.59	0.39	0.45
33	Generator	non dangerous good - Kleber etc.	1	0.036	0.8	0.6	0.59
34	Generator	cooler	1	2.594	3.44	2.1	1.09
35	Generator	RG cover	1	1.5	2.44	1.7	2.2
36	Generator	sound absorbing cover / Geno-Erreger	1	8.261	4.88	4.37	3.57
37	Generator	end cover	1	0.845	2.44	1.4	1.98
38	Generator	dangerous good class 3 / UN 1133	1	0.007	0.34	0.26	0.33
39	Generator	accessories, assembly parts	1	2.229	4.75	1.25	1.08
40	Generator	dangerous good class 8	1	0.007	0.34	0.26	0.33
41	Generator	exciter machine	1	30.189	6.34	2.42	2.97
42	Generator Accessories I	Frame Cooler Head	1	21.4	4.55	4.63	2.18
43	Generator Accessories I	End shield bearing	1	17.6	3.97	3.02	2.36
44	Generator Accessories I	End shield bearing	1	17.2	3.97	2.78	2.36
45	Generator Accessories I	H.V. Terminal Box	1	6.4	3.56	2.63	1.79
46	Generator Accessories I	Cooler	1	5.6	4.91	2.43	1.4
47	Generator Accessories I	Primary Water Tank	1	5.4	10.51	2.43	1.52
48	Generator Accessories I	Assembly Supports	1	5.4	2.99	2.05	1.76
49	Generator Accessories I	slip ring shaft	1	5.237	3.64	1.32	1.56
50	Generator Accessories I	Baffle Ring + Carrier	1	1.85	2.03	1.83	1.71

BHEL-PSWR

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APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

51	Generator Accessories I	Bearing Shells	1	1.62	1.6	1.22	1.35
52	Generator Accessories I	Platform	1	1.56	5.21	1.81	1.15
53	Generator Accessories I	H.V. Bushings	1	1.3	1.93	1.59	0.61
54	Generator Accessories I	Bearing Pedestal	1	1.1	1.53	0.81	1.37
55	Generator Accessories I	Connection Halves	1	0.9	2.44	1.22	0.73
56	Generator Accessories I	Seal Ring Holders	1	0.9	1.22	1.22	0.73
57	Generator Accessories I	Support Block	1	0.71	2.44	1.22	0.73
58	Generator Accessories I	Cooler Covers	1	0.7	1.6	1.22	0.73
59	Generator Accessories I	Current Connections	1	0.595	1.22	1.22	0.73
60	Generator Accessories I	Sealing Wall	1	0.4	1.67	1.7	0.47
61	Generator Accessories I	Labyrinth Rings	1	0.4	1.22	1.23	1.35
62	Generator Accessories I	Sliding Pedestal	1	0.39	1.22	0.89	0.8
63	Generator Accessories I	Sliding Plate	1	0.25	7.99	0.59	0.28
64	Generator Accessories I	Vibration Detectors	1	0.23	1.6	1.22	0.73
65	Generator Accessories I	Hose Lines	1	0.19	1.22	1.22	0.73
66	Generator Accessories I	Bonnets	1	0.095	1.22	0.71	0.73
67	Generator Accessories I	Seal Ring	1	0.055	0.7	0.69	0.29
68	Generator Accessories I	Seal Ring	1	0.05	0.65	0.65	0.27
69	Generator Accessories I	Angle Steel	1	0.04	1.62	0.24	0.29
70	Generator Accessories I	Profiles	1	0.036	0.48	0.38	0.44
71	Generator Accessories I	09/11 EP.Res.Priming Coat	1	0.019	0.41	0.41	0.47
72	Generator Accessories I	11/11 Varnish	1	0.009	0.37	0.27	0.33
73	Generator Accessories I	Leakage Test Agent	1	0.009	0.37	0.27	0.33
74	Generator Accessories I	09/11 EP-Catalyst	1	0.005	0.37	0.27	0.33
75	Generator Accessories I	03/12 Varnish	1	0.005	0.37	0.27	0.33
76	Generator Accessories I	Adhesive	1	0.004	0.37	0.27	0.33
77	Generator Accessories I	08/16 Epoxy Resin	1	0.004	0.37	0.27	0.33
78	Generator Accessories I	03/12 Insulation Varnish	1	0.004	0.37	0.27	0.33
79	Generator Accessories I	12/11 Jointing Compound	1	0.004	0.37	0.27	0.33
80	Generator Accessories I	07/16 Epoxy Resin	1	0.004	0.37	0.27	0.33
81	Generator Accessories I	Adhesive	1	0.004	0.37	0.27	0.33
82	Generator Accessories I	09/11 Assembly Slide Material	1	0.004	0.37	0.27	0.33
83	Generator Accessories I	10/11 Epoxy Resin	1	0.004	0.37	0.27	0.33
84	Generator Accessories I	03/12 Adhesive	1	0.004	0.37	0.27	0.33
85	Generator Accessories I	03/12 Assembly Slide Material	1	0.004	0.37	0.27	0.33
86	Generator Accessories I	Adhesive	1	0.004	0.37	0.27	0.33
87	Generator Accessories I	Jointing Compound	1	0.003	0.37	0.27	0.33
88	Generator Accessories I	08/11 Hardener	1	0.003	0.37	0.27	0.33
89	Generator Accessories I	Adhesive	1	0.003	0.37	0.27	0.33
90	Generator Accessories I	03/12 Adhesive	1	0.003	0.37	0.27	0.33
91	Generator Accessories I	Jointing Compound	1	0.003	0.37	0.27	0.33
92	Generator Accessories I	Jointing Compound	1	0.003	0.37	0.27	0.33

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

93	Generator Accessories I	03/12 Adhesive	1	0.003	0.37	0.27	0.33
94	Generator Accessories I	Adhesive	1	0.003	0.37	0.27	0.33
95	Generator Accessories I	O-Rings	1	0.001	0.31	0.16	0.17
				593.0284			

Unit #

4

Generator (10816)

S N	PKG. NO	GROSS WT (In MT)	NET WT (In MT)	DESCRIPTION	PKG SIZE
1	601	11.915	9.985	FOUNDATION PLATES	6400X1680X950
2	602	0.960	0.760	FOUNDATION BOLTS	2540X655X600
3	603	2.170	1.670	FOUNDATION ITEMS	5800X1120X520
4	605	312.000	292.000	GENERATOR STATOR	9860X4440X4260
5	606	84.215	75.005	GENERATOR ROTOR	14125X1790X1740
6	607	9.883	8.250	END SHIELD LOWER HALF (TE)	3800X1500X2240
7	608	8.883	7.250	END SHIELD UPPER HALF (TE)	3800X1500X2240
8	609	9.933	8.300	END SHIELD LOWER HALF (EE)	3800X1500X2240
9	610	8.933	7.300	END SHIELD UPPER HALF (EE) END SHIELD UPPER HALF (EE)	3800X1500X2240
10	611	1.906	1.696	GENERATOR BEARING (EE & TE)	1180X1050X1170
11	612	1.315	0.897	BAFFLE RING CARRIER & AIR GAP SEAL ASSY.	2035X1885X1200
12	613	1.523	1.158	TERMINAL BUSHINGS	2200X1830X610
13	614	7.337	5.302	TERMINAL BUSHING BOX	3500X2600X1740
14	615	1.435	1.030	SHAFT SEALS (EE & TE) & OIL CATCHER (INNER & OUTER)	2140X1140X965
15	616	1.218	0.738	BAFFLE RING ASSY	2070X1870X1080
16	617	0.815	0.450	GENERATOR ACCESSORIES	1500X1500X1000
17	618	0.592	0.492	FLEXIBLE TERMINAL CONNECTIONS	1350X950X400
18	619	0.550	0.500	GENERATOR ACCESSORIES	950X950X450
19	620	0.810	0.710	GENERATOR ACCESSORIES	1000X1000X750
20	621	0.140	0.085	GENERATOR ACCESSORIES	1700X1200X250
21	622	2.040	1.840	PRIMARY WATER TANK	10500X2400X1200
22	623	0.830	0.430	PW TANK PIPE LINES	4500X1800X500
23	624	0.680	0.530	PW TANK PIPE LINES	3000X600X500
24	625	1.190	0.790	PLATFORM FOR PW TANK	5000X1200X600
25	626	21.500	19.992	COOLER HOUSING FRAME	4290X4450X1428
26	627	0.090	0.065	SEAL RINGS	750X750X200
27	628	0.858	0.708	CONNECTION PIECE ASSEMBLY	1650X1100X450
28	631	0.080	0.052	DRY AIR BLOWER	1100X1000X700
29	637	32.928	29.928	BRUSHLESS EXCITER SET	5750X2350X3400
30	640	1.741	0.860	EXCITER BED PLATE ACCESSORIES	3900X1250X1150
31	642	1.111	0.611	EXCITER ACCESSORIES	2200X1200X1100
32	642/1	0.592	0.392	EXCITER ACCESSORIES (DRY AIR BLOWER)	1800X1500X1100
33	643	0.775	0.695	EXCITER BED PLATE ACCESSORIES (NON TEST BED ITEMS)	1000X800X800
34	644	1.572	0.872	RR WHEEL AIR GUIDE COVER	2800X1500X2000

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

35	645	2.500	1.940	SEAL OIL STORAGE TANK	5000X1800X1700
36	646	7.065	4.550	PW PUMP AND FILTER UNIT	4000X4000X3000
37	648/1	5.300	4.300	SINGLE FLOW S.O.U. -PART I	3910X3100X3200
38	648/2	4.525	3.525	SINGLE FLOW S.O.U. -PART II	2510X2500X3300
39	649	0.660	0.460	LIQUID DETECTOR RACK	2000X600X2000
40	650	1.205	0.630	GAS UNIT	1980X1640X2420
41	651	0.250	0.170	CO2 VAPOURISER	1520X840X840
42	652	0.333	0.150	H2 DISTRIBUTOR	2400X900X2400
43	653	0.353	0.163	CO2 DISTRIBUTOR	3000X900X2400
44	654	0.143	0.060	N2 DISTRIBUTOR	1400X1240X440
45	655	0.139	0.089	DRAIN OIL COLLECTOR	2000X550X550
46	656	0.100	0.056	RESINS	1200X600X600
47	657	2.486	1.986	TG SYSTEM INTEGRAL PIPING (VALVES)	2750X1400X1400
48	658	0.222	0.172	TG SYSTEM INTEGRAL PIPING (INSTRUMENTS)	1000X940X900
49	659	0.055	0.040	CONSUMABLES	800X400X200
	Total	557.856	499.634		

Unit # 3

Hardwar BOIs

SNO	ITEM ID	ITEM DESC	QTY	Approx Wt (In MT)
Generator & Auxiliaries				
1	BG001	EMPTY H2 CYLINDER	120 Nos	11
2	BG002	EMPTY CO2 CYLINDER	40 Nos	
3	BG003	EMPTY N2 CYLINDER	12 Nos	
4	BG004	PORTABLE GAS ANALYSER	1 No	
5	BG005	MOISTURE MEASURING EQUIPMENT	1 Set	
6	BG007	VAPOUR EXHAUSTER	2 Nos	
7	BG008	MOTORISED TEMPERATURE CONTROL VALVE WITH ACTUATOR NB250 VAR-02	1 Set	
8	BG009	H2 GAS ANALYSER CABINET	2 Nos	
9	BG011	REFRIGERATION GAS DRYER	2 Nos	
10	BG018	STARTING RESISTOR FOR DC S.O MOTOR	1 No	
11	BG021	GROUNDING BRUSH MONITOR	1 Set	
12	BG079	PRIMARY WATER COOLER (PLATE TY	2 Nos	
13	BG080	STROBOSCOPE		
14	BG090	GENERATOR INTEGRAL PIPING	1 Set	
15	BG091	HYDROGEN COOLERS PIPING	1 Set	
16	BG092	PW TEMPERATURE CONTROL VALVE	1 No	
17	BG093	THREE PHASE UPS FOR GENERATOR		
18	BG098	EXCITER COVER COMPLETE WITH FA		
Condenser & Heat Exchanger				
19	BH001	WELDED AUSTENITIC S.S. TUBES G	29668 Nos	300
20	BH010	CONDENSOR AIR EVACUATION PACKA	2 Nos	
21	BH012	AIR EXHAUSTER WITH MOTOR	2 Nos	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

22	BH022	MULTI BALL BEARING SUPPORT FOR	1 Set	
Turbine & Auxiliaries				
23	BT006	BUTTERFLY VALVES	1 Set	
24	BT009	NRV WITH ALUMINIUM FLAP	2 Nos	
25	BT011	OIL PURIFICATION UNIT	1 No	
26	BT014	SPRAY NOZZLES	1 Set	
27	BT015	DIRT CATCHERS	1 No	
28	BT016	DAMPER	1 Set	
29	BT017	VARIABLE LOAD SPRING CAGES	1 Set	
30	BT020	THERMAL INSULATION OF TURBINE		27.5
31	BT021	THERMAL INSULATION OF TIP	1 Set	
32	BT023	TURBINE OIL		100
33	BT025	OIL PURIFICATION SYSTEM (CENTR	1 No	
34	BT026	GROUP CABLES	1 Set	
35	BT027	TURBINE INTEGRAL PIPING	1 Set	93.5
36	BT028	H & S FOR TURBINE INTEGRAL PIPING	1 set	
37	BT029	FLOW NOZZLES FOR PG TEST	1 Set	
38	BT030	DRAIN VALVES	1 Set	
39	BT043	CONTROL FLUID (FRF)	1 M3	
40	BT046	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE	1 Set	
41	BT054	STEAM TRAP	1 Set	
42	BT065	GEAR PUMP (LUB. OIL RECIRCULAT	1 No	
43	BT070	LEVEL INSTRUMENTS FOR OIL SYST		
44	BT071	LEVEL INDICATORS FOR OIL TANKS		
45	BT074	VACUUM BREAKER VALVE WITH PNEU	1 No	
46	BT081	HPT STEAM EVACUATION VALVE		
47	BT091	660MW STEAM TURBINE GENERATOR		
48	BT091	660MW STEAM TURBINE GENERATOR		
49	BT093	TG DECK EMBEDMENT	1 Set	
50	BT096	OIL MODULE	1 No	
51	BT097	OIL THROTTLE VALVES	1 Set	
52	BT104	SEAL STEAM CONTROL VALVE WITH		
53	BT105	LEAK STEAM CONTROL VALVE WITH		
54	BT107	PNEUMATIC GLOBE VALVE		
55	BT110	HYDRAULIC POWER SUPPLY UNIT FO		
56	BT115	EXTRACTION & CRH NRVS		
57	BT117	BUTTERFLY VALVE WITH LIMIT SWI		
58	BT118	TURBOVISORY SENSORS & ACCESSOR		
59	BT119	OIL THROTTLE VALVE FOR JACKING		
		Approx Wt for the items whose weight not shown		100
		Total		632

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

Break Up of TG- INTEGRAL PIPING (Part of Bought out items of BHEL HWR)

S No.	DESCRIPTION	Approx Wt (In Kg)	Approx Wt (In MT)
1	LUBE. OIL PIPING (CS & Alloy)	15000	15
2	CONTROL FLUID PIPING (Stainless Steel)	17200	17.2
3	SEAL STEAM PIPING	16000	16
4	CONDENSATE SPRAY PIPING (CS & Alloy Steel)	3600	3.6
5	TURBINE WATER DRAINAGE PIPING (CS & Alloy Steel)	13000	13
6	ACW PIPING (OIL & C.F.ROOM)	5000	5
7	GENERATOR INTEGRAL PIPING—SEAL OIL, P.W. PIPING AND GAS PIPING ETC.	23700	23.7
	Total	93500	93.5

Unit # 4

Hardwar BOIs

SNO	ITEM ID	ITEM DESC	QTY	Approx Wt (In MT)
Generator & Auxiliaries				
1	BG001	EMPTY H2 CYLINDER	120 Nos	11
2	BG002	EMPTY CO2 CYLINDER	40 Nos	
3	BG003	EMPTY N2 CYLINDER	12Nos	
4	BG004	PORTABLE GAS ANALYSER	1 No	
5	BG005	MOISTURE MEASURING EQUIPMENT	1 Set	
6	BG007	VAPOUR EXHAUSTER	2 Nos	
7	BG008	MOTORISED TEMPERATURE CONTROL VALVE WITH ACTUATOR NB250 VAR-02	1 Set	
8	BG009	H2 GAS ANALYSER CABINET	2 Nos	
9	BG011	REFRIGERATION GAS DRYER	2 Nos	
10	BG018	STARTING RESISTOR FOR DC S.O MOTOR	1 No	
11	BG021	GROUNDING BRUSH MONITOR	1 Set	
12	BG079	PRIMARY WATER COOLER (PLATE TY	2 Nos	
13	BG080	STROBOSCOPE		
14	BG090	GENERATOR INTEGRAL PIPING	1 Set	
15	BG091	HYDROGEN COOLERS PIPING	1 Set	
16	BG092	MOTORISED TEMPERATURE CONTROL VALVE FOR PRIMARY WATER	1 No	
17	BG093	THREE PHASE UPS FOR GENERATOR		
18	BG098	EXCITER COVER COMPLETE WITH FA		
Condenser & Heat Exchanger				
19	BH001	WELDED AUSTENITIC S.S. TUBES G	29668 Nos	300
20	BH010	CONDENSOR AIR EVACUATION PACKA	2 Nos	

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APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

21	BH012	AIR EXHAUSTER WITH MOTOR	2 Nos	
22	BH022	MULTI BALL BEARING SUPPORT FOR	1 Set	
Turbine & Auxiliaries				
23	BT006	BUTTERFLY VALVES	1 Set	
24	BT009	NRV WITH ALUMINIUM FLAP	2 Nos	
25	BT011	OIL PURIFICATION UNIT	1 No	
26	BT014	SPRAY NOZZLES	1 Set	
27	BT015	DIRT CATCHERS	1 No	
28	BT016	DAMPER	1 Set	
29	BT017	VARIABLE LOAD SPRING CAGES	1 Set	
30	BT020	THERMAL INSULATION OF TURBINE	1 No	27.5
31	BT021	THERMAL INSULATION OF TIP	1 Set	
32	BT023	TURBINE OIL	1FL	100
33	BT024	DRY AIR PRESERVATION SYSTEM		
34	BT027	TURBINE INTEGRAL PIPING	1 Set	93.5
35	BT028	H & S FOR TURBINE INTEGRAL PIPING	1 Set	
36	BT029	CALIBRATED FLOW NOZZLES ASSLY.	1 Set	
37	BT030	DRAIN VALVES	1 Set	
38	BT043	CONTROL FLUID (FRF)	1M3	
39	BT046	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE	1 Set	
40	BT054	STEAM TRAP	2 Nos	
41	BT065	GEAR PUMP (LUB. OIL RECIRCULAT		
42	BT074	VACUUM BREAKER VALVE WITH PNEU	1 No	
43	BT081	HPT STEAM EVACUATION VALVE	1 No	
44	BT093	TG DECK EMBEDMENT	1 Set	
45	BT096	OIL MODULE	1 No	
46	BT097	OIL THROTTLE VALVES		
47	BT104	SEAL STEAM CONTROL VALVE WITH		
48	BT105	LEAK STEAM CONTROL VALVE WITH		
49	BT107	PNEUMATIC GLOBE VALVE		
50	BT110	HYDRAULIC POWER SUPPLY UNIT FO		
51	BT111	ELECTRO-HYDRAULIC ACTUATORS FO		
52	BT115	EXTRACTION & CRH NRVS		
53	BT117	BUTTERFLY VALVE WITH LIMIT SWI		
54	BT118	TURBOVISORY SENSORS & ACCESSOR		
55	BT119	OIL THROTTLE VALVE FOR JACKING		
56	BT122	MOUNTING HARDWARES FOR MS & HR		
		Approx Wt for the items whose weight not shown		100
		Total		632

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

Break Up of TG- INTEGRAL PIPING (Part of Bought out items of BHEL HWR)

S No.	DESCRIPTION	Approx Wt (In Kg)	Approx Wt (In MT)
1	LUBE. OIL PIPING (CS & Alloy)	15000	15
2	CONTROL FLUID PIPING (Stainless Steel)	17200	17.2
3	SEAL STEAM PIPING	16000	16
4	CONDENSATE SPRAY PIPING (CS & Alloy Steel)	3600	3.6
5	TURBINE WATER DRAINAGE PIPING (CS & Alloy Steel)	13000	13
6	ACW PIPING (OIL & C.F.ROOM)	5000	5
7	GENERATOR INTEGRAL PIPING—SEAL OIL, P.W. PIPING AND GAS PIPING ETC.	23700	23.7
	Total	93500	93.5

Unit # 3 & 4

Motor, RE Joint, Flash Tank, Misc Tanks (Bhopal Supply)

S.No.	ITEM DESCRIPTION	TOTAL QTY / UNIT	DIMENSION (MM)	WT / Nos	Total WT (In MT)	Total WT (In MT)
			(L X W X H)	(In KG)	Unit # 3	Unit # 4
1	H.T. MOTORS					
1.1	BFP MOTOR	2	4200 X 4500 X 3800	23000	46	46
1.2	CEP MOTOR	3	2400 X 2000 X 3700	9500	28.5	28.5
1.3	ACW MOTOR	3	2000 X 1800 X 1100	2800	8.4	8.4
1.4	DMCW MOTOR	3	2000 X 1800 X 1100	2800	8.4	8.4
2	RE JOINTS					
2.1	REJ-OUTLET	1 Set	4750 X 3300 X 4000	25090	25.09	25.09
2.2	REJ-INLET	1 Set	3500 X 3300 X 4500	25010	25.01	25.01
3	FLASH TANKS					
3.1	HP DRAIN	1	4500D X 7000L	Dry: 4800	4.8	4.8
				Flooded: 21000		
3.2	LP DRAIN	1	3000D X 5300L	Dry: 5250 kg	5.25	5.25
				Flooded: 32000 kg		
3.3	UNIT	1	2500D X 3700L	Dry: 1700 kg	1.7	1.7
				Flooded: 4500 kg		

BHEL-PSWR

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APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC.						
3.4	STEAM DRAIN	1	2200D X 3100L	Dry: 4800 kg	4.8	4.8
				Flooded: 21000 kg		
3.5	FWSVD	1	2200D X 3100L	Dry: 1900 kg	1.9	1.9
				Flooded: 6000 kg		
4	MISC TANKS					
4.1	CLEAN OIL TANK	1	3300 X 6300 X 4400	Empty: 8.4 tons	8.4	0
				Flooded: 63.4 tons		
4.2	DIRTY OIL TANK	1	3300 X 6300 X 4400	Empty: 8.4 tons	8.4	0
				Flooded: 63.4 tons		
4.3	OIL UNLOADING	1	2250 X 1200 X 900	Empty: 584 kg	0.584	0
				Flooded: 1584 kg		
4.4	DMCW	1	7200 X 2000 X 2500	Empty: 6 tons	6	6
				Flooded: 26.85 tons		
5	BF VALVES					
5.1	2300- EA	4	3800 X 3200 X 800	12000	48	48
5.2	700-MO	6	1600 X 1100 X 400	1138	6.828	6.828
5.3	600-EA	3	1500 X 900 X 600	755	2.265	2.265
5.4	500-EA	6	1300 X 800 X 350	588	3.528	3.528
5.5	500-MO	1	1300 X 800 X 350	562	0.562	0.562
5.6	450-MO	12	1300 X 800 X 350	387	4.644	4.644
5.7	400-MO	3	1100 X 600 X 300	337	1.011	1.011
5.8	400-EA	3	1100 X 600 X 300	348	1.044	1.044
			Total		251.116	233.732

Unit # 3 & 4 PEM Supply

Sl. No.	Package	Approx WT (In MT) Unit # 3	Approx WT (In MT) Unit # 4
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TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

1	MISC.PUMPS (HORIZONTAL)	40	40
2	CONTROL VALVE		
3	FLOW ELEMENT - NOZZLE	6	6
4	FLOW ELEMENT - ORIFICE		
5	M.E. BELLOWS	35	35
6	STEAM TRAPS	0.2	0.2
7	DUAL PLATE CHECK VALVES	4	4
8	ROTAMETER		0
9	STEEL GATE/GLOBE/NR VALVES(WATER SYSTEM)	2	2
10	GUN METAL VALVES	1	1
11	LUBE OIL TRANSFER PUMPS	0.7	0.7
12	CHEMICAL DOSING SYSTEM		0
13	BUTTERFLY VALVES (STEAM SERVICE)	12	12
14	BUTTERFLY VALVES (WATER SYSTEMS)	5	5
15	OXYGEN DOSING SYSTEM		0
16	BALL VALVES	1	1
17	SPRING LOADED BYPASS VALVES	2	2
18	AIR TRAPS	1	1
19	HEAT EXCHANGERS(PLATE TYPE)	5	5
20	THERMAL INSULATION - R-MATTRESSES/P-SECN	370	370
21	THERMAL INSULATION - ANCILLARY MATERIAL		
22	COLTCS	15	15
23	CHAIN PULLEY BLOCK	0.3	0.3
24	ELECTRIC HOIST	5	5
25	SUMP PUMPS/SUBMERSIBLE PUMPS	5	5
26	SELF CLEANING STRAINERS	5	5
27	ALUMINIUM SHEETS/COILS	130	130
28	SINGLE GIRDER EOT / HOT Misc. Cranes	25	25
	Approx Wt for the items whose weight not shown	20	20
	Total	603	603

Break up of details of above items for Each Unit

S N	Description	UOM	Qty
A	GUN METAL VALVES		
	GM GLOBE VALVE- 25 NB MANUAL(ND)	NOS	60
	GM HOSE VALVE- 25 NB MANUAL	NOS	48
	GM GLOBE VALVE- 50 NB MANUAL	NOS	64
	GM GLOBE VALVE- 40 NB MANUAL	NOS	12
	GM GLOBE VALVE- 25 NB MANUAL	NOS	70
	GM GATE VALVE- 50 NB MANUAL	NOS	16
	GM GATE VALVE- 40 NB MANUAL	NOS	6
B	Misc Pumps (Horizontal) TG		
	DMCW Pumps	Nos.	6
	ACW Pumps	Nos.	6

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

C	Misc Pumps (Horizontal) SG		
	DMCW Pumps	Nos.	4
D	Submersible Type Sump Pump		
	Fixed type for CW Pit in TG Hall	Nos.	4
	Portable type for General purpose	Nos.	2
E	Steel Gate / Globe/ NR Valves (W.S)		
	DMCW 85-87, 91 (2Nos. Each)- GLV 25 NB	Nos.	8
	DMCW 88	Nos.	2
F	Ball Valves		
	Tag No- IA 61 - 185 , NB 15	Nos.	300
	Tag No- IA 31 - 47 , SA 21-56, NB 25	Nos.	85
	Tag No- IA 11, 21-23 , SA 11-20, NB 50	Nos.	23
	Tag No- IA 1-2, SA 1-3, NB 150	Nos.	9
G	Flow Element - Nozzle		
	Condenser Flow to Dearator	Nos.	2
	TDBFP - A/B Suction	Nos.	4
	MDBFP - C/D Suction	Nos.	4
	HPH 6A/6B Drain flow to Dearator	Nos.	4
	Extraction Steam flow to Dearator	Nos.	2
	Extraction Steam flow to BFPT - A/B	Nos.	4
H	Electric Hoists		
	3 T capacity for Vacuum pump motor handling	Nos.	2
	5 T capacity for DMCW TG Pump motor handling	Nos.	2
	5 T capacity for DMCW SG Pump motor handling	Nos.	2
	5 T capacity for ACW Pump motor handling	Nos.	
	10 T capacity for CW BF valves handling	Nos.	4
	3 T capacity for oil barrel handling in central lube oil system.	Nos.	1
	3 T capacity for overload valves below TG Deck.	Nos.	2
	3 T capacity for handling in elevator machine room of TG Hall, service building and administrative building area.	Nos.	6
I	Rotameter	Nos.	10
J	Butterfly Valves (Water System)		
	BF 80 NB (CSS) MOTORISED	Nos.	4
	BF 80 NB (CSS) MANUAL	Nos.	4
	BF 80 NB (CI- NI) MANUAL	Nos.	4
	BF 250 NB (CI - NI) MOTORISED	Nos.	4
	BF 200 NB (CI - NI) MOTORISED	Nos.	4
	BF 200 NB (CI - NI) MANUAL	Nos.	8
	BF 150 NB (CI - NI) MANUAL	Nos.	36

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

	BF 100 NB (CSS) MANUAL	Nos.	4
	BF 100 NB (CI- NI) MANUAL	Nos.	56
K	Flow Element - Orifice		
	DMCW Pump TG - Discharge header	Nos.	2
	ACW Pump - Discharge header	Nos.	2
	CEP B/C - Discharge flow	Nos.	4
	Condensate flow downstream of GSC	Nos.	2
	Normal makeup to hot well	Nos.	2
	Emergency makeup to hot well	Nos.	2
L	Lube Oil Transfer Pumps		
	LOTP (Capacity - 6600 LPH)	Nos.	2
	Duplex Strainer (Capacity - 6600 LPH)	Nos.	2
M	Chain Pulley Block		
	2 T capacity for TG building general maintenance	Nos.	2
	2 T capacity for LPBP valve and actuator handling	Nos.	2
N	Aluminium Sheet		
	Aluminium Sheets/ coils 22 SWG	MT	6
	Aluminium Sheets/ coils 20 SWG	MT	46
	Aluminium Sheets/ coils 18 SWG	MT	79
O	Self Cleaning Strainer	Sets	4
P	Thermal Insulation	MT	370
Q	Air Traps	Sets	2
	Ball Float Air Trap (Without Strainer)	Nos	30
	"Y" type strainer	Nos	30
R	COLTCS	Sets	4
S	Oxygen Dosing System	Sets	4
T	Steam Traps		
	Ball Float Steam Traps	Nos	2
	"Y" type strainer for Ball Float Steam Traps	Nos	2
	SS THERMODYNAMIC STEAM TRAPS -I	Nos	26
	AS THERMODYNAMIC STEAM TRAPS -II	Nos	8

Unit # 3 & 4

Hyderabad Supply

A: BFP Drive Turbine

S. N.	DESCRIPTION	PACKING SIZE (mm) (L x W x H)	QTY. / Unit	APPROX . WT. (In MT) / No.	Total Wt. (Unit # 3)	Total Wt. (Unit # 4)
1	Steam Turbine	4350x4900x(4250 with Gov. Valves & 3500 without Gov. valves)	2	60	120	120

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

2	Gear Box	1050x1250x1150	2	1.1	2.2	2.2
3	Lube oil console Package -I	4800x2800x2900	2	10	20	20
4	Lube oil console Package -II	3100x2800x1200	2	4	8	8
5	Emergency oil pump assembly	2100x1000x800	2	1.5	3	3
6	Jacking oil pump assembly	650x1500x600	2	0.6	1.2	1.2
7	Oil purification unit	1800x2000x1800	2	2.5	5	5
8	Oil accumulators	800x600x1900	2	0.35	0.7	0.7
9	Governing console	1300x1000x1500	2	0.75	1.5	1.5
10	Transition piece	3226x2032x2200	2	2.15	4.3	4.3
11	Turbine enclosure		2	4	8	8
12	DCSC for Emergency lube oil pump	1600X750X2500	2	0.6	1.2	1.2
		Total		87.55	175.1	175.1

Note : Turbine enclosure will be supplied in dismantled condition.
2 No's of BFP drive turbines are being supplied for every 660 MW unit .

B: Turbine Driven BFP

S. N.	DESCRIPTION	PACKING SIZE (mm) (L x W x H)	QTY. / Unit	APPROX . WT. (In MT) / No.	Total Wt. (Unit # 3)	Total Wt. (Unit # 4)
1	Turbine Driven Boiler Feed Pump (TD BFP) with Base Plate & Tubing	3500 x 3100 x 3000	2	22.5	45	45
2	Turbine Driven Boiler Feed Booster Pump (TD BP) with Base Plate & Tubing	3000 x 2800 x 2000	2	6.5	13	13
3	Recirculation Valve	1100 x 1100 x 2900	2	1	2	2
4	Conical Suction Strainer at BFP suction	4000 x 1200 x 1200	2	1.4	2.8	2.8
5	Basket type Suction Strainer at BP suction	1500 x 1500 x 2000	2	2.5	5	5
6	Local Gauge Rack (LGB)– 1,2 & 3	1100 x 900 x 2200	6	0.4	2.4	2.4
7	Local instrument Transmitter Rack (LIR)	2000 x 650 x 2150	1 (For 2 BFPs)	0.25	0.25	0.25
		Total		34.55	70.45	70.45

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

Note 2 No's of TD BFP are being supplied for every 660
: MW unit .

C: Motor Driven BFP

S. N.	DESCRIPTION	PACKING SIZE (mm)(L x W x H)	QTY./ Unit	APPROX . WT. (In MT) / No.	Total Wt.(Unit # 3)	Total Wt.(Unit # 4)
1	Motor Driven Boiler Feed Pump (MD BFP) with Base Plate & Tubing	3500 x 3100 x 3000	2	20.5	41	41
2	Motor Driven Boiler Feed Booster Pump (MD BP) with Base Plate & Tubing	2200 x 1900 x 3000	2	4.6	9.2	9.2
3	Hydraulic Coupling	4000 x 3000 x 4000	2	11.5	23	23
4	HC Working Oil Coolers & accessories	5000 x 1000 x 1000	2	2.1	4.2	4.2
5	HC Lube Oil Coolers & accessories	2500 x 600 x 600	2	1	2	2
6	Recirculation Valve	1000 x 1000 x 2800	2	0.9	1.8	1.8
7	Conical Suction Strainer at BFP suction	3100 x 1000 x 1000	2	1.2	2.4	2.4
8	Basket type Suction Strainer at BP suction	1500 x 1500 x 1600	2	2.35	4.7	4.7
9	Local Gauge Rack (LGB)– 1,2&3	1100 x 900 x 2200	6	0.4	2.4	2.4
10	Local instrument Transmitter Rack (LIR)	1050 x 650 x 1500	2	0.15	0.3	0.3
11	MD BFP Motor	4700 x 4500 x 3000	2	30	60	60
		Total		74.7	151	151

Note 2 No's of MD BFP are being supplied for every 660
: MW unit .

D: Condensate Extraction Pump

S. N.	DESCRIPTION	PACKING SIZE (mm) (L x W x H)	QTY. / Unit	APPROX . WT. (In MT) / No.	Total Wt. (Unit # 3)	Total Wt. (Unit # 4)
1	Condensate Extraction Pump	11000 x 3000 x 3000	3	19	57	57
2	Sole plate	2200 x 2200 x 400	3	1	3	3
3	Canister	7600 x 2200 x 2200	3	3.4	10.2	10.2
4	Basket type Suction Strainer at CEP suction	1750 x 1750 x 2000	3	1.5	4.5	4.5
5	Local Gauge Rack	1300 x 900 x 2000	3	0.3	0.9	0.9
6	LIR Rack for Pr. Transmitters	2000 x 650 x 2150	1	0.25	0.25	0.25

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

7	LIR Rack for Diff. Pr. Transmitters (Common for 3 pumps)	1050 x 650 x 1500	1	0.15	0.15	0.15
8	CEP Motor	3500 (H) X Dia 2100	3	9.5	28.5	28.5
		Total		35.1	104.5	104.5

Note 3 No's of CEP are being supplied for every 660
: MW unit .

E: Miscellaneous Items

S.N	Equipment	Overall Dimensions (in mm)	Qty (In Nos)	Dry Wt. (In MT) (Wt / no.)	Total Wt. (Unit # 3)	Total Wt. (Unit # 4)
1	Drain Cooler					
a.	Complete Assly.	L 8700 x W 1100 x H 1500	1	6.8	6.8	6.8
2	LP Heater #2					
a.	Complete Assly.	L 13800 x W 2000 x H 2200	1	29	29	29
3	LP Heater #3					
a.	Complete Assly.	L 13800 x W 2000 x H 2200	1	27.5	27.5	27.5
4	LP Heater #4					
a.	Complete Assly.	L 14500 x W 2000 x H 2200	1	26	26	26
4	Deaerator					
a.	Header	L 12850 x W 3400 x H 3750	1	36	36	36
b.	Storage Tank Sec-1	L 11500 x W 4150 x H 4650	1	46.5	46.5	46.5
c.	Storage Tank Sec-2	L 10550 x W 4150 x H 4650	1	41.5	41.5	41.5
d.	Storage Tank Sec-3	L 12500 x W 4150 x H 4750	1	51	51	51
e.	Storage Tank Sec-4	L 10550 x W 4150 x H 4650	1	41.5	41.5	41.5
f.	Storage Tank Sec-5	L 11500 x W 4150 x H 4650	1	46.5	46.5	46.5
5	HP Heater #6A/B					
a.	Complete Assly.	L 10500 x W 2100 x H 2500	1	52	52	52
6	HP Heater #7A/B					
a.	Complete Assly.	L 13700 x W 2100 x H 2500	1	78	78	78
7	HP Heater #8A/B					
a.	Complete Assly.	L 11100 x W 2100 x H 2500	1	75	75	75
8	BFPDT Twin oil Cooler					
a.	Per Cooler	Ø 508 x H 5000	2	5.7	11.4	11.4
		Total		563	568.7	568.7

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX – 1

LIST OF PACKAGES, PACKAGE DIMENSION DETAILS, WEIGHTS ETC

TRY Valves

S N	Description	Qty per Unit	
		Nos.	Wt. (In MT)
1	PCP valves, Root Valves, HP Bypass system, TIP valves, RHID, LP Valves etc.	1750	217

Note: The valves sizes ranging from 1/4 inch to 38 inches.

NOTE :

1. THE LIST IS TENTATIVE AND HAS BEEN GIVEN TO ENABLE THE CONTRACTOR TO STUDY THE NATURE OF WORK TO BE DONE IN THIS CONTRACT. THERE MAY BE VARIATION IN SIZE, WEIGHT ETC. AND NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED ON ACCOUNT OF THIS BY BHEL.
2. SOME OF THE PACKAGES MAY BE SENT IN PARTS TO SUIT THE SITE CONDITION / TRANSPORTATION, THE SAME IS TO BE ASSEMBLED AT SITE WITHOUT ANY EXTRA COST, LIKEWISE THE PACKAGE MAY BE ASSEMBLED TOGETHER AND SEND AS A SINGLE ASSY. CONTRACTOR MAY HAVE TO DISMANTLE AND ERECT OR, ERECT AS SINGLE ASSEMBLY AS PER THE INSTRUCTION OF BHEL ENGINEERS WITHOUT ANY EXTRA COST.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
APPENDIX – 2
SUMMARY OF WEIGHT DETAILS

Summary of Weight Details

Unit # 3

S N	Package / Unit	Hardwar	Bhopal	Hyderabad	Trichy	PEM	Total
1	Condenser	505					505
2	Turbine	1162					1162
3	Generator	659					659
4	Hardwar BOIs	632					632
5	Drive Turbine, Pumps, Dearators, Heaters etc.			1070			1070
6	RE Joints, Flash Tanks, BF Valves etc.		251				251
7	PEM BOIs					603	603
7	Platform & Structure					200	200
8	Trichy Valves				217		217
	Total	2959	251	1070	217	803	5300

Unit # 4

S N	Package / Unit	Hardwar	Bhopal	Hyderabad	Trichy	PEM	Total
1	Condenser	518					518
2	Turbine	982					982
3	Generator	558					558
4	Hardwar BOIs	632					632
5	Drive Turbine, Pumps, Dearators, Heaters etc.			1070			1070
6	RE Joints, Flash Tanks, BF Valves etc.		234				234
7	PEM BOIs					603	603
7	Platform & Structure					200	200
8	Trichy Valves				217		217
	Total	2690	234	1070	217	803	5013

NOTE: THE WEIGHT INDICATED ABOVE IS APPROXIMATE AND THERE MAY BE A VARIATION IN WEIGHT OF EQUIPMENT / PACKAGE. NO CLAIM, WHATSOEVER, WILL BE ENTERTAINED BY BHEL ON ACCOUNT OF VARIATION IN WEIGHT QUANTITIES.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

11. GENERAL

11.0.1

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

11.0.2

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

11.0.3

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

11.0.4

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

11.0.5

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

11.0.6

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

11.0.7

The work to be carried out under the scope of these specifications covers the complete work of collection from stores/storage yard, handling, transporting, unloading at erection site, pre-assembly, erection, alignment, hot alignment, bolting, fastening, welding, radiography, leveling, cold pulling, adjusting, Non-destructive testing, Post weld heat treatment, hydraulic test, chemical cleaning, passivation, steam blowing, oil flushing, water flushing, air flushing, pre-commissioning tests, trial running of auxiliaries covered under these specifications, commissioning and all other activities till handing over of the unit. The work shall conform to dimensions and tolerances specified in the various drawings, documents etc. That will be provided during the course of installation. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost failing which the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

work will be got done by BHEL at the risk and cost of the contractor. Contractor may please note that the loading of materials at storage yard/Stores in contractor's Trailer / Carriers while collecting materials will be done by material handling agency deployed by BHEL.

11.0.8

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

11.0.9

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

11.0.10

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

11.0.11

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

11.0.12

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

11.0.13

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

11.0.14

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

11.0.15

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

11.0.16

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

11.0.17

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

11.0.18

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

11.1 COLLECTION AND RETURN OF EQUIPMENTS, MATERIALS & CONSUMABLES

11.1.1

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

11.1.2

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

11.1.3

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

11.2 TEST TAPPING POINTS

Installation and welding of Tapping Points for taking performance test measurements shall be carried out by the contractor as part of this work for the equipments covered under this tender

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

specification under the guidance of BHEL engineer. The scope will be limited to all the tapping points for which materials are available and their locations identified within the regular contract period and extensions thereof.

11.2.1

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

11.2.2

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

11.2.3

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

11.3 GENERAL

11.3.1

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

11.3.2

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

11.3.3

No temporary supports should be welded on to the piping.

11.3.4

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

11.3.5

Adjustment of spring hangers for piping shall be done by the contractor during initial erection. After initial commissioning trials, it is possible that the spring hangers have to be adjusted repeatedly till the correct spring compression is achieved. Contractor shall do the same to the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI General

satisfaction of BHEL engineer. The marking of cold and hot positions on the hangers shall be done by the contractor.

11.3.6

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

11.3.7

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

11.3.8 Submission of Periodical Reports

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

Consumption of welding electrodes and gases

- 1) Consumption of construction power
- 2) Manpower reports
- 3) Daily and Monthly Progress reports
- 4) Field calibration reports

BHEL at site will inform formats for these reports.

11.3.9 It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII: CIVIL WORKS, FOUNDATION, GROUTING

12 PREPARATION OF FOUNDATION

12.1

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

12.2

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

12.3

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

12.3.1

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

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

In order to ensure the quality, the major grouting of equipments using any of above grout mixes shall essential be done as per the recommendations of supplier with regard to grout preparation and use of machinery etc under the supervision of the respective supplier. BHEL has arrangement with above suppliers for supervision services and the supervision charges for the same will be borne by BHEL. However, the contractor shall ensure readiness of equipment for grouting in all respect before such a service is requisitioned and the duration is not prolonged unduly. Any overstay required due to contractor shall be charged to the contractor with BHEL's departmental charges. Contract shall consult BHEL engineer before deciding upon the vendor for the above.

12.3.2

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII: CIVIL WORKS, FOUNDATION, GROUTING

12.4

BHEL will provide only shims and packer plates (either machined or plain), which are received from BHEL's manufacturing plants and go as permanent part of the equipment. Additional packer plates and shims if required will have to be prepared by the contractor out of steel plates, steel sheets to meet site requirements. Necessary steel plates for this purpose will be provided by BHEL free of cost.

12.5

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

12.6

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIII EQUIPMENT INSTALLATION

13 EQUIPMENTS INSTALLATION – COMMON REQUIREMENTS

13.1

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

13.2

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

13.3

Cleaning, servicing, lubrication of actuators, pumps, headers, governing system, ESV & IV, control valves, tanks, vessels etc. during erection and commissioning stages is in the scope of work. However, gaskets/pickings/lubricants for replacement will be provided by BHEL free of cost.

13.4

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

13.5

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

13.6

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

13.7

All racks or assembled units like Governing Rack, Seal Oil Unit, Gas Unit, Seal Oil Valve Rack, Gas Cylinder Racks etc supplied from manufacturing units will be tested in BHEL/ Customer stores or at site. This may require transportation, filling of oil, water etc in these racks for carrying out testing of these racks. Defects noticed during testing of these racks will have to be rectified by the contractor free of charges. Further, any pipeline / flanges / fittings not found assembled properly, the same have to be rectified / corrected by the contractor free of charges.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIV PIPING INSTALLATION

14 PIPING INSTALLATION

14.1

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

14.2

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

14.3

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

14.4

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

14.5

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

14.6

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

- (1) To locate cause of vibrations in equipments/auxiliaries/pipelines and carrying out necessary corrections in case the same is attributed to the contractor.
- (2) Fabrication and erection & welding of racks, steel supports, guides, restraints for all the piping. Steel for this purpose will be supplied by BHEL free of charge in random and running lengths.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIV PIPING INSTALLATION

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

14.7

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

14.8

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XV CONDENSER INSTALLATION

15 CONDENSER INSTALLATION

15.1

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

15.2

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

15.3

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

15.4

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

15.5

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

15.6

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

15.7

LP Heater No. 1 is to be erected inside the condenser in rear side, for which contractor has to cut open the condenser dome plate already erected. After erection, condenser plates have to be strengthened / stiffened as per the instruction of BHEL Engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVI GENERATOR, DEAREATOR INSTALLATION & HANDLING HEAVIER EQUIPMENTS

16.1 GENERATOR INSTALLATION

16.1.1 GENERATOR STATOR

Generator stator will be transported from HARIDWAR works to site on special wagon / Trailer. This will be received at site in unloading bay. Unloading of Gen. Stator from wagon/trailer, lifting of stator and shifting it to TG Deck foundation, assembling the terminal box & cooler housing is in the scope of this work.

16.1.2

The generator stator shall be lifted and placed by the contractor with the help tandem operation of 2 Nos. EOT crane (200 MT capacity each) as per the drawing & the scheme envisaged by BHEL on to the generator foundation. The lifting beam for this purpose shall be provided by BHEL. The generator stator shall be unloaded in unloading bay perpendicular to the generator axis. Before lifting and shifting, the rotating arrangement for rotation of generator stator so that it comes parallel to generator axis is in the contractor's scope.

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

16.2 HANDLING OF HEAVIER EQUIPMENTS

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

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

16.3 DEARATOR ERECTION: The contractor shall make suitable arrangements well in advance for lifting and placement to final position, fit up, welding etc. of **DEAERATOR / FST SECTIONS** at required elevation / location with utmost care. The suitable capacity crane shall be provided by BHEL as per the list of T & P's to be provided by BHEL on sharing basis for this purpose.

Erection of permanent approach platform and ladders etc for De-aerator and FST is in the scope of work. The structural steel and other members will be supplied in random length/size & will have to be cut to required size and profile as incidental to work.

16.4 ADDITIONAL PLATFORM / STRUCTURES

Additional platforms and approaches wherever required by the engineer to facilitate operation are to be fabricated and installed as per approx. weight details given in Appendix II (Summary of Weight Details). Bidders are required to carry out the work at rate as fixed against ITEM NO.-2 of RATE SCHEDULE for fabrication & erection of such platforms & approaches. This does not

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVI GENERATOR, DEAREATOR INSTALLATION & HANDLING HEAVIER EQUIPMENTS

include those of DEAERATOR and FST. These are covered under the erection of static auxiliaries.

Payment for this item shall be made on pro rata basis as per following:

For Fabrication	: 40 %
For Erection	: 40 %
For welding	: 20 %

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

17 HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

17.1

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

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

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

17.2

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

17.3

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

17.4

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

17.5

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

17.6

While conducting hydraulic test of steam lines, water lines, oil lines either individually or grouping a few lines or in portions. Blanks/spools may have to be put up at terminal points,

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XVII HYDROSTATIC TESTING, PRESERVATION & OTHER TESTS

strainers, walls, flanges etc. After conducting the tests, the blanks shall be removed and the lines restored. Also interconnecting piping between boiler and turbine, the hydraulic test may have to be done section wise and some-times piping of other agencies may have to be combined. Contractor shall carry out all such incidental work to satisfactorily conduct the hydro test. Wherever work is involved in the terminal points, Contractor shall carryout the same as per instruction of BHEL engineer. The decision of BHEL engineer is final and the same is binding on the contractor.

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

18 PRE-COMMISSIONING TESTS, COMMISSIONING, POST COMMISSIONING

18.1

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

- (a) Trial run of Boiler Feed Pumps, CEP, Vacuum Pumps, Booster Pump, etc and other pumps/equipments like Misc pumps etc and other various rotating machineries / pumps as per tender specification.
- (b) Trial run of motors/ drives for various auxiliaries.
- (c) Hydraulic Test, Chemical Cleaning, Oil flushing of lube oil system, Jacking oil/Lifting oil, HP oil supply system, Governing oil system/Control oil system, LP Bypass system, Air cleaning/blowing of pipelines, closed systems, Tanks and Vessels.
- (d) Flushing of all pipelines by air/oil/water/Chemicals/steam as the case may be.
- (e) Servicing of all valves, Hydraulic Power cylinders, HP Valves (ESV), HP Overload Bypass valves, IP Valves, LP Bypass valves, CRHNRV and fittings.
- (f) Manual/mechanical cleaning of Oil tanks, Suction Strainers / Filter elements of CEP, BFP, Booster Pump, Vacuum Pumps, Misc. Pumps, and other various equipments & tanks /vessels erected by the contractor. This may have to be repeated several times during the commissioning process.
- (g) Chemical cleaning of piping systems as per requirement. Contractor shall carry out disassembly and reassembly of vulnerable components like spray nozzles, gauges, instruments etc. as instructed by BHEL during this process.
- (h) Putting turbine on barring gear.
- (i) Rolling and synchronization.
- (j) Full load operation.
- (k) Trial operation

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

18.2

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

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

18.3

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

18.4

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

18.5

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

18.6

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

18.7

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

18.8

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

18.9

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

18.10

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

18.11

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

18.12

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

18.13

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

18.14

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

18.15

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

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

18.16

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

18.17

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

18.18

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

18.19

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

19.1 WELDING AND HEAT TREATMENT

19.1.1

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

19.1.2

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

19.1.3

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

19.1.4

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

19.1.5

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

19.1.6

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

19.1.7

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

19.1.8

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

19.1.9

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

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

19.1.10

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

19.1.11

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

19.1.12

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

19.1.13

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

19.1.14

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

19.1.15

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

19.1.16

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

19.1.17

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

19.1.18

Heat treatment may be required to be carried out at any time (day or night) to ensure the continuity of the process. The contractor shall make all necessary arrangements including labour required for the same as per directions of BHEL.

19.1.19

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

19.1.20

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

19.1.21

Checking effectiveness of stress relieving by hardness tests (either by Poldi Hardness Tester or other approved test methods as per BHEL engineer's instruction) including necessary testing equipments is within the scope of the work/specification.

19.1.22

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

19.1.23

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

19.1.24

Joint fit up will be a stage for inspection.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIX WELDING, HEAT TREATMENT, RADIOGRAPHY

19.1.25

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

19.2 RADIOGRAPHY

19.2.1

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

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

19.2.2

Contractor shall note that 100% radiography shall be taken on all high pressure welding till such time the welders' performance is found to be satisfactory. Subsequently, subject to consistency in welder's performance, the percentage of radiography will be based on BHEL's standard practice/code requirement. The defects shall be rectified immediately and to the satisfaction of BHEL engineer. The decision of BHEL engineer regarding acceptance/rejection of the joints will be final and binding on the contractor.

19.2.3

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

19.2.4

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

19.2.5

It may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. Necessary trained personnel shall be deployed for this purpose.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

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

20.1

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

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

20.2

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

20.3

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

20.4

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

20.5

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

20.6

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

20.7

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

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

20.8

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

20.9

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

20.10

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

20.11

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

20.12

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

20.13

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

20.14

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXI TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

21 TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

21.1

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

21.2

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

21.3

Contractor shall provide all required suitable cranes and trailers for materials handling during collection from BHEL/ client's stores/ storage yard, transportation to site of work and at work site for all equipments and consignments including heavy and voluminous equipments/ components/ consignments like HP turbine module, LP turbine inner-outer casing, LP turbine inner casing, LP rotor, generator rotor, brushless exciter, HP heaters etc. BHEL/customer shall not provide any T&P other than mentioned in relevant appendix for the purpose identified.

21.4

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

21.5

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

21.6

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

21.7

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXI TOOLS AND TACKLES, MEASURING AND MONITORING DEVICES

21.8

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

21.9

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

21.10

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

21.11

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

21.12

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

21.13

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

21.14

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

21.15

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

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

- 1) All protective paints for the protection of weld joint fit-ups, application of primers on finished weld joints are in the scope of contractor.
- 2) Two coats of steam washable paints shall be applied on steam side of LP turbine and condenser components, as advised by BHEL. The steam washable paints, primer and thinner will be provided by contractor as part of scope of work along with other like arrangements for surface preparation and paint application like sand/shot-blasting, consumables like surface cleaning agents, paint brush, brush cleanser, labour and necessary tools and plants as required for completion of work.
- 3) The water boxes shall be sandblasted to remove all traces of primer applied at the works. Thereafter apply two coats of primer paint followed by two/three coats of alloyed resin machinery enamel paints as approved by BHEL. Contractor shall submit manufacturer's batch test certificate / test certificate from BHEL approved laboratory for the primers and paints. Prior approval of BHEL for each and every batch of the primer & paints shall be mandatory. In order to achieve a desired minimum paint dry film thickness (DFT) as specified in BHEL drawing, number of coats may be applied and method of application shall be as recommended by the paint manufacturer. Required paints & primers and other consumables shall be arranged by contractor.
- 4) All site weld joints falling in steam side shall be painted with two coats of steam washable paint.
- 5) All water side surfaces of water chambers including tube plate shall be thoroughly surface prepared and painted. Required primer & paints and other consumables for condenser water box and tube plates shall be provided by Contractor.
- 6) After the successful completion of hydraulic testing, the interior surfaces of the water boxes, main tube plates shall be painted with suitable anticorrosive paints as per special procedures laid down by BHEL. Required necessary paints along with primers and other consumables shall be arranged by Contractor.
- 7) Prior to hydraulic testing of water side of condenser, interior surfaces of water boxes shall be painted.
- 8) After completion of tubing and tube side hydro test, all water side surfaces of water chambers including tube plate shall be painted.
- 9) Preservation of all components/equipments during various stages of erection, commissioning till handing over is in the contractor's scope. All prescribed methods of surface cleaning prior to application of preservative paint shall be followed by the contractor. **Contractor has to arrange all primer and paints, and other consumables like wire brush, painting brush required for this work.**
- 10) Condenser internal components/parts/surfaces have to be surface protected with steam washable paint as per BHEL standards.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIII LINING AND INSULATION

23 LINING AND INSULATION

23.1

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

1. TG integral piping and tanks & vessels
2. Feed water storage tank
3. Other equipments including BOI's, though not listed above but required for completion
4. SG-TG auxiliaries including, but not limited, to heat exchangers, pumps, tanks and vessels and other equipments
5. TG integral piping including condensate and extraction system piping

23.2

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

23.3

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

23.4

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

23.5

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

23.6

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

23.7

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

23.7

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

23.8

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIII LINING AND INSULATION

23.9

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

23.10

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

23.11

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

23.12

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

23.13

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

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

23.14

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

23.15

Wastage allowances for the material issued are envisaged as follows:

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

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIII LINING AND INSULATION

23.16

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

- Cutting of cladding sheets as per the profile of the equipment and painting on inner surface two coats of bituminous paint. Paint shall be arranged by contractor.
- Cutting of the wool mattresses to the required shape and application of finishing cement of required thickness wherever required.

23.17

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

23.18

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

23.19

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIV FINAL PAINTING

24 FINAL PAINTING

24.1

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

24.2 Touch-up painting on damaged areas –

- a) For coatings damaged up to metal surface

Surface preparation shall be carried out by manual cleaning. Minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer. Primer coat of touch-up primer has to be applied by brush immediately after the surface preparation.

Over this primer coat, finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer.

Painting scheme is enclosed for information at relevant annexure. However, for execution only the latest document shall be applicable and no claim whatsoever shall be entertained in case of any variance between such documents. Similarly, documents as provided progressively during the execution of work for all other products/ equipments etc shall be applicable.

24.3

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

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

24.4

The scope of work includes painting of colour bands, lettering, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/customer engineer at site for the equipments/ components covered in these specifications.

24.5

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

24.6

In certain isolated instances where it is not possible to clean the equipments as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XXIV FINAL PAINTING

24.7

Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents. The contractor at his own cost shall provide all the consumables and application implements.

24.8

During the preparation of surface, if the shop coat is damaged by chemical cleaning or by mechanical means, contractor shall repair the same free of cost to BHEL.

24.9

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

24.10

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

24.11

Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by contractor, BHEL shall have the right to recover the cost of such damages from the contractor.

24.12

Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the contractor without any extra charges.

24.13

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

24.14

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

24.15

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

24.16 Supply of all required paints shall be in the scope of contract