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## TENDER SPECIFICATION

**TENDER NO. BHEL/ NR/SCT/GADARWARA /STG/PACKAGE-A&B/987**

**FOR**

**"ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION & HANDING OVER OF STEAM TURBINE, GENERATOR & AUXILIARIES AND FINAL PAINTING INCLUDING SUPPLY OF PAINTS OF UNIT NO. 1 (PACKAGE-A) AND UNIT NO.2 (PACKAGE-B) AT 2X800 MW, NTPC GADARWARA STPP."**

### **PART I – TECHNICAL BID**



**Bharat Heavy Electricals Limited**  
(A Govt. Of India Undertaking)  
**Power Sector – Northern Region,**  
**Plot No. 25 , Sector - 16A ,**  
**Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)**



ISO 9001, ISO 14001,  
OHSAS 18001 & SA 8000  
certified company  
SubContract and Purchase Deptt.

**Bharat Heavy Electricals Limited**  
(A Govt. Of India Undertaking)  
**Power Sector – Northern Region,**  
**Plot No. 25 , Sector - 16A ,**  
**Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)**  
**Phone: 0091-0120- 2416440/ 2416475**  
**Fax 091-0120-2416528**  
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**TENDER NO. BHEL/ NR/SCT/GADARWARA /STG/PACKAGE-A&B/987**

**IMPORTANT NOTE**

PURCHASER OF THIS TENDER DOCUMENT IS ADVISED TO CHECK AND ENSURE COMPLETION OF ALL PAGES OF TENDER DOCUMENT AND REPORT ANY DISCREPANCY TIMELY FOR CORRECTIVE ACTION, IF ANY, TO THE ISSUING AUTHORITY BEFORE THE BIDS ARE SUBMITTED. ORIGINAL COPY OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS MUST BE SUBMITTED BACK AS PART OF THE BID WITHOUT WHICH THE SAME IS LIABLE TO BE REJECTED BY BHEL.

THIS TENDER SPECIFICATION ISSUED TO:

M/S-----  
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**Rev 01**  
**1<sup>st</sup> Jun**  
**2012**

# NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited



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**NOTICE INVITING TENDER (NIT)**

**NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES**

**OR**

**PURCHASE TENDERS FROM THIS OFFICE ALSO**

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To

Dear Sir/Madam

**Sub : NOTICE INVITING TENDER**

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

**1.0 Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION
i	TENDER NUMBER	<b><u>BHEL/ NR/SCT/GADARWARA /STG/PACKAGE-A&amp;B/987</u></b>
ii	Broad Scope of job	“ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION & HANDING OVER OF STEAM TURBINE, GENERATOR & AUXILIARIES AND FINAL PAINTING INCLUDING SUPPLY OF PAINTS OF UNIT NO. 1 (PACKAGE-A) AND UNIT NO.2 (PACKAGE-B) AT 2X800 MW, NTPC GADARWARA STPP.”
iii	<b>DETAILS OF TENDER DOCUMENT</b>	
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> <span style="float: right;"><i>Applicable</i></span>
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i> <span style="float: right;"><i>Applicable</i></span>
c	Volume-IC	<i>General Conditions of Contract (GCC)</i> <span style="float: right;"><i>Applicable</i></span>
d	Volume-ID	<i>Forms and Procedures</i> <span style="float: right;"><i>Applicable</i></span>
e	Volume-II	<i>Price Schedule (Absolute value).</i> <span style="float: right;"><i>Applicable</i></span>
iv	Issue of Tender Documents	<ol style="list-style-type: none"> <li><b>Sale from BHEL PS Regional office at :</b> Start : 03/02/15 , Time : 0900 HRS Closes: 25/02/15 , Time :1200 HRS</li> <li>From BHEL website (<a href="http://www.bhel.com">www.bhel.com</a>) Tender documents will be available for downloading from website till due date of submission</li> </ol> <span style="float: right;"><i>Applicable</i></span>
v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 25/02/15 , Time : 1500 HRS Place : Noida <span style="float: right;"><i>Applicable</i></span>
vi	OPENING OF TENDER	Date : 25/02/15 (Within 2 hours of the latest due date and time of <span style="float: right;"><i>Applicable</i></span>

		offer submission). Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender	
vii	EMD AMOUNT	Rs 2,00,000/-	Applicable
viii	COST OF TENDER	Rs 2000/-.	Applicable
ix	LAST DATE FOR SEEKING CLARIFICATION	Date: 13/02/2015 Along with soft version also, addressing to undersigned & to others as per contact address given below	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)		<b>Not applicable.</b>
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)		<b>Not applicable.</b>
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) <b>and not in the newspapers</b> . 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 Noida 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 Noida, 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 Noida. For other details and for 'One Time EMD' please refer General Conditions of Contract.
- 5.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:
- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
  - PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)
  - One set of tender documents shall be retained by the bidder for their reference

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

Sl no	Description	Remarks
<b>Part-I A</b>		
	<b>ENVELOPE – I superscribed as :</b> PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING:-</b>	
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.  <b>Note:</b> 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 : <u>Technical</u> 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.	

<b>PART-I B</b>		
	<b>ENVELOPE – II superscribed as:</b> PART-I (EMD/COST of TENDER)	

	TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING:-</b>	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender <b>OR</b> 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)	

	<b>PART-II</b>	
	<b>PRICE BID</b> consisting of the following shall be enclosed	
	<b>ENVELOPE-III</b> superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING</b>	
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)	

	<b>OUTER COVER</b>	
	<b>ENVELOPE-IV</b> (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING:</b>	
i	<ul style="list-style-type: none"> <li>○ Envelopes I</li> <li>○ Envelopes II</li> <li>○ Envelopes III</li> </ul>	

**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:

- $P_1, P_2, P_3, P_4, P_5, \dots, P_N$  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  $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$ )
- 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  $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$ )
- 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' ' $T_1$ ' (ie  $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-N}$ ). 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 (ie ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$ ')
- Overall Performance Rating ' $R_{BHEL}$ ' for the similar Package/Packages (under execution/** executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL):

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

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

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 <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>	...	P <sub>N</sub>	Total No of similar packages for all Regions = P <sub>T</sub> 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 <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	...	T <sub>N</sub>	Sum (Σ) of columns (iii) to (ix)  = T <sub>T</sub>
3	Monthly performance scores for the corresponding period (as in Row 2)	S <sub>1-1</sub> , S <sub>1-2</sub> , S <sub>1-3</sub> , S <sub>1-4</sub> , ... S <sub>1-T1</sub>	S <sub>2-1</sub> , S <sub>2-2</sub> , S <sub>2-3</sub> , S <sub>2-4</sub> , ... S <sub>2-T2</sub>	S <sub>3-1</sub> , S <sub>3-2</sub> , S <sub>3-3</sub> , S <sub>3-4</sub> , ... S <sub>3-T3</sub>	S <sub>4-1</sub> , S <sub>4-2</sub> , S <sub>4-3</sub> , S <sub>4-4</sub> , ... S <sub>4-T4</sub>	S <sub>5-1</sub> , S <sub>5-2</sub> , S <sub>5-3</sub> , S <sub>5-4</sub> , ... S <sub>5-T5</sub>	.. ... ...	S <sub>N-1</sub> , S <sub>N-2</sub> , S <sub>N-3</sub> , S <sub>N-4</sub> , ... S <sub>N-TN</sub>	-----
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	...	S <sub>N</sub>	Sum (Σ) of columns (iii) to (ix)  = S <sub>T</sub>

ii) Calculation of Overall ‘Performance Rating’ (R<sub>BHEL</sub>) 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<sub>BHEL</sub>’ shall be calculated subject to availability of ‘performance scores’ for at least 6 ‘package months’ in the order of precedence below:

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

In case, R<sub>BHEL</sub> 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<sub>BHEL</sub>) at Power Sector Regions.:

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

- 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
- For  $R_{BHEL} = 60$ ,  $P_{Max} = '1'$
- For  $R_{BHEL} \geq 80$ , there will be no upper limit on  $P_{Max}$

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if  $P \leq P_{Max}$   
(where P is calculated as per clause 9.1)

### IV. Explanatory note:

- 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
- Identified Packages (Unit wise)

**Table-1**

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

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

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

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

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

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

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

- d) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders' or due to non-approval by Customer, then BHEL at its discretion reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating 'R<sub>BHEL</sub>'** only, starting from the upper band.
- e) 'Under execution' shall mean works in progress as per the following:
- i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries
  - ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)
  - iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.
- Note : BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (i), (ii) and (iii) above, depending upon the balance scope of work to be completed.
- f) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work.

- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be

decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**
- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .
- However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDS' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 **Not used**
- 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 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](http://www.bhel.com).

- 27.0 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 RA.

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.”

Information and General Terms and Conditions governing RA shall form part of the RFQ/ Enquiry.

- 28.0 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.

29.0 **Micro and Small Enterprises (MSE)**

Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer

Type under MSE	SC/ST owned	Others
Micro		
Small		

**Note:** - If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.

MSE suppliers can avail the intended benefits only if they submit along with the offer, or before price bid opening, attested copies of either EM-II certificate having deemed validity (two years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with CA certificate (format enclosed as Annexure - 3) applicable for the year, certifying quantum of investment in plant and machinery within the permissible limit as per the act for relevant status (Micro or Small) where the deemed validity of EM-II is over. Date to be reckoned for determining the deemed validity will be last date of technical bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents.

MSEs shall be exempted from payment of earnest money at the time of tender deposit. However, there is no exemption of security deposit submission

No benefits shall be applicable for that particular enquiry if the required documents are not submitted before price bid opening.

30.0 **Order of Precedence**

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

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

for BHARAT HEAVY ELECTRICALS LTD

(SCT)

**Enclosure**

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Chartered Accountant certificate for MSMED
04. Annexure-4: GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)
05. Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
06. Annexure-6: Modification / Deletions in Standard Clause of General Conditions of Contract (GCC) or Special Conditions of Contract (SCC)
07. Other Tender documents as per this NIT.

**ANNEXURE - 1****PRE QUALIFYING REQUIREMENTS**

JOB	<b>"ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION &amp; HANDING OVER OF STEAM TURBINE, GENERATOR &amp; AUXILIARIES AND FINAL PAINTING INCLUDING SUPPLY OF PAINTS OF UNIT NO. 1 (PACKAGE-A) AND UNIT NO.2 (PACKAGE-B) AT 2X800 MW, NTPC GADARWARA STPP."</b>
TENDER NO	<b>BHEL/ NR/SCT/GADARWARA /STG/PACKAGE-A&amp;B/987</b>

SL NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria
A	<b>Submission of Integrity Pact duly signed</b>	<b>Not Applicable</b>
B	<b>Technical Criteria</b>	<b>Applicable</b>
B1	Bidder who wish to participate should have executed works of similar nature of at least <b>One STG of 400 MW unit or of higher rating</b> during last 7 years, as on the date of opening of Technical Bid.	
C	<b>Financial Criteria</b>	<b>Applicable</b>
C-1	<b>TURNOVER</b> Bidders should have achieved an average annual financial turnover (Audited) of Rs. 270 Lacs or more over last three Financial Years (FY) i.e 2011-12, 2012-13,2013-14.	
C-2	<b>NETWORTH</b> Net worth of the bidder based upon the latest Audited Accounts as furnished for 'C 1' above should be positive.	<b>Applicable</b>
C-3	<b>PROFIT</b> 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 on latest Audited Accounts.	<b>Applicable</b>
D	Relevant documents meeting above requirement at 'B' and 'C' shall be submitted by bidder	<b>Applicable</b>
E	Assessment of Capacity of Bidder to execute the work as per SI no. 9 of NIT (By BHEL)	<b>Applicable</b>
F	Approval of Customer	<b>Applicable</b>
G	Consortium criteria	<b>Not Applicable</b>

**Explanatory Notes for QR 'B'**

1. For B , 'Executed' means the STG should have been **Synchronized** by the date of Technical Bid opening.
2. If the qualifying work is completed in the Seven (7) years period specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.
3. 'Similar' work means – Steam Turbine Generator (STG)
4. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as given above along with all annexure.

**ANNEXURE - 2****CHECK LIST****NOTE:- Tenderers are required to fill in the following details and no column should be left blank**

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

This is to Certify that M/S ..... ,  
 (hereinafter referred to as 'company') having its registered office at  
 ..... is registered under MSMED Act 2006, (Entrepreneur  
 Memorandum No (Part—II) ..... dtd: ..... ,  
 Category: ..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company  
 as on date..... as per MSMED Act 2006 is as follows:

**1. For Manufacturing Enterprises:** Investment in plant and machinery (i.e.  
 original cost excluding land and building and the items specified by the Ministry of Small  
 Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:

Rs ..... Lacs

**2. For Service Enterprises:** Investment in equipment (original cost excluding land and  
 building and furniture, fittings and other items not directly related to the service rendered or as  
 may be notified under the **MSMED** Act, 2006:

Rs ..... Lacs

The above investment of Rs . .....Lacs is within permissible limit of  
 Rs..... Lacs for ..... Micro / Small **(Strike off which is not applicable)**  
 Category under MSMED Act 2006.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

**ANNEXURE - 4****GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)**

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).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. 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.
3. 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.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. 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 non-compliance 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. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. 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, as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. 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.
12. 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.

13. 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.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, the H1(s) bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

**ANNEXURE - 5****Authorization of representative who will participate in the on line Reverse Auction Process;**

1	NAME & DESIGNATION OF OFFICIAL	
2	POSTAL ADDRESS (COMPLETE)	
3	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
4	FAX NO.	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

**ANNEXURE - 6****Modification / Deletions in Standard Clause of General Conditions of Contract (GCC) or Special Conditions of Contract (SCC)**

1	<b>Modification/ deletion in Price Variation Compensation</b> Clause no. 2.17of GCC:
2	<b>Clause No. 2.17.5 of GCC shall be modified as below:-</b> Base date shall be the calendar month <b>of the schedule completion date of the contract. Schedule Completion date shall be the actual start date plus delivery period as defined in clause no 6.0 of TCC (Part-I)</b>
3	<b>Clause No. 2.17.9 shall be modified as:-</b> PVC shall be applicable only <b>for the extended period of contract (if any) after the schedule completion date.</b> However, the total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:
4	For the portion of backlog attributable to the contractor, <b>no PVC shall be paid.</b>
5	For the period of Force Majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.  For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months
6	The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.
7	All other terms & conditions of Clause No. 2.17 of GCC shall remain same.

Rev 01

1<sup>st</sup> June

2012

# TECHNICAL CONDITION OF CONTRACT (TCC)

(Document No. PS: MSX:TCC)

BHARAT HEAVY ELECTRICALS  
LIMITED



## Technical Conditions of Contract (TCC)

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## TECHINICAL CONDITIONS OF CONTRACT (TCC)

TENDER NO. BHEL/ NR/SCT/GADARWARA /STG/PACKAGE-A&B/987

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD,TRANSPORTATION TO SITE,ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, GENERATOR, INTEGRAL PIPING AND OTHER AUXILIARIES OF THE SYSTEM AND FINAL PAINTING OF UNIT NO. 1 (PACKAGE-A) AND UNIT NO.2 (PACKAGE-B) INCLUDING SUPPLY OF PAINTS

OF 2X800 MW GADARWARA STPP OF NTPC AT DISTT.  
NARSINGHPUR, GADARWARA M.P.

### PART- I OF TCC



**Bharat Heavy Electricals Limited**  
(A Govt. Of India Undertaking)  
**Power Sector – Northren Region,**  
Plot No. 25 , Sector - 16A ,  
Distt. Gautam Budh Nagar, NOIDA – 201 301 (INDIA)

# Technical Conditions of Contract (TCC)

## Chapter-I : Project Information

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S.No.	DESCRIPTION	Chapter No	PAGE NO.
	<b>Part-I: Contract specific details</b>		
1.	Project Information	Chapter-I	
2.	Scope of Works	Chapter-II	
3.	Facilities in the scope of Contractor/BHEL (Scope Matrix)	Chapter-III	
4.	T&Ps and MMEs to be deployed by Contractor	Chapter-IV	
5.	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V	
6.	Time Schedule	Chapter-VI	
7.	Terms of Payment	Chapter-VII	
8.	Taxes and other Duties	Chapter-VIII	
9.	Special requirement & important conditions	Chapter-IX	
10.	Annexures (1A- X)	Chapter-X	
11.	Rate Schedule	Chapter-XI	

## Technical Conditions of Contract (TCC)

### Chapter-I : Project Information

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Sl. No.	Title	Description
1.1	Name of the Owner	<b>NATIONAL THERMAL POWER CORPORATION LTD. (NTPC)</b>
1.2	Address	Gadarwara Thermal Power Station, near Chichli & Umaraiya villages, Tehsil – Gadarwara, District– Narsinghpur Madhya Pradesh, Pin- 487551
1.3	New Installation	2 x 800 MW
1.4	Nearest Railway station	Gadarwara Railway Station
1.5	Nearest Road	Gadarwara is located on the MP SH 22
1.6	Nearest City	Jabalpur
1.7	Nearest Airport	Nearest Airport is Dumna Airport, Jabalpur-129 KM and Raja Bhoj Airport, Bhopal -209 KM
1.8	Highest Temperature	45 deg C
1.9	Lowest Temperature	1 deg C
1.10	Elevation	354.77 metres

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

<b>2.0.0</b>	BHEL has been awarded the work of Design, Engineering, Supply, Erection, Testing & Commissioning & Handing over of BTG package and Mill bay structures & bunker of 2X800 MW Super Critical Thermal Power plant at Gadarwara, M.P.by <b>National Thermal Power Corporation (NTPC)</b> .
<b>2.1.0</b>	<b>Scope of Work :</b> The scope of work under this tender consists of following :
<b>2.1.1</b>	<b>Service Portion (STG)</b>
<b>2.1.1.1</b>	<p>The scope of work under this tender consists of Handling and collection of material from BHEL/client's stores and storage yard, Transportation to site, inspection, preparation of foundation, erection, levelling, centering, alignment, grouting &amp; final alignment of Steam turbine, Turbo generator and auxiliaries including identified BOI, preassembly, erection, alignment, welding, NDT, fixing hangers &amp; supports, oil flushing, water flushing, hydro testing, &amp; steam blowing of integral piping, oil piping and Oil Room, H<sub>2</sub>, CO<sub>2</sub>, Water cooling system, Pre assembly, erection, welding, NDT of water cooled Condenser, feed water storage tank, de-aerator etc., Erection of LP/HP heaters, GSC &amp; other coolers, flash tanks etc., CW piping from puddle flange (4m beyond A-Row) including RE joints, bellows, BFVs, COLTCS &amp; associated equipments/systems of condenser CW, erection and commissioning of Motor Driven &amp; Turbo Driven Boiler feed pumps, Motor driven Condensate Extraction Pumps, ECW pumps, ACW pumps &amp; associated surface finish, supply &amp; application of primer &amp; finish paints / Anti corrosive / steam wash paints including labelling on equipments &amp; piping, pre-commissioning, commissioning, trial operation &amp; handing over of Steam Turbine, Generator and Auxiliaries of Unit-1 &amp; 2 of 2 x 800 MW sets at Gadarwara site.</p> <p>However, there will be two separate packages for the two units, as follows:</p> <ol style="list-style-type: none"><li><b>1. Package-A -- Erection, Testing, Commissioning &amp; Handing over of Steam Turbine, Turbo-Generators &amp; its Auxiliaries for Unit No. 1</b></li><li><b>2. Package-B -- Erection, Testing, Commissioning &amp; Handing over of Steam Turbine, Turbo-Generators &amp; its Auxiliaries for Unit No.2</b></li></ol> <p>The above two packages shall be awarded to two separate contractors as per procedure given below as per clause no. 9.1 of Part-I of TCC.</p>

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

	<b>The scope here under is given applicable for both the packages.</b>
2.1.1.2	<b>The scope of work under this tender for Erection ,Testing, Commissioning &amp; Handing over of 1x800 MW Steam Turbine, Turbo-Generators &amp; its Auxiliaries broadly consists of:</b>
2.1.1.2.1	Receipt of Materials from BHEL Store, yards, other designated places of unloading and transportation to erection site/ TG Floor. Their preservation, safe keeping, watch and ward.
2.1.1.2.2	Checking, dressing, chipping and leveling of foundations. Pre-assembly, erection, alignment of various equipment, machining and grouting.
2.1.1.2.3	Welding, heat treatment, radiography (including supply of radioactive sources) and other non-destructive tests such as MPI wherever required.
2.1.1.2.4	Erection and commissioning of Main Turbine (HP, IP, LP(02 No.'s)) with all auxiliaries.
2.1.1.2.5	Erection and Commissioning of Generator and Auxiliaries.
2.1.1.2.6	Erection and Commissioning of all BFPs ( Turbo-driven + Motor Driven) and auxiliaries.
2.1.1.2.7	Erection and commissioning of all CEPs along with suction strainers, Motors and other auxiliaries.
2.1.1.2.8	Erection and commissioning of all MISC pumps including DMCW ,ACW Pumps, Drip pumps etc.
2.1.1.2.9	Erection and commissioning of Gland Steam Condenser, Drain Cooler, LP Heaters, HP Heaters.
2.1.1.2.10	Erection and Commissioning of Condenser with extraction steam piping and air extraction piping inside condenser steam space up to condenser walls, including Erection, Commissioning & load testing of Condenser water box handling arrangement.
2.1.1.2.11	Erection, Commissioning of Condenser on load tube cleaning systems and self-cleaning strainers including interconnecting piping, skids and Panels.
2.1.1.2.12	Generator Stator shifting from Trailer /Service Bay to the foundation on TG floor with the help of EOT Crane.
2.1.1.2.13	Erection (Shifting, Assembly, Welding and NDT) and Commissioning of De-aerator and Feed Storage Tank with platform and accessories.
2.1.1.2.14	Erection and Commissioning of associated integral Piping of all auxiliaries such as BFP's Lube Oil, Working Oil and control Oil piping for TD BFP's,other interconnecting piping along with valves, fittings, H&S & insulation etc.
2.1.1.2.15	Grouting of all equipment's as per requirement along with supply of required materials such as Conbextra GP-2(Fosroc) or other approved equivalents, machineries and other resources as required to carry out the job.
2.1.1.2.16	Insulation of all equipment's covered under this scope as per Drawing/ design requirement, machineries and other resources as required to carry out the job. The insulation of HWR supplied equipments and piping (see Annexure)

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

	is not in the scope of this contract. Though for Haridwar scope of equipments and piping, the application of insulation is not in the scope of this contract, but the transportation of the HWR scope insulation material and arrangement of scaffolding for the insulation of equipments and integral piping is in the scope of this contract.
2.1.1.2.17	Erection and Commissioning of Auxiliaries of Turbine, Generator, BFPs and other systems.
2.1.1.2.18	Erection, Commissioning of Turbine and Generator Integral piping such as lube oil, governing oil, Generator seal oil system, gas system, Overload pipelines, Jacking oil system, control fluid system, Primary Water system, dirty/ waste fluid system, Chemical dosing system, Gland steam system - for main turbine (for Haridwar portion of supply) and drive turbines of BFPs (for Hyderabad portion of Supply), Water drainage system, Turbine Governing System with Valves and their Actuators, LP Bypass System with Valves and control system, CRH NRV's with servomotors/actuators and integral piping of other systems, tanks and equipment's as per scope.
2.1.1.2.19	Condenser Evacuation system for the 02 condensers of each Unit i.e. 04 x100% Vacuum pumps for 01 Unit, with connected piping and other integral piping for each condenser such as Vacuum Breaker line with Valves.
2.1.1.2.20	Erection and Commissioning of PHE's, Coolers, chemical dosing skids such as NaOH, Oxygen, Ammonia, Hydrazine etc., Self cleaning strainers, Erection, Welding and NDT of Extraction piping such as LP Extraction A1,A2,A3 with sheathing and compensators etc.
2.1.1.2.21	Erection and commissioning of HT and LT motors of the equipment's and auxiliaries, inclusive of CT mounting, testing etc. The greasing of these motors is in the scope of this contract. Complete Field Testing as per requirement of these motors is also in the scope of this contract including supply of the test kits and reqd. equipments and consumables.
2.1.1.2.22	Assistance during Chemical cleaning of 80 Group piping and associated testing plus related activities of different system and normalization.
2.1.1.2.23	Arrangement of fixing of steam blowing and hydro-test blanks and restoration in Valves/strainers including removal / restoration in ESV-CV, IV-CV and Over Load lines etc. The assembly and dis-assembly of strainers in valves is also in the scope.
2.1.1.2.24	Erection of Platforms (with grating, railing, toe-guards and stairs) for safe approach and operation of auxiliaries and valves, as per BHEL and customer requirement etc. Erection of equipment handling systems, other than that supplied by MU's/Vendors.
2.1.1.2.25	Flushing, cardboard blasting, steam blowing/washing, acid prickling, hydro-test related testing, pre-commissioning, commissioning activities of lube 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.

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

2.1.1.2.26	Setting and commissioning of governing system of Main Turbine and Drive Turbines
2.1.1.2.27	Erection and commissioning of drive turbine BFP's with associated auxiliaries such as Gear Box, Lube Oil Consoles, EOP,JOP systems, centrifuge, Oil Accumulators, Governing Consoles ,transition Pieces and enclosure etc. Erection, welding and NDT of ME Joints(Bellows) and BF Valves of exhaust system of drive Turbine.
2.1.1.2.28	Preparation of MIRs, following of safety and quality norms and documentation, preparation of material status and up-gradation of activities, networks at regular intervals.
2.1.1.2.29	Erection and commissioning of all miscellaneous tanks of water/ oil/ steam /waste systems.
2.1.1.2.30	<b>Assistance during PG testing of main equipment along with all auxiliaries</b> , Supply of Manpower during PG Test for installing of Temp and Pressure gauge Sensors, Mounting of thermo-wells etc.
2.1.1.2.31	Completion of punch points and assistance for handing over of unit (s) to customer. Execution of all Mechanical jobs identified during OWNER Technical audits, check list of pre-commissioning and commissioning. Erection of additional supports required to restrain pipe movement avoiding interference with nearby structural / piping
2.1.1.2.32	Unit trial operation of equipments, systems, of 800 MW Unit (s) as a whole, resolving any deficiencies observed and handing over of <b>Unit No. 1 (Package A) and Unit No.2 (Package B) of 2X800 MW, NTPC GADARWARA STPP at Narsinghpur, M.P.</b>
2.1.1.2.33	Dewatering inside Power house building / CW/CEP pit and TG building for equipment erection facilitating is in contractor scope, inclusive of providing de-watering pump.
2.1.1.2.34	Arranging statutory co-ordination for IBR related activities, if any.
<b>FOR FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT CHAPTERS IN THIS BOOK</b>	
<b>2.1.2</b>	<b>Supply Portion (STG)</b>
2.1.2.1	<b>Procurement of Paints</b> Contractor has to supply all paints, primers and other consumables for painting of relevant area of STG of Unit No.1 & 2. BHEL reserves the right to reject any material not found satisfactory. Contractor shall produce manufacturer's test certificate.
<b>2.1.2.2</b>	<b>NOTES:</b>
2.1.2.2.1	Material which will be supplied by contractor as per supply rate schedule for which separate order shall be issued. <b>Price for supply items as per supply rate schedule remains firm i.e. price variation compensation mentioned in clause no. 2.17 of GCC and overrun compensation in clause no. 2.12 of GCC of contract shall not be applicable for supply</b>

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	<b>order.</b>
2.1.2.2.2	Paints, primers etc. to be procured from BHEL approved suppliers, with prior approval from BHEL site .
2.1.2.2.3	Contractor has to supply paints required for painting the total scope of work as envisaged in service portion of contractor.
<b>2.1.3</b>	<b>Separate order shall be issued for Service portion (STG) and Supply Portion.</b>
<b>2.2.0</b>	<b>SITE VISIT</b> The bidder must visit site, to acquaint themselves with the conditions prevailing at site and in & around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
<b>2.3.0</b>	<b>SITE ORGANISATION</b>
2.3.1	The contractor shall provide adequate staffing in the following areas in addition to the staffing requirements of execution as instructed/informed by BHEL:  <ol style="list-style-type: none"> <li>1. Overall planning, monitoring &amp; control.</li> <li>2. Quality control and quality assurance.</li> <li>3. Materials management.</li> <li>4. Safety, fire &amp; security.</li> <li>5. Industrial relations and fulfilment of labour laws and other statutory obligations.</li> </ol>
2.3.2	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.
2.3.3	On award of contract, the contractor shall submit to BHEL site organization chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. The persons, whose bio-data have been approved by BHEL, will have to be posted at site and deviations in this regard will not generally be permitted.

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

2.3.4	The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL.
2.3.5	The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields in erection, commissioning etc as applicable. For proper supervision of the work, the contractor shall ensure providing one qualified supervisor against deployment of 15 workmen.
<b>2.4.0</b>	<b>ERECTION SCHEDULE</b>
2.4.1	Contractor shall submit within 30 days of LOI date, detailed program (L2 schedule) of construction / erection / commissioning, for approval to Site In-Charge/Project Manager-Noida. L2 schedule shall be the working level document demonstrating contractor's ability and methods of completing the work within the key milestones identified in the tender specification. These program would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detailed monitoring, The three monthly rolling program with the first month's program being tentative based on the site conditions would be prepared based on these program. The Contractor shall also be involved along with the Customer/BHEL to tie up detailed resource mobilization plan over the period of time of the contract matching with the performance targets. Other requirements are as per Clause No. 2.9 of GCC.
2.5.0	Deleted
2.6.0	<b>The contractor shall comply with following towards Social Accountability:</b>
2.6.1	The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
2.6.2	The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.
2.6.3	The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.
2.6.4	The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimination/ Corporal punishment for failure in meeting with

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

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	relevant requirements.
2.6.5	The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.
2.6.6	The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
2.6.7	The Contractor shall arrange potable drinking water to its employees & workers.
<b>2.7.0</b>	In order to meet the environmental concerns it is expected that the contractor for each package shall plant, protect and <b>maintain at least 150 trees</b> in the vicinity of the project as per the available space and as per the advice of Engineers. Contractor shall ensure daily housekeeping and keep proper cleanliness of work place and do the disposal of wastes to certified area.
<b>2.8.0</b>	<b>Brief description of major equipment (per unit) to be Installed, Tested and Commissioned under this specification is given below:</b> <b>(For package A &amp; B):</b> However, changes in design may occur as is usual in any such large scale work for which no compensation will be payable and contractor shall complete the entire work as detailed in tender specifications within finally accepted rates / prices. <b>Below mentioned details are general and some sub-systems may have been left out. Omission of any system will not absolve contractor from erection and commissioning work of such systems, which are required for the completion and smooth running of the TG package as per customer contract of the TG scope.</b>
2.8.1	<b>STEAM TURBINE</b>
2.8.1.1	High Pressure(HP), Intermediate pressure(IP) and Low pressure(LP) steam turbine(02 No.'s) complete with sole plates, foundation bolts, holding down bolts, casings, bearings, bearing pedestals, rotors, couplings, steam gland seals, electric/hydraulic turning gear etc.
2.8.1.2	Emergency stop(ESV) and control valves(CV), Reheat stop interceptor and control valves, overload valve etc. with their servomotors/HP Governing Actuators, steam strainers & blanking arrangement (strainers may be

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

	supplied already erected in the valve ) for main and reheat steam lines etc., LP bypass stop and control valves along with their HP Actuators.
2.8.1.3	Cold Re-heat and extraction NRVs along with their servomotors / Actuators, necessary supports, Platforms and secondary structure if required.
2.8.1.4	Complete Installation of necessary blanking to protect the valves and turbine internals during hydraulic testing and steam blowing. If required CRH NRV may have to be dismantled and replaced with a spool during steam blowing. It will be re-installed after completion of steam blowing.
2.8.1.5	<b>Electro –hydraulic governing system</b> 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.
2.8.1.6	Erection, welding and NDT of Complete Cross Over piping along with their supports from IP turbine to LP turbines.
2.8.1.7	Extraction piping along with their supports and protective covers from LP turbines to condenser dome walls. The integral and package piping of this contract scope has to be erected, welded, tested along with respective H&S and valves.
2.8.1.8	Complete Overload piping (SA335P91 Material) of overload valve of Hardwar scope. The seal steam and Drain piping is also of the same material. The detailed approx. weights of P91 grade piping is given in <b>Annexure IX</b> .
2.8.1.9	For SA335P91 material piping, the induction heating machine and associated auxiliaries along with DG set shall be supplied by BHEL. All consumables for the process has to be supplied by Contractor/bidder including the welding electrodes and filler wire, ceramic pads, induction coil, insulation for Indn. heating, thermocouple .BHEL will not supply the electrodes/Filler for P-91 welding, as per the clause of Chapter –IV(Clause 4.14) of SCC. The contractor has to procure P91 electrodes/ filler wire for use at site only of BHEL's approved brand.
2.8.1.10	Turbine Lube Oil System consists of main oil tank, oil coolers, centrifuge, 2x100 %MOP, 2x100% AOP, AC and DC JOP- 01 no. each, 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. The pumps and their motors may be supplied in loose parts, contractor shall have to match / assemble and align at site as per instructions of BHEL Engineer including placement on foundation.
2.8.1.11	Governing system skids: 2x100% Control oil pumps, control oil tank, filters, control oil purification system, Accumulators etc. HP governing consists of HPSU skids along with accessories and piping.

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<b>2.8.2.0</b>	<b>GENERATOR</b> Hydrogen Cooled Main Generator Consisting of the following:
2.8.2.1	Stator
2.8.2.2	Rotor
2.8.2.3	End Shields & Bearing
2.8.2.4	Exciter with Coolers, Enclosures etc.
2.8.2.5	Seal Oil System
2.8.2.6	Primary Water System including Tanks and Piping
2.8.2.7	H <sub>2</sub> Cooling System
2.8.2.8	CO <sub>2</sub> System
2.8.2.9	Seal Oil Storage Tank
2.8.2.10	PW Tank & Alkaliser Unit/Demineraliser Unit (Ion Exchange Unit)
2.8.2.11	Generator package piping along with cooling water and N <sub>2</sub> piping.
2.8.2.12	Other Accessories
<b>2.8.2.13</b>	<b>ALL WORKS OF SHIFTING THE STATOR TO FOUNDATION, LEVELLING, CENTERING AND ALIGNMENT ETC. WILL BE CARRIED OUT BY CONTRACTOR WITHIN THE SCOPE OF THISWORK.</b>
2.8.2.13.1	<b>FOR LIFTING OF GENERATOR STATOR (443 MT), 02 NOS EOT CRANES (CAPACITY 265/25 TONES) IS AVAILABLE IN TG HALL. THE STATOR SHALL BE LIFTED WITH EOT CRANES IN TANDEM OPERATION USING LIFTING BEAM.</b>
2.8.2.13.2	<u>(Handling of stator)</u> - The contractor has to place & install the stator on generator foundation with EOT cranes. Scope under this tender includes shifting of the generator stator from the place of unloading in the service bay or trailer to the Generator Deck. For lifting of the stator, the cranes will have to be operated in tandem operation. The contractor has to shift the lifting beam, generator lifting slings from storage yard to the bay, and shall assemble and make ready the EOT's, lifting beams and slings for tandem operation to the satisfaction of BHEL engineer. The dismantling of Terminal box or any other fitting of generator may also be required to be carried out before lifting, with no extra cost to BHEL. Matching with base plate/sole plate etc.,if required has to be completed before lifting as per BHEL instruction.
2.8.2.13.3	The Stator weighing about 443 MT (Approx.) will be transported by road and received at site in a special type of low bed high payload hydraulic carrier from BHEL Hardwar. The stator will be duly supported and lashed to ensure safe and secured transportation.

## Technical Conditions of Contract (TCC)

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<b>2.8.3.0</b>	<b>CONDENSER- 02 Nos. per Unit</b> Condenser mainly comprising of the following parts:
2.8.3.1	Bottom Plate
2.8.3.2	Hot Well
2.8.3.3	Turbine & generator End side Wall
2.8.3.4	Dome Walls
2.8.3.5	Front & Rear Water Boxes with Tube Plates
2.8.3.6	Tube Support Plates
2.8.3.7	Springs / Bearings
2.8.3.8	Steam Dump devices
2.8.3.9	Air Extraction Pipe & Baffle Plates
2.8.3.10	Stiffening/Support Pipes/Rods, Bars etc.,
2.8.3.11	Misc. Fittings & Loose items
2.8.3.12	Condenser Water Box handling system with crane facilities for maintenance/withdrawal of tubes and structures, steel columns, beam, bracing, foundation bolts etc.
2.8.3.13	Condenser Tubes- (WELDED AUSTENITIC S.S. TUBES, Approx. 59810 No.'s FOR 01 Unit.)
<b>2.8.4.0</b>	<b>AUXILIARIES</b>
2.8.4.1	HP,LP & Unit Flash tanks, DM Water Tanks, Steam Drain tanks, FWSVD tanks, Oil Unloading Vessel and all other misc. tanks with drains & vents, platforms and stairs. The handling system for all auxiliaries as per site requirement will also have to be erected, within this contract.
2.8.4.2	Erection, Preassembly, fit-up, Welding, NDT, Hydro-test and Insulation and Cladding of De-aerator & feed storage tank (in 5 sections), complete with ladders platform and other accessories.
2.8.4.3	GSC, Drain coolers along with fittings, flash boxes, 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.
2.8.4.4	LP and HP heaters, all fittings, group protection device, safety valves, stand pipes along with fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects. The handling system for all auxiliaries as per site requirement will also have to be erected, within this contract.

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

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2.8.4.5	CW piping(Inlet and Outlet) from customer terminal point( <b>Puddle flange -- 04 m from A row</b> ) including of RE Joints , Butterfly valves with Actuators, Bellows,flanges, Blanks and tie rods and spool pieces, H&S etc. to make system complete in all respect. NDT requirements also to be met as per Drawing.
2.8.4.6	The erection of Self-cleaning strainers(SCS) along with its integral piping ,panels ,gauges etc. is also in the scope of the contract. Suction strainers for boiler feed and condensate extraction pumps along with supports and other fixtures.
2.8.4.7	Turbine oil coolers, seal oil coolers, along with stand pipes and fittings including gauge glasses for level indication, safety valves etc. to make the equipment complete in all respects.
2.8.4.8	Oil strippers, strainers, oil injectors, Oil centrifuge and duplex oil filters.
2.8.4.9	Main oil, drain oil along with fittings including gauge glasses for level indication, platforms and staircases to make the equipment complete in all respects.
2.8.4.10	Coolers , Tank , Filters, skids, Accumulators etc of Control Fluid System
2.8.4.11	Hydraulic coupling, working oil and lubricating oil coolers of Boiler feed pumps and governing systems and other accessories of TD-BFP.
2.8.4.12	Seal oil storage tank, LLD Racks, CO2 Vaporisers, Ion Exchange Unit, magnetic Filters, H2 drier, 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.
2.8.4.13	Hydrogen cooling system, Nitrogen and carbon dioxide systems including H <sub>2</sub> dryers, gas control units and gas stands, gas cylinders and racks and distributors to make the system complete in all respects.
2.8.4.14	Exciter air cooler.
2.8.4.15	Turbine Central 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.
<b>2.8.5.0</b>	<b>PUMPS AND MOTORS</b>
2.8.5.1	Boiler Feed Pumps (2 Motor Driven & 2 Turbine Driven)

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

2.8.5.2	2 Drive Turbine for TD BFP Consists of : <ul style="list-style-type: none"><li>- Turbine Assembly</li><li>- Governing Valve Assembly</li><li>- Oil Pumps</li><li>- Lube Oil Console</li><li>- Gear Box</li><li>- Connecting Couplings</li><li>- Oil Coolers etc.</li><li>- The Metallic expansion joints and BF valve of Drive Turbine Exhaust.</li></ul>
2.8.5.3	Hydraulic coupling, HT Motor for MD BFP
2.8.5.4	Booster Pumps for BFP's
2.8.5.5	Lube Oil Piping, Working Oil & Cooling Systems & other Accessories for 04 no.'s BFP's –02 No.'s Motor driven and 02 No. Turbine driven
2.8.5.6	Condensate Extraction Pump – 3 no.'s
2.8.5.7	Motors for CEP- 3 no.'s
2.8.5.8	Air evacuation pumps for each condenser, including priming pumps for maintaining condenser vacuum, along with motors and its accessories, to make the equipments complete in all respects. 02 Vacuum Pumps for each condenser (Total 04 No. Vacuum pumps / Unit)
2.8.5.9	A.C. and DC motor driven lubricating oil pumps including DC motors starters along with resistance box.
2.8.5.10	Seal oil pumps with drives and fittings to make the system complete in all respects
2.8.5.11	HT Motors for BFP, ECW-TG Pumps, ACW and Drip Pumps & other HT and LT Motors. The greasing, mounting of CT's, testing and commissioning is in the scope of the contractor including of the grease guns, testing kits.
2.8.5.12	<b>The erection and commissioning of the actuators of this contract scope. The The commissioning of actuators of valves erected in the TG and auxiliaries is also under this contract scope.</b>
2.8.6.0	<b>BOUGHT OUT ITEMS</b>
2.8.6.1	Turbine Integral Piping Consists of : <ul style="list-style-type: none"><li>- Lube Oil Piping</li><li>- Control Oil Piping</li><li>- Seal Oil Piping</li></ul>

## Technical Conditions of Contract (TCC)

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	<ul style="list-style-type: none"> <li>- Gland Seal Piping</li> <li>- Equipment Drains &amp; Vents</li> <li>- Cross Over Piping</li> <li>- Air &amp; Gas System Piping</li> <li>- ACW piping for H2 Coolers including Temp. control Valve</li> <li>-Overload Piping.</li> <li>-Other Misc. System/package Piping Etc.</li> </ul> <p><b>The erection/commissioning of integral piping has to be completed in all respects by the contractor. It may also be required to erect Valves/control valves/Bellows/ steam-traps, fittings, H&amp;S etc. of PEM/ Trichy scope for completion of the system, with no extra cost to BHEL.</b></p>
2.8.6.2	Air evacuation System (Vacuum Pumps and system )
2.8.6.3	Oil Centrifuge, Portable Lube Oil Purification Unit & Associated System
2.8.6.4	Control Fluid Purification Unit with pumps, Vapour exhauster etc.,
2.8.6.5	3 Way Control Valves
2.8.6.6	Drain Valves
2.8.6.7	Hangers & Supports
2.8.6.8	Pumps with Accessories (JOP, AOP, EOP,ACW, DMCW, Drip pumps etc)
2.8.6.9	Springs & Hanger supports
2.8.6.10	Dampers (Vacuum Breaking Device)
2.8.6.11	H2 & CO2 Cylinders, N2 Cylinders
2.8.6.12	Fixing of Pick-Ups, Probes & Accessories for Vibration Monitoring System
2.8.6.13	Bearing Vapour Exhauster
2.8.6.14	Coupling Covers
2.8.6.15	RE Joints & Stretching Bolt Assembly
2.8.6.16	Flash Tanks and Flash Box
2.8.6.17	Butterfly Valves of CW piping (Dia. 2500)
<b>2.8.7.0</b>	<b>PEM supplied Packages to be erected &amp; commissioned under this scope of work.</b>

## Technical Conditions of Contract (TCC)

### Chapter-II : Scope of Work

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2.8.7.1	Plate heat Exchangers (PHEs)
2.8.7.2	Condenser on load tube cleaning system
2.8.7.3	Wet steam washing system.
2.8.7.4	Simplex strainers, Self cleaning strainers
2.8.7.5	Misc. Pumps such as ACW and ECW/DMCW pumps
2.8.7.6	Drip pumps with Motor and accessories
2.8.7.7	Miscellaneous electric hoists/Cranes and Chain Pulley Blocks(Mech. & Electrical). Mono-Rails of the equipments.
2.8.7.8	Lube Oil Pumps.
2.8.7.9	Valves and other fittings of PEM scope which are required to complete integral piping.
2.8.7.10	Chemical dosing system such as NaOH, Oxygen, Ammonia, Hydrazine etc. with the integral piping of the skid.
2.8.7.11	Metallic expansion bellows of PEM supply. The erection, welding and NDT of these with the equipment or piping is also in the scope of contractor.
2.8.7.12	Erection, welding and NDT of Butterfly valves of Drive Turbine exhaust system with the piping.
2.8.7.13	Insulation for all rotating and static equipments, de-aerator, heaters, strainers, piping and other auxiliaries erected under this scope, except for insulation for equipments supplied by Haridwar for Turbine, ESV & IV Valves and integral piping etc.
2.8.8.0	<b><u>COMMON SYSTEM</u></b>  <b>The Erection and commissioning of common system i.e. Common Lube Oil Purification Room is in the scope of package –A.</b>
2.8.8.1	<b>The erection and commissioning of common Lube Oil Purification Room consisting of Clean Oil Tank ,Dirty Oil Tank ,Unloading tank, Duplex Strainers, C.L.O Purifier skid, clean Oil and Dirty Oil transfer Pumps, Inter-connecting piping of the CLO Room etc.</b>
2.8.8.2	<b>The erection of oil piping of respective unit from and to the CLO room shall be in the scope of individual packages A &amp;B.</b>

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### Chapter-II : Scope of Work

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<b>2.9.0</b>	<b>Miscellaneous equipment drain &amp; vent line according to layout- These are to be completed as per Customer/BHEL's instruction, with no extra cost implication to BHEL.</b>
<b>2.10.0</b>	The customer / or their Consultant may depute their representative or checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
<b>2.11.0</b>	<p><b>The Information furnished in the Annexures of rate schedule is only a description regarding the item to be erected by the contractor. BHEL reserves the right of adding or excluding any components/ items / systems according to the site requirements/ customer requirements to complete various systems in all respects.</b></p> <p><b>Any other systems / components which are integral to equipment supplied by the manufacturing units shall also be erected and commissioned by the contractor within the quoted/accepted Lump sum rate. No additional payment shall be made towards any variation in weights and quantities for such systems.</b></p>

**Technical Conditions of Contract (TCC)**  
**Chapter-III : Facilities in the scope of Contractor/BHEL (Scope Matrix)**

S.No.	Description	Scope /to be taken care by		Remarks
		BHEL	CONTRACTOR	
<b>3.0</b>	<b>Facilities in the scope of Contractor/ BHEL</b>	BHEL	CONTRACTOR	
<b>3.1</b>	<b>ESTABLISHMENT</b>			
3.1.1	FOR CONSTRUCTION PURPOSE			
3.1.1.1	<b>Open space for office</b>	YES		Limited space ( free of charge) As and where made available by customer M/s NTPC
3.1.1.2	<b>Open space for storage</b>	YES		<b>Limited space(free of charge) As and where made available by customer M/s NTPC</b>
3.1.2	FOR LABOUR COLONY			
3.1.2.1	<b>Open space</b>		<b>YES</b>	<b>Contractor have to make their own arrangement</b>
<b>3.2</b>	<b>ELECTRICITY</b>			
<b>3.2.1</b>	<b>Electricity for construction purposes (-415 V) (chargeable/free)</b>			<b>Free of Cost except O/H EOT cranes of TG and BFP building</b>
3.2.1.1	Single point source	YES		
3.2.1.2	Further distribution for the work to be done which include supply of materials & execution		<b>YES</b>	
<b>3.2.2</b>	<b>Electricity for the office, stores, etc of the bidder which include:</b>	YES		<b>Free of cost</b>
3.2.2.1	Distribution from single point including supply of materials & service		<b>YES</b>	
3.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		<b>YES</b>	
3.2.2.3	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above Lines		<b>YES</b>	<b>Contractor have to make their own arrangement</b>
3.2.2.4	Duties & deposits including statutory clearances for above		<b>YES</b>	
3.2.2.5	Demobilization of the facilities after completion of works		<b>YES</b>	
<b>3.3</b>	<b>WATER SUPPLY</b>			

**Technical Conditions of Contract (TCC)**  
**Chapter-III : Facilities in the scope of Contractor/BHEL (Scope Matrix)**

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<b>3.3.1</b>	<b>FOR CONSTRUCTION:</b>			
3.3.1.1	Making the water available at single point		<b>YES</b>	Contractor have to make bore wells itself wherever approved by M/s NTPC. For pre-commissioning and commissioning activities,NTPC will provide water.
3.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		<b>YES</b>	
<b>3.3.2</b>	<b>LABOUR COLONY:</b>			
3.3.2.1	Making the water available at single point		<b>YES</b>	<b>Contractor have to arrange on his own.</b>
3.3.2.2	Further distribution as per the requirement of work including supply of materials & execution		<b>YES</b>	
<b>3.4</b>	<b>LIGHTING</b>			
3.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		<b>YES</b>	
3.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		<b>YES</b>	
3.4.3	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		<b>YES</b>	
<b>3.5</b>	<b>Communications facilities for site operations of the bidder</b>			
3.5.1	Telephone, fax , internet ,intranet, email etc.		<b>YES</b>	
<b>3.6</b>	<b>COMPRESSED AIR SUPPLY</b>			
3.6.1	Supply of compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage system etc.		<b>YES</b>	
3.6.2	Installation of the above system and		<b>YES</b>	

**Technical Conditions of Contract (TCC)**  
**Chapter-III : Facilities in the scope of Contractor/BHEL (Scope Matrix)**

	operation & maintenance of the same			
3.6.3	Supply of all the consumables for the above system during the contract period.		<b>YES</b>	
<b>3.7</b>	<b>ERECTION FACILITIES</b>			
3.7.1	Providing erection drawings for all the Equipment's covered under this scope	YES		
3.7.2	Drawings for construction method	YES	<b>YES</b>	
3.7.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		<b>YES</b>	
3.7.4	Shipping lists etc for reference & planning the Activities	YES		
3.7.5	Preparation of site erection schedules and other input requirements		<b>YES</b>	
3.7.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	YES	<b>YES</b>	
3.7.7	Weekly erection schedule based on Sl. No.2.1.5		<b>YES</b>	
3.7.8	Daily erection/work plan based on Sl. No.2.1.7		<b>YES</b>	
3.7.9	Periodic visit of senior official of 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 month		<b>YES</b>	
3.7.10	Preparation of preassembly bay		<b>YES</b>	
3.8	BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.			
3.9	The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.			
3.10	Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets. <b>The energy meter to be installed by the contractor &amp; shall be tested and certified by State Electricity</b>			

**Technical Conditions of Contract (TCC)**  
**Chapter-III : Facilities in the scope of Contractor/BHEL (Scope Matrix)**

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	<b>Board or any other agency approved by the Customer at their own cost.</b>
<b>3.11</b>	<b>The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points:</b>
3.11.1	All electrical installations should be as per Indian Electricity rules.
3.11.2	All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
3.11.3	Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
3.11.4	All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
3.11.5	Contractor has to make their own earthing arrangement for their equipment / DB earthing.
3.11.6	All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
3.11.7	Contractor should use “MCCB” and “ELCB” either on incoming or outgoing connections to the DBs.
3.11.8	Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.
3.11.9	For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.
3.11.10	ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.
3.11.11	In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.
3.12.0	On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expenses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.
3.13.0	Compressor required capacity for construction purposes shall be arranged by Contractor.

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

<b>4.0 INDICATIVE LIST OF T&amp;P/MMD TO BE DEPLOYED BY CONTRACTOR</b>					
				For Pkg. A	For Pkg. B
SL. No	EQUIPMENT		CAPACITY	QTY	QTY
4.1	Welding Generators, Transformers, Rectifiers & TIG Welding Machine and ovens for welding electrodes backing and holding			APR*	APR*
4.2	Mobile crane#		50 T	1 no.	1 no.
	#The Mobile crane of 50 MT capacity shall be kept at site from Condenser Erection start to completion of Barring Gear of TG set and can be demobilized from site after Barring gear, with information and consultation with BHEL Site Construction Manager.				
4.3	Low Bed Trailer **		As Per Requirement	1	1
	**The scope of shifting of material is in the scope of Contractor. Contractor has to arrange for the trailer of appropriate capacity, as per the requirement of shifting of the material from stores/Yard/ place of unloading, with no extra cost to BHEL. The trailers are to be arranged as per BHEL requirement, in addition to the trailers with pulling unit at site.				
4.4	Trailer with Pulling Unit		30 MT	2 No.	2 No.
4.5	Hydra (Tyre Mounted Mobile crane)		14/18 MT	2 No.	2 No.
4.6	Hydraulic Jack (Low Height)		25/50/100T	APR	APR
4.7	Screw Jacks		5/10/25/50T	APR	APR
4.8	Hydraulic Pipe Bending Machine (Manual )			APR	APR
4.8.1	Hydraulic Pipe Bending Machine (Motorised )			APR	APR
4.9	Magnetic Particle Impregnation Test Kit			*APR	*APR
4.10	Stress Relieving Sets, including heating coils, panels, Recorders Etc.			APR	APR
4.12	Vacuum Cleaner			2 No.	02No.

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

	(Industrial)				
4.13	Surface Grinder and other Workshop Equipments			1 set each	1 set each
4.14	Electric Winches			APR	APR
4.15	Torque Tension Meter/ Wrench Up to 4000 NM Range (Hydraulic)			APR	APR
4.16	Electronic / Electrical Tube Expander (With Tools)			6 number.	6 number.
4.17	Air Compressor		140 / 210 CFM	1 number	1 number.
4.18	Tube/ Pipe chamfering machine			1 number	1 number
4.19	Profile making M/C			APR	APR
4.20	Nibbling M/C			APR	APR
4.21	Shearing M/C			APR	APR
4.22	Portable grinding M/C			APR	APR
4.23	Portable drilling M/C			APR	APR
4.24	Chain Pulley blocks	02 MT- 20 MT		APR	APR
4.25	Fire retardant Tarpaulins			APR	APR
4.26	Fire Extinguisher			APR	APR
4.27	Three phase distribution board with complete setup for drawl & distribution of construction power			APR	APR
4.28	Power cables for drawl & distribution of construction power, heating machines			APR	APR
4.29	Recordable UT test Equipment			APR	APR
4.30	Long feeler Gauge set			APR	APR

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

4.31	Scaffolding pipes			APR	APR
4.32	Hand operated Megger	Up to 200 M ohms 500V/ 1000V	$\pm 5\%$ at center scale $\pm 10\%$ at end of scale	2 Nos.	2 Nos.
4.32	Digital Multimeter 4½ digit			2 Nos. each	2 no. each
4.33	Inside and Outside Micrometers, (With Calibration certificates and LC-0.01mm), Three Pin Micrometers	From 50 mm - APR		2 Sets	2 Nos.
4.34	Inside - Outside Calipers, Precision Depth Gauges			APR	APR
4.35	Allen Key sets, Tape and die sets			APR	APR
4.36	Gas Cutting Sets			APR	APR
4.37	Pull Lifts - 3.6 / 6 / 10 T			APR	APR
4.38	Tools for Reaming and Honing			APR	APR
4.39	Hand Tool Sets			APR	APR
4.40	Taper Pin and straight Pin Reamers			APR	APR
4.41	Torque wrenches, Impact Drive Sockets.			APR	APR

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

4.42	Ratchet Square insert (MM size and Inch size)			APR	APR
4.43	Dry Paint thickness gauge ,Ultra sonic testing set			APR	APR
4.44	Double End,Single End,Ring, Box, Hammering spanners			APR	APR
4.45	Electrode drying cabinet (Master baking Oven)			APR	APR
4.46	Wire Rope Slings, D- Shackles, Belt Slings,Hook Chooks, Chain Pulley Blocks			APR	APR
4.47	Magnetic Base Drilling Machines, Grinding Machines, Cutting Machines, Argon Sets, Gas Cutting Machines			APR	APR
4.48	Dial Gauges of different ranges and types including lever dial gauges(with LC 0.01mm)			APR	APR
4.49	Micro- ohmmeter for winding resistance of Rotor and other electric machines (HT/LT) of the contract scope- contractor has to arrange digital micro-ohmmeter.			APR	APR
4.50	Digital Megger	5 KV		1	1
4.51	NDT test kits			APR	APR
4.52	DFT measurement (Alcometer)			APR	APR
4.53	Dumpy level	0 to 350 mm	LC-0.01	1 No.	1 No.
4.54	Surface plate	Up to 1.0 Sq.	Grade 1,2,3	APR	1APR

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

		Mtr			
4.55	Straight Edge	Up to 2 Mtr. long	Grade 1,2,3	02 No.	02 No.
4.56	Concrete Mixer for Grouting			APR	APR
4.57	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable			2 Sets	2 Sets
4.58	Master pressure gauge	0 – 600 Kg/cm <sup>2</sup>		APR	APR
4.59	The arrangement for Hydro Test of systems (Master pressure gauges and hydro test pump) has to be arranged by the contractor.				
	<b>*APR- Contractor has to deploy T&amp;P “AS PER REQUIREMENT” of BHEL site as decided by BHEL Engineer In-charge.</b>				
<b>4.60</b>	<b><u>NOTES:</u></b>				
4.60.1	The above list specifies only major T&P/MMD (may not be complete) to be deployed by the contractor for the respective packages. All additional/ other tools and plants which are required for satisfactory & timely completion of work of the respective packages shall also be deployed by the contractor within finally accepted rate/ price. Any special testing kit/ MME/ T&P/ precision equipment, other than supplied by the MU/manufacture (in case of BOI's) as special equipment for erection/testing or provided by BHEL, has to be arranged by the contractor within final accepted rates.				
4.60.2	If works gets delayed due to non-availability of T&P and MMD, BHEL reserves the right to procure/hire the equipment/T&P and get work done at the risk & cost of contractor without prejudice to right of BHEL as in GCC.				
4.60.3	Contractor has to submit the Calibration certificates of all the precision equipment to BHEL. BHEL may ask for recalibration of the MME's /precision equipments for ensuring quality of work. Contractor must re-ascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.				
4.60.4	Other terms and conditions regarding above items shall be as per T&P clause in SCC.				

## Technical Conditions of Contract (TCC)

### Chapter-IV : T&Ps and MMEs to be deployed by Contractor

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4.60.5	Special T&P or IMTE's requirement for tests like Helium leak detector test, Holiday testing, UV lamps for fluroscent dye Test of condenser shall be arranged by contractor as per site requirement.
4.60.6	Any T&P's, Cranes, Slings,D-shackles and other lifting tackles, Trailers required for shifting of material from store to site shall be arranged by contractor over and above T&P's/ crane provided by BHEL. The contractor has to arrange for trailers (Low Bed and normal) of required capacity for shifting of the material from stores, yard and any other place of unloading of material/equipment.

## Technical Conditions of Contract (TCC)

### Chapter-V : T&Ps and MMEs to be deployed by BHEL on sharing basis

#### 5.0 LIST OF T&P and MMD being provided by BHEL for use of contractor free of hire charges on sharing basis.

S.NO.	EQUIPMENT	CAPACITY	QTY	REMARKS
<b>T&amp;Ps</b>				
5.1	Crawler crane	600 T/250 T	01 No.	Refer Clause no. 5.9.3
5.2	Crawler crane	135 T	01 No.	
5.3	Crawler crane	75/100 T	01 No.	
<b>5.4</b>	<b>Double Girder EOT Crane</b>			<b>For Stator Lifting and Based on availability</b> for material handling and erection within TG hall and BFP Building on chargeable basis.
5.4.1	EOT Crane in T.G. hall (To be used for both units in AB Bay) on chargeable basis.	<b>265 T / 25 T</b>	<b>2 Nos</b>	
5.4.2	EOT Crane in BFP building (BC Bay – 01 no. seperate for each unit) on chargeable basis.	<b>85 T</b>	<b>1 No.s per Unit</b>	
5.5	The special T&P provided by Siemens/other vendor for E&C as per Annexure-X		Based on Avail - bility	On returnable basis to contractor
<b>SPECIAL T&amp;Ps</b>				
5.6	Slings for lifting turbine rotors with lifting beam		One Set	
5.7	Slings for lifting generator stator with lifting beam		One Set	
5.8	Digital Micro-ohmmeter for checking/measuring winding resistance of the Generator stator.		APR	
5.9	NOTES:			
5.9.1	<p><b><u>Cl.4.2.2.16 c. of SCC shall be read as</u></b> day-today upkeep and running maintenance like filling topping up of lubricants, changing filters, etc including repair of self starter, batteries and dynamo of these cranes shall be the responsibility of the contractor. <b>Manpower for these works and other crane related works is in the scope of Contractor.</b> If on checking it is found that the same is not followed, BHEL will exercise its right to get the job/works done at the risk and cost of contractor. BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance may be excluded from scope of contractor.</p>			

## Technical Conditions of Contract (TCC)

### Chapter-V : T&Ps and MMEs to be deployed by BHEL on sharing basis

5.9.2	<b>Cl.4.2.2.16 e. of SCC shall be read as</b> -The <b>operator for</b> BHEL's cranes <b>100 MT &amp; above capacity</b> being provided by BHEL free of cost. <b>Further, Helpers and fuel for operation of all BHEL cranes, shall be provided by contractor within the final accepted rates.</b>
5.9.3	<b>The cranes at Sl. No.5.1 to 5.3 will be provided as per requirement on sharing basis for lifting of Deaerator shell and feed storage tank shell segments and for shifting of HP, IP &amp; LP turbine &amp; LP turbine rotor, Heaters, valves and other heavy components. The types of cranes shall be allotted after seeing the actual load requirement.</b> The cranes shall be issued for the purpose of loading/unloading and lifting to locations as stated above at erection site <b>at the discretion of the BHEL Engineer.</b>
5.9.4	<b>For lifting of equipments, where 50 T crane(Contractor scope) is not suitable, BHEL shall provide the cranes as stated at Clause No. 5.1, 5.2 &amp; 5.3</b>
5.9.5	<b>The contractor shall make necessary arrangement like laying of steel plates, assembly &amp; dismantling of heavy lift attachment, boom, jib etc. for movement and operation of BHEL cranes.</b>
5.9.6	After handing over of The D/G EOT's (after commissioning of the EOT cranes) to Customer by BHEL, Customer shall provide skilled operation and maintenance personnel for EOT cranes available in TG hall and BFP buildings. <b>The customer will provide the EOT's on chargeable basis for erection of the Units/equipment's under this package. The EOT cranes shall be used by the contractor on chargeable basis; BHEL will deduct the EOT usage charges on actual basis as charged by the Customer for using EOT, from the running Bills of Contractor. Though the customer shall operate and maintain the EOT's, the contractor has also to arrange for skilled EOT operators for ensuring uninterrupted flow of work ,separately for day and night to meet project schedule, within the quoted rates. The regular maintenance of the EOT is in the scope of the NTPC, only after the handing over of the EOT's. The contractor may be required to extend help during the maintenance/Upkeep of the EOT and initial operation.</b>
5.9.7	Any other special T&P if supplied by the manufacturer and available with the customer may also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition. However low height jack may not be made available and will

## Technical Conditions of Contract (TCC)

### Chapter-V : T&Ps and MMEs to be deployed by BHEL on sharing basis

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	have to be arranged for by the contractor.
5.9.8	<b>For T&amp;P mentioned above provided by BHEL, contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.</b>
5.9.9	Other terms and conditions regarding above items shall be as per T&P clause in SCC

## Technical Conditions of Contract (TCC)

### Chapter-VI : Time Schedule

<b>6.0</b>	<b>TIME SCHEDULE</b>																		
6.1	<b><u>TIME SCHEDULE FOR PACKAGE A&amp;B: GADARWARA -UNIT 1&amp;2</u></b>																		
6.1.1	The contractor is required to commence the work within 15 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor.																		
6.1.2	<b>Entire work as detailed in the tender specifications for package A&amp;B: Gadarwara</b> :Each Unit (Pkg. A & Pkg. B) shall be completed <b>within 23 months</b> from the Zero date as per program/ milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL's commitments to their customer as indicated from time to time.																		
6.1.3	<p>The various milestones dates to be achieved for Package A &amp; B: Gadarwara- Unit 1&amp;2 respectively, under this tender are as:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><b>MILE STONES</b></th> <th style="text-align: left;"><b>MONTHS</b></th> </tr> </thead> <tbody> <tr> <td>Condenser Erection Start</td> <td>ZERO</td> </tr> <tr> <td>TG Erection Start</td> <td>THREE</td> </tr> <tr> <td>Box – up for oil flushing</td> <td>THIRTEEN</td> </tr> <tr> <td>Oil Flushing Completion.</td> <td>FIFTEEN</td> </tr> <tr> <td>Barring Gear</td> <td>SIXTEEN</td> </tr> <tr> <td>Synchronisation (Coal firing)</td> <td>NINETEEN</td> </tr> <tr> <td>FULL LOAD</td> <td>TWENTY ONE</td> </tr> <tr> <td>Trial operation &amp; Handing over</td> <td>TWENTY THREE</td> </tr> </tbody> </table> <p>Note: There will be phase shift of 04 Months b/w Unit No.1 &amp; 2</p>	<b>MILE STONES</b>	<b>MONTHS</b>	Condenser Erection Start	ZERO	TG Erection Start	THREE	Box – up for oil flushing	THIRTEEN	Oil Flushing Completion.	FIFTEEN	Barring Gear	SIXTEEN	Synchronisation (Coal firing)	NINETEEN	FULL LOAD	TWENTY ONE	Trial operation & Handing over	TWENTY THREE
<b>MILE STONES</b>	<b>MONTHS</b>																		
Condenser Erection Start	ZERO																		
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Synchronisation (Coal firing)	NINETEEN																		
FULL LOAD	TWENTY ONE																		
Trial operation & Handing over	TWENTY THREE																		
6.2	The contractor has to ensure that work is completed in all respects leaving no pending points. However the punch list/ pending points, which are possible to be attended at site, shall be fully liquidated within two months from Full Load operation of the unit.																		
6.3	The work under the scope of this contract is deemed to be complete in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.																		

## Technical Conditions of Contract (TCC)

### Chapter-VII : Terms of Payment

<b>7.0</b>	<b>TERMS OF PAYMENT</b>	
7.1	The 'Engineer' will certify the actual work executed in the measurement book and bills, which shall be accepted by the contractor in measurement book.	
7.2	Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.	
7.3	Subject to any deduction, which BHEL may be authorized to make under the Contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained here under:	
7.3.1	<b>Interest bearing recoverable advance: Applicable as per Clause No. 2.13 of GCC</b>	
7.3.2	<b>PROGRESSIVE PAYMENT ON PRORATA BASIS</b>	
7.3.2.1	<b>85% of Lump sum price (Item No.11.3.1.1 of Rate Schedule of Package-A &amp; 11.6.1.1 of Rate Schedule of Package-B) (Applicable on items covered under ANNEXURE – IA to IX)</b>	
7.3.2.1.1	<b>CONDENSER* (Weightage 20% = 2x10%)</b>	Percentage
7.3.2.1.1.1	Preparation of Foundation ,Erection and Alignment and Final grouting of condenser supports	2 X 1%
7.3.2.1.1.2	Placement, Alignment, Pre-Assembly and welding of Bottom Plate segments, Hotwell and NDT	2 X 4%
7.3.2.1.1.3	Assembly and positioning of water chamber, side walls, , Welding and NDT	2 X 6%
7.3.2.1.1.4	Assembly, Erection, alignment and welding & NDT of Tube support plates and condenser internals like Baffle Plates, Air Evacuation pipes etc.	2 X 7.5%
7.3.2.1.1.5	Transportation, Hole cleaning, Insertion, Expansion, Cutting etc. of Condenser Tubes	2 X 6.5%
7.3.2.1.1.6	Assembly, Welding & NDT of Lower and Upper Dome Walls and Dome Stiffeners, Extraction Piping and Steam Dump Device, LPH with Supports etc.	2 X 6%
7.3.2.1.1.7	Hydro Test of Water Side, Fluorescent dye Test, Water fill Test,	2 X 5%
7.3.2.1.1.8	Condenser Floating, Welding of Condenser Neck Joint	2 X 5%

## Technical Conditions of Contract (TCC)

### Chapter-VII : Terms of Payment

	and NDT & Completion of Balance works as erection of stand pipes and vacuum breaker valves etc.	
7.3.2.1.1.9	Erection, commissioning, Load Testing of Condenser Water Box Handling System.	2 X 1.5%
	<b>Sub- Total for Condenser</b>	<b>85%</b>
7.3.2.1.2	<b>TURBINE (1HP+ 1IP+ 02 LPs* = 21%)</b>	
7.3.2.1.2.1	Preparation of Foundation, Placement, Alignment and Grouting of Base Plates of LPC and Bearing Pedestals	5%
7.3.2.1.2.2	Placement, Alignment ,welding of Centre Guide Pins, LPT Front and side walls to form Outer Casing Bottom Portion	7%
7.3.2.1.2.3	Assembly, welding of Casing Frame Section and bracing pipes in LPT outer casing bottom half and complete NDT.	9%
7.3.2.1.2.4	Erection, Alignment of Inner Casing, Placement of LP Rotor and and checking of Blade Clearance, axial and radial flow paths.	7%
7.3.2.1.2.5	Fitment, Assembly and Welding of LPT Outer Casing Upper Part	2%
7.3.2.1.2.6	Erection of shaft seal assembly and expansion joints	1%
7.3.2.1.2.7	Boxing up of LP Inner casing and all associated checks.	2%
7.3.2.1.2.8	Final Box up of LP Turbine No.1 and No.2	5%
7.3.2.1.2.9	Erection ,Placement, alignment, Box-Up (in case of IP is sent in loose parts)and all checks of IP Turbine such as centering, Horn drop, Roll Checks etc.	10%
7.3.2.1.2.10	Placement of HP Turbine, Lowering of HP Rotor on Bearings and Checking of Clearances , Roll check, centering, Erection of Turning Gear assembly.	7%
7.3.2.1.2.11	Alignment of All Rotors including Reaming, Honing and Fixing of permanent Coupling Bolts, CRO and swing check	9%
7.3.2.1.2.12	Erection and commissioning of HPSU ,LPBP control Unit System/Equipment, skids with all accessories	5%

**Technical Conditions of Contract (TCC)**  
**Chapter-VII : Terms of Payment**

7.3.2.1.2.13	Installation and alignment of ESVS, IV&CV, LPBP Valves, Overload valve along with supports and Actuators	9%
7.3.2.1.2.14	Erection, Alignment and Welding, NDT of Cross Over Piping and Over Load piping.	5%
7.3.2.1.2.15	Assembly of Hydro Test and Steam Blowing Devices in ESV,IV and LPBP valves, and Normalisation etc.	0.5%
7.3.2.1.2.16	Final Boxing Up of Pedestals after Oil Flushing Completion	1.5%
7.3.2.1.2.17	<b>Sub- Total for Steam Turbine</b>	<b>85%</b>
7.3.2.1.3	<b>TURBO GENERATOR (12%)</b>	
7.3.2.1.3.1	Preparation of Foundation, Levelling, Matching and Grouting of Foundation Plates.	4%
7.3.2.1.3.2	Lifting, Levelling, centering and Alignment of STATOR	15%
7.3.2.1.3.3	Fixing of End Shields of upper and lower halves on to Foundation Beams	4%
7.3.2.1.3.4	Rotor Threading and Air gap Checking	8%
7.3.2.1.3.5	Final Boxing Up of Generator ,completion of all works as erection of seal ring holder and seal ring on both sides, Generator coolers	12%
7.3.2.1.3.6	Alignment of Generator Rotor with LP Turbine Rotor, Run-out checks and Reaming, Honing of Coupling holes and Fixing of Coupling Bolts	9%
7.3.2.1.3.7	Erection of Excitation Equipments & Alignment of Gen-Exciter Rotors including swing check and completion of Balance Works	10%
7.3.2.1.3.8	Completion of Generator and exciter integral piping in all respect including of PW system including Stator Primary Water Piping system, Co <sub>2</sub> ,N <sub>2</sub> purging system , H <sub>2</sub> Filling system inclusive of all accessories as driers, LLD racks, skids etc.	10%
7.3.2.1.3.9	Final Grouting and Bolt stretching of Generator Base plates and Exciter	5%

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7.3.2.1.3.10	Final Gas Tightness Test of Stator with complete system and Helium Leakage test	5%
7.3.2.1.3.11	Assembly of Terminal Bushings in terminal box and electrical checks of stator and rotor before rotor Insertion	3%
	<b>Sub- Total for Turbo Generator</b>	<b>85%</b>
7.3.2.1.4	<b>PUMPS &amp; AUXILIARIES (13%)</b>	
7.3.2.1.4.1	Erection/testing, commissioning of Main Oil Pump, ,JOP, EOP, AOP, Oil coolers ,Centralised Lube Oil Purification System along with all auxiliaries such as Dirty Oil tank ,Clean Oil tank etc (Only for Package -A).	14%
7.3.2.1.4.2	Erection, grouting, Testing, commissioning of 02 (Two) No.'s Motor Driven BFP along with all auxiliaries.	18%
7.3.2.1.4.3	Erection, grouting, Testing, commissioning of Two Nos. Turbine Driven BFP along with all auxiliaries and systems.	30%
7.3.2.1.4.4	Erection, Testing, Grouting etc. of all miscellaneous ACW,DMCW (TG)Pumps and Vacuum Pumps etc.	14%
7.3.2.1.4.5	Erection, Testing, Grouting etc of Condensate Extraction Pumps	9%
7.3.2.1.4.6	<b>Sub-Total for Pumps &amp; Auxiliaries</b>	<b>85%</b>
7.3.2.1.5	<b>HEATERS &amp; DEAERATORS (11%)</b>	
7.3.2.1.5.1	Erection, testing & commissioning of HP & LP Heaters(outside condenser), with all fittings and Handling system.	27%
7.3.2.1.5.2	Erection, testing & commissioning of Gland Steam Condenser, Drain Coolers, Flash Tanks and flash Boxes, inclusive of insulation, supports.	12%
7.3.2.1.5.3	Erection, testing & commissioning of De-aerator, Feed Storage Tank and associated approach platform with ladders etc	46%
	<b>Sub-Total for Heaters &amp; Deareators</b>	<b>85%</b>

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7.3.2.1.6	<b>MISCELLANEOUS ITEMS (7%)</b>	
7.3.2.1.6.1	Erection, welding and NDT of BF valves, Metallic expansion Joints of TD BFP exhaust ,Enclosures, Erection CO2/H2 Cylinder racks and cylinders etc	<b>11%</b>
7.3.2.1.6.2	Complete Erection, welding , NDT of CW inlet and outlet piping from customer terminal point(puddle Flange - 4 m from A row), Debris Filters, RE Joints, ME Bellows, BF Valves, H&S of CW, Blanks and Tie rod arrangements .	<b>20%</b>
7.3.2.1.6.3	Erection, testing & commissioning of Chemical dosing skids.	<b>9%</b>
7.3.2.1.6.4	Erection, testing & commissioning of DMCW tanks and other Miscellaneous tanks of TG scope.	<b>12%</b>
7.3.2.1.6.5	Erection, testing & commissioning of Plate Heat Exchanger Package	<b>5%</b>
7.3.2.1.6.6	Erection, testing & commissioning of Condenser on Load Tube Cleaning Package	<b>12%</b>
7.3.2.1.6.7	Erection, testing & commissioning of Self Cleaning Strainer Package and all others strainers.	<b>8%</b>
7.3.2.1.6.8	Erection, testing & commissioning of Misc. hoists & chain pulley blocks	<b>8%</b>
	<b>Sub-Total for Misc. Items</b>	<b>85%</b>
7.3.2.1.7	<b>INTEGRAL PIPING (16%)</b>	
7.3.2.1.7.1	Turbine Integral Piping and Generator Integral and Package Piping consisting of Lube Oil, Jacking oil, Oil vapour extraction, Control oil, Seal Oil system, seal steam, Condensate spray /Exhaust Hood Spray, Turbine water drainage etc. complete in all respects, including all accessories like thermo-wells, probes, orifices etc. and hangers and supports (Erection and commissioning on prorata basis)	<b>85%</b>
	<b>Total for Integral Piping</b>	<b>85%</b>
<b>7.3.2.1.8.0</b>	<b>NOTES:</b>	

## Technical Conditions of Contract (TCC)

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7.3.2.1.8.1	<p>* The payment for 2 Nos. Condensers and 02 Nos. LP Turbines will be divided equally.</p> <p>** The unit for which IP turbine has to be assembled at site, final box-up of turbine can be internally allotted % from the IP Turbine Erection %, at the discretion of site management.</p>
7.3.2.1.8.2	BHEL Construction Manager, at it's discretion, may further divide the total breakup for the progressive payment of the Lumpsum amount, and the same will be binding to the contractor.
7.3.2.1.8.3	The above break up is only for payment purposes and does not cover all equipment in the scope of the subject work. The total scope of work shall be as detailed in the tender specification.
7.3.2.1.8.4	Pro-rata payments shall be made every month in proportion to the work carried out by the contractor during the month, which shall be measured on the basis of percentages fixed above. The engineer shall carry out the assessment of the work for payment within the above percentages and it shall be final and binding on contractor. However, further percentage break up for payment against above clauses, will be mutually discussed and finalized at site.

<b>7.3.2.2</b>	85% of Unit Rate (applicable for item no. 11.3.1.2 of Rate Schedule of Package A and item no. 11.6.1.2 of Rate Schedule of Package-B)	
Sr. No	Description	Percentage
1	PLACEMENT IN POSITION	50%
2	ALIGNMENT	15%
3	WELDING/BOLTING/ FIXING	20%
<b>TOTAL</b>		<b>85%</b>

<b>7.3.2.3</b>	STAGE/MILESTONE PAYMENT (15%) applicable for item no 11.3.1.1 & 11.3.1.2 of Rate schedule of Package A and item no. 11.6.1.1 & 11.6.1.2 of Rate Schedule of Package-B								
Sl No.	Milestone/ Stage	Conden-ser	Turbine	Gener-ator	Pump & Aux.	Heaters & Dearators	Misc. Items	Integral Piping	Addition of Platforms /Structures
7.3.2.3.1	Oil Flushing (TG)	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.2	Barring Gear (TG)	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.3	Rolling & Synchronization	3%	3%	3%	3%	3%	3%	3%	3%
7.3.2.3.4	Full Load	2%	2%	2%	2%	2%	2%	2%	2%
7.3.2.3.5	Trial Operation of unit	2%	2%	2%	2%	2%	2%	2%	2%

## Technical Conditions of Contract (TCC)

### Chapter-VII : Terms of Payment

7.3.2.3.6	Painting (including arrow marking, nomenclature etc)	2%	2%	2%	2%	2%	2%	2%	2%
7.3.2.3.7	Area cleaning, temp. structure cutting/removal and return of scrap	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.8	Punch list points/ pending points liquidation	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.9	Material Reconciliation	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.10	Completion of contractual obligations	1%	1%	1%	1%	1%	1%	1%	1%
7.3.2.3.11	<b>Total for Milestone/Stage payments (15%)</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>	<b>15%</b>
7.3.2.3.12	<p><b>Note:</b></p> <p><b>If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site in-charge, at his discretion, after recording reasons for exercising such option, can split and release payment up to 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone/ commissioning activity.</b></p>								

7.3.2.4	PAYMENT FOR SUPPLY OF PAINTS (applicable for item no. 11.3.2.1 of Rate Schedule of Package A and item no. 11.6.2.1 of Rate Schedule of Package-B)								
7.3.2.4.1	100% payment after completion of finish painting as certified by BHEL Engineer.								
<p>Note:-</p> <p>This value for supply portion will remain firm irrespective of variation in quantities Actually erected.</p>									

**Technical Conditions of Contract (TCC)**  
**Chapter-VII : Terms of Payment**

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## Technical Conditions of Contract (TCC)

### Chapter-VIII : Taxes & Duties

<b>8.0</b>	<b>TAXES &amp; DUTIES (SERVICE PORTION-STG)</b>
8.1	<p>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 &amp; services consumed and output goods &amp; 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.</p> <p>However, provisions regarding <b>Service Tax and Value Added Tax (VAT)</b> on output services and goods shall be as per following clauses.</p>
<b>8.2</b>	<b>Service Tax &amp; Cess on Service Tax</b>
8.2.1	Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be <b>exclusive</b> of Service Tax and Cess on Output Services.
8.2.2	Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. The Service Tax Rules permit more than one option or methodology for discharging the liability of tax/levy/duty and BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor. Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract.
8.2.3	For the purpose of claiming any Service Tax from BHEL, the following procedure shall be adopted :
8.2.3.1	Contractor shall submit serially numbered Service Tax and Cess Invoices, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely:
8.2.3.1.1	The name, address and registration number of the contractor
8.2.3.1.2	The name and address of the party receiving taxable service (BHEL)
8.2.3.1.3	Description, classification and value of taxable service provided and
8.2.3.1.4	The Service Tax payable thereon.
8.2.4	All the four conditions shall be fulfilled in the invoice for payment of Service Tax by BHEL. Where more than one nature of Service under Service Tax Rules is involved, the invoice mentioned above shall contain the break up of all

## Technical Conditions of Contract (TCC)

### Chapter-VIII : Taxes & Duties

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	values for each nature of Service.
8.2.5	Name and address of the contractor should be same in the service tax invoice and monthly bill. Any change in the name and address in past should be supported by documentary evidence duly certified by the registering authority.
8.2.6	<p>Purpose of above requirements, inter-alia, is to enable availment of CENVAT credit by BHEL. As per recent amendments, Time restrictions for taking Cenvat credit is within six months from date of invoice.</p> <p>Wherever Cenvat credit could not be availed by BHEL within statutory time limit of 6 months due to delay in submission of invoices or for any other reasons attributable to contractors, Liability towards loss of such Cenvat credit shall be passed on to contractors.</p>
8.3	<b>VAT (Sales Tax /WCT)</b>
8.3.1	The rates quoted by the Contractor shall be inclusive of VAT/Sales Tax and BHEL shall not reimburse any amount on this account due to any reason whatsoever.
8.3.2	<p>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.</p> <p>Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.</p> <p>Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing all their material, plant and equipment etc at site for the execution of the work, including arrangement of Road Permits if and as applicable under the relevant VAT Act.</p>
8.4	<b>Modalities of Tax Incidence on BHEL</b>
8.4.1	Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.

## Technical Conditions of Contract (TCC)

### Chapter-VIII : Taxes & Duties

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<b>8.5</b>	<b>New Taxes/Levies</b>
8.5.1	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.
8.5.2	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.
8.5.3	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.
<b>8.6</b>	<b>TAXES &amp; DUTIES (SUPPLY PORTION)</b>
8.6.1	Price quoted should be inclusive of all the applicable charges, taxes and duties, including entry tax. However rates of sales tax, excise duty & other statutory levies should be indicated separately. Variation in excise duty, sales tax/ VAT or any other statutory levies during contractual delivery period should be to BHEL's account. No "C" form will be issued for this supply. Contractor should arrange own road permit, if any, himself for arranging material and they have to arrange cenvatable invoice. In case of material purchased within the state, VAT shall be payable only if submission of VAT invoices/ documentary evidence by the vendor.

**Technical Conditions of Contract (TCC)**  
**Chapter-IX- Special requirement & Important Conditions**

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9.0	<b>Any other special requirement</b>
9.1	<b>THE PROCEDURE FOR SELECTION &amp; FINALIZATION OF CONTRACTORS FOR PACKAGE-A &amp; PACKAGE-B OF THIS TENDER FOR UNIT NO. 1 &amp; 2 AT 2X800 MW, GADARWARA STPS OF NTPC, GADARWARA is as follows:</b>
9.1.1	There will be two units of 800 MW each <b>AT 2X800 MW GADARWARA STPS OF NTPC, GADARWARA, DISTT. NARSINGHPUR, M.P.</b>
9.1.2	<b>Scope of work under Package-A &amp; B of this tender is given under clause 2.1.1 &amp; 2.1.2. The two packages shall be awarded to two separate contractors i. e. no single bidder shall be awarded more than one package.</b>
9.1.3	Bidders may submit their offer either for both the packages or any one of the packages i.e. Package-A / Package-B given in this tender. However, Bidders shall specifically confirm in their bid that they have quoted for Package-A / Package-B or both of the tender.
9.1.4	Bidders shall submit price bid for each package separately by enclosing each price bid in a separate envelop, clearly indicating on cover of the envelop the respective package number( A/B) besides furnishing other requisite details.
9.1.5	RA/Price Bid opening for Package A shall be done first
9.1.6	Party who is awarded the job of Package “A” shall not be considered for participating in RA/Price bid opening of package “B”.
9.1.7	<b>There will be two separate Contracts for each Package. All the contracts will individually be treated as a separate contract and Contract Agreement for each part shall be signed separately.</b>
9.2	<b>IMPORTANT CONDITIONS</b>
9.2.1	In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be as mentioned in Notice inviting tender.
9.2.2	<b>Modification/ deletion in Price Variation Compensation</b> Clause no. 2.17of GCC:
9.2.2.1	<b>Clause No. 2.17.5 of GCC shall be modified as below:-</b>  Base date shall be the calendar month of the schedule completion date of the contract. <b>Schedule Completion date shall be the actual start date plus delivery period as defined in clause no 6.0 of TCC (Part-I)</b>

## Technical Conditions of Contract (TCC)

### Chapter-IX- Special requirement & Important Conditions

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9.2.2.2	<b>Clause No. 2.17.9 shall be modified as:-</b>  PVC shall be applicable only <b>for the extended period of contract (if any) after the schedule completion date.</b> However, the total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:
9.2.2.2.1	For the portion of backlog attributable to the contractor, <b>no PVC shall be paid.</b>
9.2.2.2.2	For the period of Force Majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.
9.2.2.2.3	For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months
9.2.2.2.4	The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.
9.2.3	All other terms & conditions of Clause No. 2.17 of GCC shall remain same.

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**Technical Conditions of Contract (TCC)**  
**Chapter-X : Annexures**

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**TENTATIVE WEIGHT SCHEDULE OF MAIN PACKAGES FOR 2X800 MW UNIT**  
**(APPLICABLE FOR PACKAGE A & B )**

**WEIGHT SCHEDULE -SUMMARY**

Sl No.	Description	Package –A	Package –B
		Approx. Wt. (in MT)	Approx. Wt. (in MT)
1.	CONDENSER	928	939
2.	TURBINE	1472	1123
3.	GENERATOR	716	664
4.	PUMPS & AUXILIARIES/EQUIVALENT		
4.1	<i>BFP</i>	118	118
4.2	<i>CEP</i>	56	56
4.3	<i>HYDRAULIC COUPLING</i>	23	23
4.4	<i>BFP DRIVE TURBINE</i>	237	237
5.	HEATERS, DEAERATORS & COOLERS	775	775
6.	MISC. ITEMS		
6.1	<i>HT MOTORS</i>	137	137
6.2	<i>RE JOINTS</i>	48	48
6.3	<i>FLASH TANKS</i>	25	25
6.4	<i>MISC. TANKS</i>	28	6
6.5	<i>BF VALVES</i>	54	54
7	<i>PEM SUPPLY</i>	213	198
8	<i>PC CHENNAI</i>	265	265
9	<i>TRICHY VALVES</i>	23	23
10	INTEGRAL PIPING	55	55
	<b>Total</b>	<b>5173</b>	<b>4746</b>

**Note:**

1. The weight indicated above is approximate for each unit and there may be a variation in weight of equipment / Package.

**Technical Conditions of Contract (TCC)**  
**Chapter-X : Annexures**

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**Technical Conditions of Contract (TCC)**  
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**Annexure-IA**

**(A) CONDENSER - Applicable for Unit No. 1 ( Package –A)**

Sl no	PACKAGE NO	DESCRIPTION	DIMENSIONS (IN MM)			NET WEIGHT (in Kgs)
			L	W	H	
<b>(A)</b>	<b>CONDENSER</b>					
1	78001/1	HOTWELL - I (CONDENSER-1)	10400	2700	1450	8025
2	78001/2	HOTWELL - II (CONDENSER-2)	10400	2700	1450	8025
3	78004/1	FRONT END BOTTOM PLATE	7860	2175	1134	5567
4	78004/2	FRONT END BOTTOM PLATE	7860	2175	1134	5567
5	78005/1	REAR END BOTTOM PLATE	7860	1405	1262	3963
6	78005/2	REAR END BOTTOM PLATE	7860	1405	1262	3963
7	78006/1	MIDDLE BOTTOM PLATE-1	7860	3850	1029	8032
8	78006/2	MIDDLE BOTTOM PLATE-1	7860	3850	1029	8032
9	78007/1	MIDDLE BOTTOM PLATE-2	7860	3850	1063	8528
10	78007/2	MIDDLE BOTTOM PLATE-2	7860	3850	1063	8528
11	78008/1	MIDDLE BOTTOM PLATE-3	7860	3850	1096	8324
12	78008/2	MIDDLE BOTTOM PLATE-3	7860	3850	1096	8324
13	78010/1	BOTTOM PLATE (LOOSE ITEMS)	1000	400	350	230
14	78010/2	BOTTOM PLATE (LOOSE ITEMS)	1000	400	350	230
15	78014/1	LOOSE ITEMS (COND.SUPPORT)	2700	1000	400	840
16	78014/2	LOOSE ITEMS (COND. SUPPORT)	2700	1000	400	840
17	78018/1	LOOSE ITEMS(COND. SUPPORT)	1400	900	760	1385
18	78018/2	LOOSE ITEMS(COND SUPPORT)	1400	900	750	1385
19	78019/1	LOOSE ITEMS(COND SUPPORT)	1740	1140	900	3700
20	78019/2	LOOSE ITEMS(COND. SUPPORT)	1740	1140	900	3700

## Technical Conditions of Contract (TCC)

### Chapter-X : Annexures

21	78020/1	FRONT WATER CHAMBER (GEN. SIDE)	7014	4030	390	8950
22	78020/2	FRONT WATER CHAMBER (GEN. SIDE)	7014	4030	390	8950
23	78022/1	FRONT WATER BOX (GEN SIDE)	6560	4020	3300	18465
24	78022/2	FRONT WATER BOX (GEN SIDE)	6560	4020	3300	18465
25	78023/1	FRONT WATER CHAMBER (TUR. SIDE)	7014	4030	390	8950
26	78023/2	FRONT WATER CHAMBER (TUR. SIDE)	7014	4030	390	8950
27	78025/1	FRONT WATER BOX (TUR. SIDE)	6560	4020	3300	18465
28	78025/2	FRONT WATER BOX (TUR. SIDE)	6560	4020	3300	18465
29	78026/1	REAR WATER CHAMBER (GEN. SIDE)	7014	4030	390	9100
30	78026/2	REAR WATER CHAMBER (GEN. SIDE)	7014	4030	390	9100
31	78028/1	REAR WATER BOX (GEN. SIDE)	6560	4020	3300	18465
32	78028/2	REAR WATER BOX (GEN. SIDE)	5900	4020	2430	18760
33	78029/1	REAR WATER CHAMBER (TUR. SIDE)	7014	4030	390	9100
34	78029/2	REAR WATER CHAMBER (TUR. SIDE)	7014	4030	390	9100
35	78031/1	REAR WATER BOX (TUR. SIDE)	5900	4020	3300	18760
36	78031/2	REAR WATER BOX (TUR. SIDE)	6560	4020	3300	18465
37	78032/1	SIDE WALL (TUR.END-PLATES) CONDENSER-1	6920	1170	40	2301
38	78032/2	SIDE WALL (TUR.END-PLATES) CONDENSER-2	6920	1170	40	2301
39	78033/1	SIDE WALL (TUR.END-PLATES) CONDENSER-1	6920	2480	100	13475
40	78033/2	SIDE WALL (TUR.END-PLATES) CONDENSER-2	6920	2480	100	13475
41	78034/1	SIDE WALL (TUR.END-LOOSE ITEMS) CONDENSER-1	4890	450	52	633
42	78034/2	SIDE WALL (TUR.END-LOOSE ITEMS) CONDENSER-2	4890	450	52	633
43	78041/1	SIDE WALL (GEN.END-PLATES) CONDENSER-1	6920	1170	40	2301

## Technical Conditions of Contract (TCC)

### Chapter-X : Annexures

44	78041/2	SIDE WALL(GEN.END-PLATES) CONDENSER-2	6920	1170	40	2301
45	78042/1	SIDE WALL(GEN.END-PLATES) CONDENSER-1	6920	2480	100	13475
46	78042/2	SIDE WALL(GEN.END-PLATES) CONDENSER-2	6920	2480	100	13475
47	78046/1	SIDE WALL(GEN.END-LOOSE ITEMS) CONDENSER-1	4890	450	52	633
48	78046/2	SIDE WALL(GEN.END-LOOSE ITEMS) CONDENSER-2	4890	450	52	633
49	78047/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
50	78047/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
51	78048/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
52	78048/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
53	78049/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
54	78049/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
55	78050/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
56	78050/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5481
57	78051/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
58	78051/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
59	78052/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
60	78052/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
61	78053/1	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
62	78053/2	SHELL INTERNAL STIFFENING RODS	3616	1000	800	5220
63	78054/1	SHELL INTERNAL STIFFENING RODS	1000	700	500	1200
64	78054/2	SHELL INTERNAL STIFFENING RODS	1000	700	500	1200
65	78055/1	SHELL INTERNAL STIFFENING RODS	3700	825	500	2085

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66	78055/2	SHELL INTERNAL STIFFENING RODS	3700	825	500	2085
67	78056/1	SHELL INTERNAL STIFFENING RODS	3700	825	500	2085
68	78056/2	SHELL INTERNAL STIFFENING RODS	3700	825	500	2085
69	78057/1	SHELL INTERNAL STIFFENING RODS	3700	825	500	2051
70	78057/2	SHELL INTERNAL STIFFENING RODS	3700	825	500	2051
71	78058/1	AIR EXTRACTION PIPING CONDENSER-1	7100	700	700	1616
72	78058/2	AIR EXTRACTION PIPING CONDENSER-2	7100	700	700	1616
73	78059/1	TUBE SUPPORT PLATE	5800	3820	400	5808
74	78059/2	TUBE SUPPORT PLATE	5800	3820	400	5808
75	78060/1	TUBE SUPPORT PLATE	5800	3820	400	5808
76	78060/2	TUBE SUPPORT PLATE	5800	3820	400	5808
77	78061/1	TUBE SUPPORT PLATE	5800	3820	400	5808
78	78061/2	TUBE SUPPORT PLATE	5800	3820	400	5808
79	78062/1	TUBE SUPPORT PLATE	5800	3820	400	5808
80	78062/2	TUBE SUPPORT PLATE	5800	3820	400	5808
81	78063/1	TUBE SUPPORT PLATE	5800	3820	400	5808
82	78063/2	TUBE SUPPORT PLATE	5800	3820	400	5808
83	78064/1	TUBE SUPPORT PLATE	5800	3820	400	5808
84	78064/2	TUBE SUPPORT PLATE	5800	3820	400	5808
85	78065/1	TUBE SUPPORT PLATE	5800	3820	400	4356
86	78065/2	TUBE SUPPORT PLATE	5800	3820	400	4356
87	78066/1	TUBE SUPPORT PLATE	5800	3820	400	4356
88	78066/2	TUBE SUPPORT PLATE	5800	3820	400	4356
89	78067/1	TUBE SUPPORT PLATE	5800	3820	400	4356
90	78067/2	TUBE SUPPORT PLATE	5800	3820	400	4356
91	78068/1	TUBE SUPPORT PLATE	5800	3820	400	4356
92	78068/2	TUBE SUPPORT PLATE	5800	3820	400	5808

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93	78069/1	SHELL INTERNAL DETAILS	1400	800	800	3240
94	78069/2	SHELL INTERNAL DETAILS	1400	800	800	3240
95	78070/1	SHELL INTERNAL DETAILS	5600	900	600	4615
96	78070/2	SHELL INTERNAL DETAILS	5600	900	600	4615
97	78071/1	SHELL INTERNAL DETAILS	1300	1200	600	2685
98	78071/2	SHELL INTERNAL DETAILS	1300	1200	600	2685
99	78072/1	SHELL INTERNAL DETAILS	1200	1000	800	2160
100	78072/2	SHELL INTERNAL DETAILS	1200	1000	800	2160
101	78074/1	LOWER DOME WALL(TS) (CONDENSER-1)	10100	3800	350	11319
102	78074/2	LOWER DOME WALL(TS) (CONDENSER-2)	7249	1897	300	3935
103	78075/1	LOWER DOME WALL(TS) (CONDENSER-1)	10760	2220	50	6396
104	78075/2	LOWER DOME WALL(TS) (CONDENSER-2)	7315	1897	500	3947
105	78076/1	LOWER DOME WALL(TS) CONDENSER-1	2350	3700	300	1556
106	78076/2	LOWER DOME WALL(TS) CONDENSER-2	12730	2500	750	8223
107	78077/1	LOWER DOME WALL(TS) CONDENSER-1	2250	3686	50	1591
108	78077/2	LOWER DOME WALL(TS) CONDENSER-2	10295	1875	650	4842
109	78078/1	LOWER DOME WALL (TS) CONDENSER-1	8500	300	50	640
110	78078/2	LOOSE ITEMS( LOWER DOME WALL TS)CONDENSER-2	8488	300	150	644
111	78079/2	LOWER DOME WALL(TS) CONDENSER-2	530	250	320	232
112	78101/1	LOWER DOME WALL ( GS) CONDENSER-1	8475	300	150	645
113	78101/2	LOWER DOME WALL ( GS) CONDENSER-2	10000	3900	300	11563
114	78102/1	LOWER DOME WALL ( GS) CONDENSER-1	10805	3000	700	7647

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115	78102/2	LOWER DOME WALL (GS) CONDENSER-2	10760	2220	300	6396
116	78103/1	LOWER DOME WALL (GS) CONDENSER-1	12796	2700	600	7532
117	78103/2	LOWER DOME WALL (GS) CONDENSER-2	2350	3700	300	1556
118	78104/1	LOWER DOME WALL(GS) CONDENSER-1	7315	1826	300	3802
119	78104/2	LOWER DOME WALL(GS) CONDENSER-2	2315	3686	300	1637
120	78105/1	LOWER DOME WALL(GS) CONDENSER-1	7250	1826	600	3808
121	78105/2	LOWER DOME WALL (GS) CONDENSER-2	8492	300	50	640
122	78106/1	LOWER DOME WALL (GEN SIDE) CONDENSER-1	2750	1250	1000	1230
123	78106/2	LOWER DOME WALL (GEN SIDE) CONDENSER-2	550	500	500	11
124	78107/1	LOOSE ITEM L D WALL (FWB) CONDENSER-1	7000	250	100	381
125	78107/2	LOOSE ITEM L D WALL (FWB) CONDENSER-2	7000	250	100	381
126	78108/1	LOWER DOME WALL(FWB) CONDENSER-1	7960	1574	700	4002
127	78108/2	LOWER DOME WALL ( FWB) CONDENSER-2	7960	1574	700	3943
128	78109/1	LOWER DOME WALL (FWB) CONDENSER-1	7470	2300	650	3635
129	78109/2	LOWER DOME WALL (FWB) CONDENSER-2	7500	2500	700	4386
130	78110/1	LOWER DOME WALL(FWB) CONDENSER-1	6870	2500	300	5115
131	78110/2	LOWER DOME WALL (FWB) CONDENSER-2	6870	2500	300	5115
132	78111/1	LOWER DOME WALL (FWB) CONDENSER-1	6070	1400	500	1754
133	78111/2	LOWER DOME WALL (FWB) CONDENSER-2	6070	1300	500	1759
134	78112/1	LOOSE ITEMS LOWER DOME WALL (FWB) COND.-1	2500	1400	300	493

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135	78112/2	LOOSE ITEMS LOWER DOME WALL (FWB) COND.-2	2500	1400	300	484
136	78113/1	LOWER DOME WALL(RWB) (CONDENSER-1)	7970	1780	700	3600
137	78113/2	LOWER DOME WALL(RWB) (CONDENSER-2)	7960	1780	300	3722
138	78114/1	LOWER DOME WALL(RWB) (CONDENSER-1)	7396	2800	1000	4494
139	78114/2	LOWER DOME WALL(RWB) (CONDENSER-2)	7396	2700	1000	4472
140	78115/1	LOWER DOME WALL(RWB) CONDENSER-1	6598	3200	700	4776
141	78115/2	LOWER DOME WALL(RWB) CONDENSER-2	6598	3200	700	4767
142	78116/1	LOWER DOME WALL(RWB) CONDENSER-1	5800	400	50	583
143	78116/2	LOWER DOME WALL(RWB) CONDENSER-2	5864	400	50	583
144	78117/1	LOWER DOME WALL(RWB) CONDENSER-1	7600	1300	300	1725
145	78117/2	LOWER DOME WALL(RWB) CONDENSER-2	7600	1500	300	1920
146	78118/1	LOOSE ITEMS LOWER DOME WALL (RWB) COND.-1	2100	2100	1800	880
147	78118/2	LOOSE ITEMS LOWER DOME WALL (RWB) COND.-2	2100	2100	1800	880
148	78121/1	DOME INTERNAL STIFFENING CONDENSER-1	5500	2300	1100	6500
149	78121/2	DOME INTERNAL STIFFENING CONDENSER-2	5500	2300	1100	6500
150	78122/1	DOME INTERNAL STIFFENING CONDENSER-1	2400	1200	2100	4308
151	78122/2	DOME INTERNAL STIFFENING CONDENSER-2	5500	550	1050	3300
152	78123/1	DOME INTERNAL STIFFENING CONDENSER-1	2000	800	550	1170
153	78123/2	DOME INTERNAL STIFFENING CONDENSER-2	1300	600	400	360
154	78124/1	DOME INTERNAL STIFFENING CONDENSER-1	5300	450	250	1170

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155	78124/2	DOMES INTERNAL STIFFENING CONDENSER-2	2250	1000	1200	3000
156	78125/1	DOMES INTERNAL STIFFENING CONDENSER-1	5300	800	800	1900
157	78125/2	DOMES INTERNAL STIFFENING CONDENSER-2	500	500	1000	400
158	78126/1	DOMES INTERNAL STIFFENING CONDENSER-1	2700	1600	1000	4400
159	78126/2	DOMES INTERNAL STIFFENING CONDENSER-2	2700	1200	1200	5600
160	78127/1	LOOSE ITEMS DOMES INTERNAL STIFFENING COND.-1	3150	1500	1600	2750
161	78127/2	LOOSE ITEMS DOMES INTERNAL STIFFENING COND.-2	3150	1600	1200	4250
162	78129/1	LP HEATER SUPPORT ARRANGEMENT LOOSE ITEMS	1000	800	500	745
163	78129/2	LP HEATER SUPPORT ARRANGEMENT LOOSE ITEMS	1000	800	500	745
164	78130/1	LP HEATER SUPPORT ARRANGEMENT LOOSE ITEMS	7500	1100	500	1880
165	78130/2	LP HEATER SUPPORT ARRANGEMENT LOOSE ITEMS	7500	1100	500	1880
166	78132/1	UPPER DOME WALL (TURBINE SIDE) CONDENSER-1	8232	300	950	2730
167	78132/2	UPPER DOME WALL (TURBINE SIDE) CONDENSER-2	8232	300	950	2730
168	78133/1	UPPER DOME WALL(GEN SIDE) CONDENSER-1	8232	300	950	2730
169	78133/2	UPPER DOME WALL(GEN SIDE) CONDENSER-2	8232	300	950	2730
170	78136/1	UPPER DOME WALL (FWB) CONDENSER-1	5755	300	950	1931
171	78136/2	UPPER DOME WALL (FWB) CONDENSER-2	5755	300	950	1931
172	78137/1	UPPER DOME WALL(RWB) CONDENSER-1	5755	300	950	1931
173	78137/2	UPPER DOME WALL(RWB) CONDENSER-2	5755	300	950	1931
174	78142/1	FRONT W/BOX HINGE ARRANGEMENT	2200	900	1100	6346
175	78142/2	FRONT W/BOX HINGE ARRANGEMENT	2200	900	1100	2588

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176	78143/1	REAR W/BOX HINGE ARRANGEMENT	1800	800	800	2948
177	78143/2	REAR W/BOX HINGE ARRANGEMENT	1800	800	800	1308
178	78144/1	FRONT W/BOX HINGE ARRANGEMENT	1000	800	700	318
179	78144/2	FRONT W/BOX HINGE ARRANGEMENT	1000	800	700	318
180	78145/1	REAR W/BOX HINGE ARRANGEMENT	1000	800	700	318
181	78145/2	REAR W/BOX HINGE ARRANGEMENT	1000	800	700	318
182	78146/1	FRONT W/BOX HINGE ARRANGEMENT	2400	700	400	552
183	78146/2	FRONT W/BOX HINGE ARRANGEMENT	2400	700	400	552
184	78147/1	REAR W/BOX HINGE ARRANGEMENT	2400	700	400	552
185	78147/2	REAR W/BOX HINGE ARRANGEMENT	2400	700	400	552
186	78150/1	FRONT W/BOX HINGE ARRANGEMENT	1495	1240	400	1037
187	78150/2	FRONT W/BOX HINGE ARRANGEMENT	1495	1240	400	1037
188	78151/1	REAR W/BOX HINGE ARRANGEMENT	1495	1140	400	890
189	78151/2	REAR W/BOX HINGE ARRANGEMENT	1495	1140	400	890
190	78157/1	CONDENSER (LOOSE ITEMS)	1000	1000	600	435
191	78157/2	CONDENSER (LOOSE ITEMS)	1000	1000	600	435
192	78158/1	COND. LOOSE ITEMS (RUBBER CORD FOR BOTH CONDENSER)	1700	1700	500	92
193	78158/2	COND. LOOSE ITEMS (RUBBER CORD FOR BOTH CONDENSER)	1700	1700	500	92
194	78159/1	FASTENERS (CONDENSER)	1200	1100	850	2300
195	78159/2	FASTENERS (CONDENSER)	1200	1100	850	2300
196	78165/1	CONDENSER LOOSE ITEMS	3000	1000	400	762
197	78165/2	CONDENSER LOOSE ITEMS	3000	1000	400	762
198	78166/0	CONDENSER STAND PIPE NO.1 LOOSE ITEMS FOR(FOR BOTH	3500	800	600	324

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		COND)				
199	78167/1	STAND PIPE NO.1 (CONDENSER 1&2)	3350	550	500	122
200	78167/2	STAND PIPE NO.2 (CONDENSER 1&2)	3500	600	600	122
201	78169/0	CONDENSER STAND PIPES NO.2 LOOSE ITEMS FOR(FOR BOTH COND)	3500	800	600	324
202	78301/0	GLAND STEAM CONDENSER	1750	1700	1700	1510
203	78304/0	LOOSE ITEMS OF GSC	700	300	200	34.3
204	78305/0	LOOSE ITEMS OF GSC (FRAGILE)	600	500	350	10
205	78315/1	LP HEATER-1	17100	2200	2000	31400
206	78315/2	LP HEATER-2	17100	2200	2000	31400
207	78316/1	LP HEATER-1 STAND PIPE	2200	350	350	100
208	78316/2	LP HEATER-2 STAND PIPE	2200	350	350	100
209	78317/1	LP HEATER-1 LOOSE ITEMS	500	400	400	110
210	78317/2	LP HEATER-2 LOOSE ITEMS	500	400	400	110
211	78320/1	TROLLEY FOR LP HEATER-1	1350	800	200	664
212	78320/2	TROLLEY FOR LP HEATER-2	1350	800	200	664
213	78431/0	EXCITER AIR COOLER	3250	950	650	450
214	78432/0	EXCITER AIR COOLER	3250	950	650	450
215	10001/0	STARTER CABINET FOR DC S.OIL MOTOR	1230	1060	2550	450
216	10002/0	GEN INSTRUMENTATION CABINET	1230	1060	2550	450
217	10004/0	LOOSE INSTRUMENTS	1000	800	400	26.5
218	10005/0	STARTER CABINET FOR DC JOP MOTOR	1230	1060	2550	450
219	10006/0	STARTER CABINET FOR DC EOP MOTOR	1230	1060	2550	450
		<b>TOTAL WEIGHT (IN KGS)</b>				<b>928062</b>

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**Annexure-IIA**

**(B) TURBINE - Applicable for Unit No. 1 ( Package –A)**

(B1)	<b>TURBINE (HARDWAR SUPPLY)</b>					
Sl no	PACKAGE NO	DESCRIPTION	DIMENSIONS LXWXH (in mm)			NET WEIGHT (in Kgs)
1	75001/1	ARRANGE.OF EMBED (ANCHOR POINT)	1600	1500	600	960
2	75001/2	ARRANGE.OF EMBED (ANCHOR POINT)	2600	600	600	1020
3	75001/3	ARRANGE.OF EMBED (ANCHOR POINT)	2400	800	700	2305
4	75001/4	ARRANGE.OF EMBED (ANCHOR POINT) - ANCHOR BOX TYPE-A	2300	920	1050	1073
5	75001/5	ARRANGE.OF EMBED(ANCHOR POINT)	1600	800	600	715
6	75001/6	ARRANGE.OF EMBED(ANCHOR POINT)	2400	800	850	1720
7	75001/7	ARRANGE.OF EMBED(ANCHOR POINT) - EMBED.FOR LPC GUIDE BOLT	1450	1375	1230	740
8	75001/8	ARRANGE.OF EMBED(ANCHOR POINT) - EMBED.FOR LPC GUIDE BOLT	1450	1370	1230	650
9	75001/9	ARRANGE.OF EMBED(ANCHOR POINT) - LOOSE ITEMS	1350	1150	950	1140
10	75001/10	ARRANGE.OF EMBED(ANCHOR POINT) - ANCHOR RODS/NUTS (L=3000)	1450	1370	1230	676
11	75001/11	ARRANGE.OF EMBED(ANCHOR POINT)	3300	1000	1000	3300
12	75003/1	BASE PLATE ASSEMBLY	2500	2000	1500	990
13	75003/2	BASE PLATE ASSEMBLY	600	500	500	270
14	75004/0	BASE PLATE ASSEMBLY	2200	1550	500	4800
15	75102/1	CASING UPPER PART	8600	3000	3000	14150
16	75102/2	CASING UPPER PART	8600	3000	3000	14150

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17	75103/1	CASING UPPER PART	8600	3000	3000	13950
18	75103/2	CASING UPPER PART	8600	3000	3000	13950
19	75104/0	RUPTURE DIAPHRAGM ASSEMBLY	2150	2150	1500	584
20	75107/1	CASING SIDE WALL (LEFT)	6000	5500	200	7900
21	75107/2	CASING SIDE WALL (LEFT)	6000	5500	200	7900
22	75108/1	CASING SIDE WALL (RIGHT)	6000	5500	200	7900
23	75108/2	CASING SIDE WALL (RIGHT)	6000	5500	200	7900
24	75109/1	FRONT WALL LP-1 (TS)	8560	5000	1000	17000
25	75109/2	FRONT WALL LP-2 (TS)	8560	5000	1000	17000
26	75110/1	FRONT WALL LP-1 (GS)	8560	5040	1000	17000
27	75110/2	FRONT WALL LP-2 (GS)	8560	5040	1000	17000
28	75111/1	LP SHAFT SEAL CASING - TS	2000	1650	750	730
29	75111/2	LP SHAFT SEAL CASING - TS	2000	1650	750	730
30	75112/1	LP SHAFT SEAL CASING - GS	2000	1650	750	730
31	75112/2	LP SHAFT SEAL CASING - GS	2000	1650	750	730
32	75113/1	LP SHAFT SEAL COMPENSATOR (TS)	2800	2800	800	1452
33	75113/2	LP SHAFT SEAL COMPENSATOR (TS)	2800	2800	800	1452
34	75114/1	LP SHAFT SEAL COMPENSATOR (GS)	2800	2800	800	1452
35	75114/2	LP SHAFT SEAL COMPENSATOR (GS)	2800	2800	800	1452
36	75116/1	CASING FRAME SECTION	8200	4900	250	6427
37	75116/2	CASING FRAME SECTION	8200	4900	250	6427
38	75116/3	CASING FRAME SECTION	2000	3000	1000	3231
39	75116/4	CASING FRAME SECTION	2000	700	1100	4822
40	75315/1	AUXILIARIES OF LP TURBINE	3000	1500	800	876
41	75315/2	AUXILIARIES OF LP TURBINE	2500	1500	1200	782
42	75315/3	AUXILIARIES OF LP TURBINE	1500	1000	800	832
43	75705/1	LP EXTRACTION A1	2200	2000	1300	756

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44	75705/2	LP EXTRACTION A1	1700	1600	1000	416
45	75706/1	LP EXTRACTION A1	2200	2000	1300	756
46	75706/2	LP EXTRACTION A1	1700	1600	1000	416
47	75707/1	LP EXTRACTION A1	2200	2000	1300	756
48	75707/2	LP EXTRACTION A1	1700	1600	1000	416
49	75707/3	LP EXTRACTION A1	2200	2000	1300	756
50	75707/4	LP EXTRACTION A1	1700	1600	1000	416
51	75708/1	LP EXTRACTION A2	2500	1730	1000	974
52	75708/2	LP EXTRACTION A2	2270	1420	1000	538
53	75709/1	LP EXTRACTION A2	2970	1720	1000	838
54	75709/2	LP EXTRACTION A2	2500	1730	1000	974
55	75710/1	LP EXTRACTION A2	2270	1420	1000	538
56	75710/2	LP EXTRACTION A2	2970	1720	1000	838
57	75711/1	LP EXTRACTION A3	2860	1200	1200	935
58	75711/2	LP EXTRACTION A3	2860	1200	1200	935
59	75712/1	LP EXTRACTION A3	4620	1120	1120	903
60	75712/2	LP EXTRACTION A3	4620	1120	1120	903
61	75713/1	LP EXTRACTION A3	1580	930	810	156
62	75713/2	LP EXTRACTION A3	1580	930	810	156
63	75716/1	EXTRACTION PIPE SHEATHING A3	5500	2800	1000	1611
64	75716/2	EXTRACTION PIPE SHEATHING A3	4200	5200	800	1684
65	75716/3	EXTRACTION PIPE SHEATHING A3	4200	3300	750	930
66	75716/4	EXTRACTION PIPE SHEATHING A3	4400	2500	1200	1033
67	75716/5	EXTRACTION PIPE SHEATHING A3	5500	2800	1000	1611
68	75716/6	EXTRACTION PIPE SHEATHING A3	4200	5200	800	1684

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69	75716/7	EXTRACTION PIPE SHEATHING A3	4200	3300	750	930
70	75716/8	EXTRACTION PIPE SHEATHING A3	4400	2500	1200	1033
71	75717/0	COMPENSATORS FOR CASING GUIDE	3000	2000	400	924
72	75723/1	LP CASING ASSEMBLY PARTS	3000	2000	1200	700
73	75723/2	LP CASING ASSEMBLY PARTS	1500	1000	800	770
74	75723/3	LP CASING ASSEMBLY PARTS LP CASING ASSEMBLY PARTS	500	500	400	6
75	75723/4	LP CASING ASSEMBLY PARTS	550	400	300	55.5
76	76104/1	STEAM STRAINERS FOR MS VALVES	1600	700	700	286
77	76202/2	STEAM STRAINERS FOR INTERCEPTOR VALVES	2800	1300	1100	1248
78	76301/1	SUSPENSION OF LPBP VALVE	3600	1700	800	986
79	76301/2	SUSPENSION OF LPBP VALVE	3600	1700	800	986
80	76412/0	LEAKAGE OIL TANK	1000	1000	3000	515
81	76413/0	WASTE OIL TANK	1000	1000	3000	515
82	76801/0	RATING, COLLABORATION AND COMPANY'S MONOGRAM	0	0	0	50
83	76914/0	COMPENSATOR	600	600	900	27.44
84	77202/0	TEMP. & PRESSURE CONNECTIONS	1700	750	750	600
					<b>Total</b>	<b>240429</b>

<b>(B2)</b>		<b>TURBINE (SIEMENS SUPPLY)</b>					
<b>SI No.</b>	<b>Component</b>	<b>Description</b>	<b>Qty</b>	<b>Dimensions LXWXH (in mm)</b>			<b>Net Weight (in Kgs)</b>
85	Turbine	Jointing Compound	1	370	270	330	10
86	Turbine	Jointing Compound	1	370	270	330	30
87	Turbine	Varnish	1	370	270	330	30
88	Turbine	Activator	1	180	160	230	10
89	Turbine	Jointing Compound	20	370	270	330	30
90	Turbine	Jointing Compound	5	370	270	330	10
91	Turbine	Varnish	1	370	270	330	30

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92	Turbine Bearings	Bearing pedestal 11	1	3600	1910	1700	5870
93	Turbine Bearings	Bearing pedestal 16	1	4500	1820	2150	11400
94	Turbine Bearings	Bearing pedestal 26	1	6470	1820	2500	23000
95	Turbine Bearings	Bearing pedestal 36	1	6460	2120	2460	23500
96	Turbine Bearings	Bearing pedestal 46	1	6500	2010	2420	23000
97	Turbine Bearings	Arrangement of bearing casing + base plate	1	1470	870	730	1360
98	Turbine Bearings	Guide bolts	1	2450	1200	1180	3700
99	Turbine Bearings	Guide bolt	1	3200	720	1200	2500
100	Turbine Bearings	Bearing casing arrangement 11	2	670	570	40	150
101	Turbine Bearings	Bearing casing arrangement 16	2	870	770	380	260
102	Turbine Bearings	Bearing casing arrangement 26	1	2320	520	600	590
103	Turbine Bearings	Bearing casing arrangement 36	4	1070	1070	530	620
104	Turbine Bearings	Bearing casing arrangement 46	2	470	370	470	50
105	Turbine Bearings	Adhesive Loctite577	1	180	160	230	10
106	Turbine Bearings	Manually-operated turning gear	1	1120	370	530	70
107	Turbine	Activator	1	180	160	230	10
108	Turbine Accessories II	HOLDER	6	2340	940	870	560
109	Turbine Accessories I	BRACKET	2	1330	880	650	290
110	Turbine Accessories I	LOAD SHACKLE	2	340	250	260	10
111	Turbine Accessories I	LIFTING SLING	1	670	670	530	40
112	Turbine Accessories I	RING BURNER	1	1840	1280	1450	480
113	Turbine Accessories I	measuring key button	6	670	470	510	30
114	Turbine Accessories II	BRACKETS	1	1880	1800	1210	2160

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115	Turbine Accessories I	HOLDER	1	470	370	380	30
116	Turbine Accessories I	CHEESE HEAD SCREW	4	340	250	260	10
117	Turbine Accessories I	DRIVE	1	3610	1350	2110	3800
118	Turbine Accessories I	DRIVE	1	3610	1350	2510	4960
119	Turbine Accessories I	HEATING DEVICE	1	880	430	600	80
120	Turbine Accessories I	SHIELD	2	1140	370	340	100
121	Turbine Accessories I	SHIELD	1	1140	370	340	100
122	Turbine Accessories I	WRENCH	1	930	730	510	80
123	Turbine Accessories I	DRIVE	1	1500	1230	2580	1980
124	Turbine Accessories I	BLOW OUT DEVICE	1	1080	520	500	110
125	Turbine Accessories I	BLOW OUT DEVICE	1	4790	2320	1320	6800
126	Turbine Accessories I	BLOW OUT DEVICE	1	2720	1270	1620	2300
127	Turbine Accessories I	SHACKLE	1	1990	1480	1080	950
128	Turbine Accessories I	LOAD SHACKLE	4	1640	1480	950	980
129	Turbine Accessories I	INSTALATTION HANGER	1	1060	320	590	90
130	Turbine Accessories I	INSTALATTION HANGER	1	1060	320	590	90
131	Turbine Bearings	INSTALLATION HANGER	1	1230	260	490	80
132	Turbine Accessories I	WRENCH	1	2200	800	350	100
133	Turbine Accessories I	DRIVE	1	2610	1280	2070	3600
134	Turbine Accessories I	LOAD SHACKLE	2	2880	1880	1140	1620
135	Turbine Accessories I	LIFTING SLING	1	2830	1500	1180	1660
136	Turbine Accessories I	LIFTING SLING	1	780	780	460	110
137	Turbine Accessories I	ROPES	1	1260	1230	950	550
138	Turbine	HYDRAULIC	1	1160	1030	920	600

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	Accessories I	CYLINDER					
139	Turbine Accessories I	LIFTING SLING	1	540	540	210	20
140	Turbine Accessories I	FLANGE	1	980	330	450	60
141	Turbine Accessories I	FLANGE	1	980	330	450	60
142	Turbine Accessories I	LIFTING SLING	1	1650	1630	1280	1440
143	Turbine Accessories I	FRAMES	1	1770	1280	1430	680
144	Turbine Accessories II	PIPE	1	560	500	410	50
145	Turbine Accessories I	CONNECTING HEAD	4	670	470	430	30
146	Turbine Accessories I	HYDRAULIC SET	1	1740	1030	1420	580
147	Turbine Accessories I	SHAFT SUPPORT	1	3690	1100	1710	2700
148	Turbine Accessories I	CURLSTORAGE	1	2290	1610	1270	2140
149	Turbine Accessories I	LIFTING DEVICE	1	6770	1830	2280	7350
150	Turbine Accessories I	CONNECTING HEAD	5	470	370	380	20
151	Turbine Accessories I	ROUND	1	5990	680	880	1560
152	Turbine Accessories I	SUPPORT	2	3140	1080	1050	1000
153	Turbine Accessories II	MOUNTING BRACKET	1	2620	1030	1220	2300
154	Turbine Accessories II	MOUNTING BRACKET	1	2650	1330	1290	2420
155	Turbine Accessories II	MOUNTING BRACKET	4	2140	1100	910	1160
156	Turbine Accessories I	SHACKLE	4	880	780	700	240
157	Turbine Accessories I	ASSEMBLY DEVICE	1	4780	1230	790	3400
158	Turbine Accessories I	flange	1	1030	330	400	70
159	Turbine Accessories I	flange	1	1030	330	400	70
160	Turbine Accessories II	ASSEMBLY DEVICE	1	1480	730	450	140
161	Turbine Accessories I	LIFTING DEVICE	1	4890	1700	3000	2680

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162	Turbine Accessories I	ASSEMBLY FIXTURE	1	1470	1080	1330	800
163	Turbine Accessories I	TOGGLE LEVER	1	1260	1080	670	260
164	Turbine Accessories I	ASSEMBLY DEVICE FOR ASSAMBYL AND DISASSAMBL Y	1	730	330	470	70
165	Turbine Accessories I	ASSEMBLY DEVICE	1	1250	780	990	590
166	Turbine Accessories I	THREADED BOLTS	1	1470	1040	760	540
167	Turbine Accessories I	Eye Nuts	2	480	380	380	40
168	Turbine Accessories I	Coupling Bolts	18	980	530	410	270
169	Turbine Valves	Stop/Control Valve Assy.	1	4640	4510	3030	35800
170	Turbine Valves	Stop/Control Valve 18015100	1	4640	4510	3030	35800
171	LP - Turbine	Upper Part 32210000	1	6220	4350	3820	33500
172	LP - Turbine	Lower Part 32210000	1	5920	5830	3870	56800
173	LP - Turbine	Guide Blade Carrier	1	2960	1650	1300	3800
174	LP - Turbine	Guide Blade Carrier	1	2960	1650	1300	3600
175	LP - Turbine	Stationary Blade Rings	1	4210	2260	990	3800
176	LP - Turbine	Stationary Blade Rings	1	4210	2260	990	3800
177	LP - Turbine	Turbine Rotor 34000000	1	8900	3680	3850	81500
178	Turbine Accessories I	Gaskets	1	1600	1220	1350	1250
179	Turbine Accessories I	Guide Bolts	3	2440	1220	730	460
180	IP - Turbine	Extraction Connection	1	1220	1230	1530	1150
181	IP - Turbine	Extraction Connection	1	1220	1230	1350	1150
182	Turbine Valves	Stop/Control Valve 28015100	1	6210	4870	3600	51400
183	Turbine Valves	Stop/Control Valve 28015200	1	6210	4870	3600	51400
184	LP - Turbine	Upper Part 42210000	1	6220	4350	3820	33500
185	LP - Turbine	Lower Part	1	5920	5830	3870	56800

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		42210000					
186	LP - Turbine	Guide Blade Carrier	1	2960	1650	1300	4000
187	LP - Turbine	Guide Blade Carrier	1	2960	1650	1300	4000
188	LP - Turbine	Stationary Blade Rings	1	4210	2260	990	4080
189	LP - Turbine	Stationary Blade Rings	1	4210	2260	990	4030
190	LP - Turbine	Turbine Rotor 44000000	1	8900	3680	3850	81500
191	IP - Turbine	Turbine Section 20100000	1	9600	4260	4470	224000
192	HP - Turbine	Turbine Section 10100000	1	8030	3860	3650	128000
193	Turbine Valves	Stop/Control Valve 18015500	1	2920	1830	1270	3830
194	Turbine Accessories I	Weights	16	1600	1220	730	1120
195	Turbine Accessories I	Weights	18	400	1220	730	280
196	Turbine Accessories I	Weights	48	400	1220	730	280
197	Turbine Accessories I	Weights	48	400	1220	730	280
198	Turbine Accessories I	Weights	10	400	1220	730	280
199	Turbine Accessories I	Guide Bolts	2	1220	890	750	440
200	Turbine Accessories I	Guide Bolts	3	2440	1220	730	470
201	IP - Turbine	Flange	1	1220	1220	730	370
202	Turbine Accessories I	Wrench	4	610	890	750	210
203	Turbine Valves	Wrench	4	610	890	750	210
204	IP - Turbine	Supporting Arms	1	1600	1220	1350	1850
205	Turbine Accessories I	Stud Bolts	32	340	480	430	80
206	Turbine Accessories I	Stud Bolts	32	340	480	430	80
207	Special Tool for Assembly of HP Turbine	Assembly Tool	2	4450	3030	1640	21200
208	Turbine Accessories I	Lifting Device (C-Hook)	1	7950	1980	1550	4500
209	Turbine Accessories I	List of tools - Special tools	1	1020	830	830	100

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210	Turbine Accessories I	LIFTING EQUIPMENT	1	880	880	820	250
211	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2330	1280	300	400
212	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2300	2300	260	220
213	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	20	6010	1130	1330	5750
214	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2800	2620	1380	3100
215	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	6610	2780	3760	14500
216	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	3530	1760	1070	2100
217	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2830	2630	1730	3800
218	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	2830	2630	1730	3800
219	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	6390	3130	3660	18400
220	Cross Over Pipe	CROSS-OVER PIPES ASSEMBLY	1	5590	3230	4130	14820
221	Cross Over Pipe	SUPPORT FOR CROSS OVER PIPE ASSEMBLY	1	2460	2300	2100	1740
222	Cross Over Pipe	COMPENSATORS FOR INLET PIPES	1	2720	2550	1580	3200
223	Cross Over Pipe	COMPENSATORS FOR INLET PIPES	1	2720	2550	1580	3200
224	Foundation Accessories	FOUNDATION FRAME	1	6420	1930	1150	13250
225	Foundation Accessories	RING	1	1290	900	710	130
226	165000000001	Rockwool mat	PCE	2350	2200	2200	1460
227	165000000002	Rockwool mat	PCE	2350	2200	2200	1480
228	165000000001	Rockwool mat	PCE	2350	2200	2200	1440
229	165000000003	Rockwool mat	PCE	2350	2200	2200	1440
230	165000000003	Rockwool mat	PCE	2350	2200	2200	1440
231	165000000003	Rockwool mat	PCE	2350	2200	2200	1440
232	165000000003	Rockwool mat	PCE	2350	2200	2200	1320
233	165000000105	Rockwool mat	PCE	2350	2200	2200	1190
234	165000000089	Rockwool mat	PCE	3000	2000	2000	1300
235	165000000089	Rockwool mat	PCE	3000	2000	2000	1300

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236	165000000089	Rockwool mat	PCE	3000	2000	2000	1300
237	165000000005	Rockwool mat	PCE	2350	2200	2200	1870
238	165000000005	Rockwool mat	PCE	2350	2200	2200	1870
239	165000000005	Rockwool mat	PCE	2350	2200	2200	1870
240	165000000005	Rockwool mat	PCE	2350	2200	2200	1870
241	165000000005	Rockwool mat	PCE	2350	2200	2200	1870
242	165000000006	Rockwool mat	PCE	2850	2100	1800	1940
243	165000000006	Rockwool mat	PCE	2850	2100	1800	1960
244	165000000004	Rockwool mat	PCE	3500	1700	2000	2940
245	165000000101	Rockwool mat	PCE	1600	1000	1700	1190
246	165000000117	Rockwool mat	PCE	2270	1170	1100	450
247	165000000118	Rockwool mat	PCE	2270	1170	1100	450
248	165000000118	Rockwool mat	PCE	2270	1170	1100	450
249	165000000115	Rockwool mat	PCE	2850	2200	2200	1780
250	165000000130	Rockwool mat	PCE	2850	2200	2200	940
251	165000000102	Rockwool mat	PCE	2700	1400	1800	740
252	165000000121	Rockwool mat	PCE	2700	1400	1800	1210
						<b>Total</b>	<b>1231400</b>

**Technical Conditions of Contract (TCC)**  
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**Annexure-III A**

<b>(C) GENERATOR - <u>Applicable for Unit No. 1 ( Package –A)</u></b>						
<b>(C1)</b>	<b>GENERATOR (HARDWAR SUPPLY)</b>					
<b>Sl no</b>	<b>PACKAGE NO</b>	<b>DESCRIPTION</b>	<b>DIMENSIONS LXWXH (in mm)</b>			<b>NET WEIGHT (IN KGS)</b>
1	803/0	FOUNDATION ITEMS	5800	1120	520	1670
2	822/0	PRIMARY WATER TANK	1000	1000	2500	317
3	823/0	PW TANK PIPE LINES	4500	1800	500	430
4	824/0	PW TANK PIPE LINES	3000	600	500	530
5	831/0	DRY AIR BLOWER	1100	1000	700	52
6	837/0	BRUSHLESS EXCITER SET	5850	2205	2657	26930
7	839/0	DRY AIR BLOWER AND ACCESSORIES	1800	1500	1100	392
8	840/0	EXCITER BED PLATE ACCESSORIES	4500	1700	1500	1752
9	842/0	EXCITER ACCESSORIES	2200	1200	1100	600
10	843/0	EXCITER FOUNDATION ACCESSORIES	1700	1000	800	440
11	844/0	RR WHEEL AIR GUIDE COVER	2000	1500	2000	815
12	845/0	SEAL OIL STORAGE TANK	5000	1800	1700	1940
13	846/1	PW PUMP AND FILTER UNIT-PART I	5000	3000	3600	3500
14	846/2	PW PUMP AND FILTER UNIT-PART II	4000	3000	3600	2500
15	846/3	ION EXCHANGER SKID	2000	2000	2000	500
16	848/1	DOUBLE FLOW S.O.U.-PART I	3910	2900	2800	4300
17	848/2	DOUBLE FLOW S.O.U. -PART II	2510	2500	3300	3525
18	848/3	DOUBLE FLOW S.O.U. -PART III	2510	2500	3300	3525
19	848/4	JB FOR SEAL OIL UNIT	2000	1000	1600	200
20	849/0	LIQUID DETECTOR RACK	2000	600	2000	460
21	849/2	JB FOR LDR	3500	1300	500	200

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22	850/0	GAS UNIT	1980	1640	2420	630	
23	851/0	CO2 VAPOURISER	1520	840	840	170	
24	852/0	H2 DISTRIBUTOR	2400	900	2400	150	
25	853/0	CO2 DISTRIBUTOR	3000	900	2400	163	
26	855/0	DRAIN OIL COLLECTOR	2000	550	550	89	
27	856/0	RESINS	1200	600	600	56	
28	857/0	TG SYSTEM INTEGRAL PIPING VLV	2750	1400	1400	1986	
29	858/0	TG SYSTEM INTEGRAL PIPING INST	1000	940	900	172	
					<b>Total</b>	<b>57994</b>	
SI No.	Component	Description	Qty	Dimensions (in mm)			Net Weight (in Kgs)
				L	W	H	
<b>(C2)</b>	<b>GENERATOR (SIEMENS SUPPLY)</b>						
30	Generator Stator	Stator Assy.	1	11660	5140	4880	462000
31	Generator Rotor	Rotor Compl. 1000	1	14720	2060	2370	95000
32	Generator Accessories	Frame Cooler Head	1	5030	4930	2380	28600
33	Generator Accessories	Shield Bearing	1	4330	3050	2560	20000
34	Generator Accessories	Shield Bearing	1	4030	2780	2360	19000
35	Generator Accessories	Coolers	1	5130	2330	1370	7000
36	Generator Accessories	H.V. Terminal Box	1	3820	2630	1800	6200
37	Generator Accessories	Lifting Slings	1	3070	1660	1200	2770
38	Generator Accessories	Baffle Ring	1	1970	1970	1850	2200
39	Generator Accessories	Bearing Shells	1	2170	1070	970	1750
40	Generator Accessories	Lifting Beams	1	2440	1230	1340	1680
41	Generator Accessories	Seal Ring Holders	1	1220	1230	1350	1220
42	Generator Accessories	H.V. Bushings	1	2500	1640	690	1000
43	Generator Accessories	Lifting Slings	1	1770	1610	1000	1000
44	Generator	HAND PUMP	1	2440	1220	730	910

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	Accessories						
45	Generator Accessories	Sliding Pedestal	1	1600	1220	1350	800
46	Generator Accessories	Brackets	1	1600	1220	730	780
47	Generator Accessories	Main Current Lines	1	2440	1220	730	780
48	Generator Accessories	Covers	1	1220	1220	730	760
49	Generator Accessories	Connection Halves	1	1600	1220	730	630
50	Generator Accessories	Support Block	1	2440	1220	730	480
51	Generator Accessories	Flanges	1	1600	1220	730	430
52	Generator Accessories	Flanges	1	1600	1220	730	430
53	Generator Accessories	Labyrinth Rings	1	1220	1230	1350	410
54	Generator Accessories	Bow	1	2970	1260	850	410
55	Generator Accessories	Sliding Plate	1	7940	590	280	240
56	Generator Accessories	Plates	1	980	530	410	220
57	Generator Accessories	Spreader Beam	1	2680	500	360	140
58	Generator Accessories	Brackets	1	1220	710	730	140
59	Generator Accessories	Flansch	1	480	380	380	30
60	Generator	03/12 EP.Res.Priming Coat	1	410	410	470	20
61	Generator	Leakage Test Agent	1	370	270	330	10
62	Generator	03/12 EP-Catalyst	1	370	270	330	30
63	Generator	04/17 Epoxy Resin	1	370	270	330	30
64	Generator	09/12 Insulation Varnish	1	370	270	330	30
65	Generator	7/12 ASSEMBLY GREASE	1	370	270	330	30
66	Generator	01/12 Jointing Compound	1	370	270	330	30
67	Generator	09/12 Varnish	1	370	270	330	30
68	Generator	09/12 Hardener	1	370	270	330	30
69	Generator	02/12 Epoxy Resin	1	370	270	330	30

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70	Generator	09/12 Assembly Slide Material	1	370	270	330	30
71	Generator	09/12 Hardener	1	370	270	330	30
72	Generator	09/12 Hardener	1	370	270	330	30
73	Generator	09/12 Epoxy Resin	1	370	270	330	30
74	Generator	09/12 Hardener	1	370	270	330	30
75	Generator	09/12 Epoxy Resin	1	370	270	330	30
76	Generator	Adhesive	1	370	270	330	30
77	Generator	09/12 Epoxy Resin	1	370	270	330	30
78	Generator	09/12 Hardener	1	370	270	330	30
79	Generator	09/12 Epoxy Resin	1	370	270	330	30
80	Generator	09/12 Epoxy Resin	1	370	270	330	30
81	Generator	09/12 Hardener	1	370	270	330	30
82	Generator	09/12 Epoxy Resin	1	370	270	330	30
83	Generator	09/12 Epoxy Resin	1	370	270	330	30
84	Generator	09/12 Hardener	1	370	270	330	30
85	Generator	09/12 Hardener	1	370	270	330	30
86	Generator	09/12 Epoxy Resin	1	370	270	330	30
87	Generator	08/12 Adhesive	1	370	270	330	30
88	Generator	08/12 Adhesive	1	370	270	330	30
89	Generator	Teflon-Spray	1	370	270	330	30
90	Generator	Adhesive	1	370	270	330	30
91	Generator	Jointing Compound	1	370	270	330	30
92	Generator	Jointing Compound	1	370	270	330	30
93	Generator	12/12 Adhesive	1	370	270	330	30
94	Generator	07/12 Hardener	1	310	160	170	10
						<b>Total</b>	<b>658010</b>

## Technical Conditions of Contract (TCC)

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#### ANNEXURE-IB

<b>(D) CONDENSER - Applicable for Unit No. 2 ( Package –B)</b>				
<b>SNO</b>	<b>PACKAGE NO</b>	<b>DESCRIPTION</b>	<b>DIMENSIONS - LXWXH (IN MM)</b>	<b>NET WT</b>
1	78001/1	HOTWELL - I (CONDENSER-1)	10400X2700X1450	8025
2	78001/2	HOTWELL - II (CONDENSER-2)	10400X2700X1450	8025
3	78004/1	FRONT END BOTTOM PLATE	7860X2175X1134	5567
4	78004/2	FRONT END BOTTOM PLATE	7860X2175X1134	5567
5	78005/1	REAR END BOTTOM PLATE	7860X1405X1262	3963
6	78005/2	REAR END BOTTOM PLATE	7860X1405X1262	3963
7	78006/1	MIDDLE BOTTOM PLATE-1	7860X3850X1029	8032
8	78006/2	MIDDLE BOTTOM PLATE-1	7860X3850X1029	8032
9	78007/1	MIDDLE BOTTOM PLATE-2	7860X3850X1063	8528
10	78007/2	MIDDLE BOTTOM PLATE-2	7860X3850X1063	8528
11	78008/1	MIDDLE BOTTOM PLATE-3	7860X3850X1096	8324
12	78008/2	MIDDLE BOTTOM PLATE-3	7860X3850X1096	8324
13	78010/1	BOTTOM PLATE (LOOSE ITEMS)	1000X400X350	230
14	78010/2	BOTTOM PLATE (LOOSE ITEMS)	1000X400X350	230
15	78014/1	LOOSE ITEMS (COND.SUPPORT)	2700X1000X400	840
16	78014/2	LOOSE ITEMS (COND. SUPPORT)	2700X1000X400	840
17	78018/1	LOOSE ITEMS(COND. SUPPORT)	1400X900X760	1385
18	78018/2	LOOSE ITEMS(COND SUPPORT)	1400X900X750	1385
19	78019/1	LOOSE ITEMS(COND SUPPORT)	1740X1140X900	3700
20	78019/2	LOOSE ITEMS(COND. SUPPORT)	1740X1140X900	3700
21	78020/1	FRONT WATER CHAMBER(GEN. SIDE)	7014X4030X390	8950
22	78020/2	FRONT WATER CHAMBER(GEN. SIDE)	7014X4030X390	8950
23	78022/1	FRONT WATER BOX (GEN SIDE)	6560X4020X3300	18465
24	78022/2	FRONT WATER BOX (GEN SIDE)	6560X4020X3300	18465
25	78023/1	FRONT WATER CHAMBER(TUR. SIDE)	7014X4030X390	8950
26	78023/2	FRONT WATER CHAMBER(TUR. SIDE)	7014X4030X390	8950
27	78025/1	FRONT WATER BOX(TUR. SIDE)	6560X4020X3300	18465
28	78025/2	FRONT WATER BOX(TUR. SIDE)	6560X4020X3300	18465
29	78026/1	REAR WATER CHAMBER(GEN. SIDE)	7014X4030X390	9100
30	78026/2	REAR WATER CHAMBER(GEN. SIDE)	7014X4030X390	9100
31	78028/1	REAR WATER BOX(GEN. SIDE)	6560X4020X3300	18465
32	78028/2	REAR WATER BOX(GEN. SIDE)	5900X4020X2430	18760
33	78029/1	REAR WATER CHAMBER(TUR. SIDE)	7014X4030X390	9100
34	78029/2	REAR WATER CHAMBER(TUR. SIDE)	7014X4030X390	9100
35	78029/1		0X0X0	0
36	78031/1	REAR WATER BOX(TUR. SIDE)	5900X4020X3300	18760

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37	78031/2	REAR WATER BOX(TUR. SIDE)	6560X4020X3300	18465
38	78032/1	SIDE WALL(TUR.END-PLATES)CONDENSER-1	6920X1170X40	2301
39	78032/2	SIDE WALL(TUR.END-PLATES)CONDENSER-2	6920X1170X40	2301
40	78033/1	SIDE WALL(TUR.END-PLATES)CONDENSER-1	6920X2480X100	13475
41	78033/2	SIDE WALL(TUR.END-PLATES)CONDENSER-2	6920X2480X100	13475
42	78034/1	SIDE WALL(TUR.END-LOOSE ITEMS)CONDENSER-1	4890X450X52	633
43	78034/2	SIDE WALL(TUR.END-LOOSE ITEMS)CONDENSER-2	4890X450X52	633
44	78041/1	SIDE WALL(GEN.END-PLATES)CONDENSER-1	6920X1170X40	2301
45	78041/2	SIDE WALL(GEN.END-PLATES)CONDENSER-2	6920X1170X40	2301
46	78042/1	SIDE WALL(GEN.END-PLATES)CONDENSER-1	6920X2480X100	13475
47	78042/2	SIDE WALL(GEN.END-PLATES)CONDENSER-2	6920X2480X100	13475
48	78046/1	SIDE WALL(GEN.END-LOOSE ITEMS)CONDENSER-1	4890X450X52	633
49	78046/2	SIDE WALL(GEN.END-LOOSE ITEMS)CONDENSER-2	4890X450X52	633
50	78047/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
51	78047/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
52	78048/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
53	78048/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
54	78049/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
55	78049/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
56	78050/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
57	78050/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5481
58	78051/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
59	78051/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
60	78052/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
61	78052/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
62	78053/1	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
63	78053/2	SHELL INTERNAL STIFFENING RODS	3616X1000X800	5220
64	78054/1	SHELL INTERNAL STIFFENING RODS	1000X700X500	1200
65	78054/2	SHELL INTERNAL STIFFENING RODS	1000X700X500	1200
66	78055/1	SHELL INTERNAL STIFFENING RODS	3700X825X500	2085
67	78055/2	SHELL INTERNAL STIFFENING RODS	3700X825X500	2085
68	78056/1	SHELL INTERNAL STIFFENING RODS	3700X825X500	2085
69	78056/2	SHELL INTERNAL STIFFENING RODS	3700X825X500	2085
70	78057/1	SHELL INTERNAL STIFFENING RODS	3700X825X500	2051
71	78057/2	SHELL INTERNAL STIFFENING RODS	3700X825X500	2051
72	78058/1	AIR EXTRACTION PIPINGCONDENSER-1	7100X700X700	1616
73	78058/2	AIR EXTRACTION PIPINGCONDENSER-2	7100X700X700	1616
74	78059/1	TUBE SUPPORT PLATE	5800X3820X400	5808
75	78059/2	TUBE SUPPORT PLATE	5800X3820X400	5808
76	78060/1	TUBE SUPPORT PLATE	5800X3820X400	5808

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77	78060/2	TUBE SUPPORT PLATE	5800X3820X400	5808
78	78061/1	TUBE SUPPORT PLATE	5800X3820X400	5808
79	78061/2	TUBE SUPPORT PLATE	5800X3820X400	5808
80	78062/1	TUBE SUPPORT PLATE	5800X3820X400	5808
81	78062/2	TUBE SUPPORT PLATE	5800X3820X400	5808
82	78063/1	TUBE SUPPORT PLATE	5800X3820X400	5808
83	78063/2	TUBE SUPPORT PLATE	5800X3820X400	5808
84	78064/1	TUBE SUPPORT PLATE	5800X3820X400	5808
85	78064/2	TUBE SUPPORT PLATE	5800X3820X400	5808
86	78065/1	TUBE SUPPORT PLATE	5800X3820X400	4356
87	78065/2	TUBE SUPPORT PLATE	5800X3820X400	4356
88	78066/1	TUBE SUPPORT PLATE	5800X3820X400	4356
89	78066/2	TUBE SUPPORT PLATE	5800X3820X400	4356
90	78067/1	TUBE SUPPORT PLATE	5800X3820X400	4356
91	78067/2	TUBE SUPPORT PLATE	5800X3820X400	4356
92	78068/1	TUBE SUPPORT PLATE	5800X3820X400	4356
93	78068/2	TUBE SUPPORT PLATE	5800X3820X400	5808
94	78069/1	SHELL INTERNAL DETAILS	1400X800X800	3240
95	78069/2	SHELL INTERNAL DETAILS	1400X800X800	3240
96	78070/1	SHELL INTERNAL DETAILS	5600X900X600	4615
97	78070/2	SHELL INTERNAL DETAILS	5600X900X600	4615
98	78071/1	SHELL INTERNAL DETAILS	1300X1200X600	2685
99	78071/2	SHELL INTERNAL DETAILS	1300X1200X600	2685
100	78072/1	SHELL INTERNAL DETAILS	1200X1000X800	2160
101	78072/2	SHELL INTERNAL DETAILS	1200X1000X800	2160
102	78074/1	LOWER DOME WALL(TS)(CONDENSER -1)	10100X3800X350	11319
103	78074/2	LOWER DOME WALL(TS)(CONDENSER -2)	7249X1897X300	3935
104	78075/1	LOWER DOME WALL(TS)(CONDENSER -1)	10760X2220X300	6396
105	78075/2	LOWER DOME WALL(TS)(CONDENSER -2)	7315X1897X500	3947
106	78076/1	LOWER DOME WALL(TS)CONDENSER-1	2350X3700X300	1556
107	78076/2	LOWER DOME WALL(TS)CONDENSER-2	12730X2500X750	8223
108	78077/1	LOWER DOME WALL(TS)CONDENSER-1	2250X3686X50	1591
109	78077/2	LOWER DOME WALL(TS)CONDENSER-2	10295X1875X650	4842
110	78078/1	LOWER DOME WALL (TS)CONDENSER -1	8500X300X50	640
111	78078/2	LOOSE ITEMS( LOWER DOME WALLTS)CONDENSER-2	8488X300X150	644
112	78079/2	LOWER DOME WALL(TS)CONDENSER-2	530X250X320	232
113	78101/1	LOWER DOME WALL ( GS)CONDENSER-1	8475X300X150	645
114	78101/2	LOWER DOME WALL ( GS)CONDENSER-2	10000X3900X300	11563
115	78102/1	LOWER DOME WALL ( GS)CONDENSER-1	10805X3000X700	7647
116	78102/2	LOWER DOME WALL (GS)CONDENSER -2	10760X2220X300	6396
117	78103/1	LOWER DOME WALL (GS)CONDENSER -1	12796X2700X600	7532

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118	78103/2	LOWER DOME WALL (GS)CONDENSER -2	2350X3700X300	1556
119	78104/1	LOWER DOME WALL(GS)CONDENSER-1	7315X1826X300	3802
120	78104/2	LOWER DOME WALL(GS)CONDENSER-2	2315X3686X300	1637
121	78105/1	LOWER DOME WALL(GS)CONDENSER -1	7250X1826X600	3808
122	78105/2	LOWER DOME WALL (GS)CONDENSER-2	8492X300X50	640
123	78106/1	LOWER DOME WALL (GEN SIDE)CONDENSER-1	2750X1250X1000	1230
124	78106/2	LOWER DOME WALL (GEN SIDE)CONDENSER-2	200X200X200	11
125	78107/1	LOOSE ITEM L D WALL (FWB)CONDENSER-1	7000X250X100	381
126	78107/2	LOOSE ITEM L D WALL (FWB)CONDENSER-2	7000X250X100	381
127	78108/1	LOWER DOME WALL(FWB)CONDENSER-1	7960X1574X700	4002
128	78108/2	LOWER DOME WALL ( FWB)CONDENSER-2	7960X1574X700	3943
129	78109/1	LOWER DOME WALL (FWB)CONDENSER-1	7470X2300X650	3635
130	78109/2	LOWER DOME WALL (FWB)CONDENSER-2	7500X2500X700	4386
131	78110/1	LOWER DOME WALL(FWB)CONDENSER-1	6870X2500X300	5115
132	78110/2	LOWER DOME WALL (FWB)CONDENSER-2	6870X2500X300	5115
133	78111/1	LOWER DOME WALL (FWB)CONDENSER-1	6070X1400X500	1754
134	78111/2	LOWER DOME WALL (FWB)CONDENSER-2	6070X1300X500	1759
135	78112/1	LOOSE ITEMSLOWER DOME WALL (FWB) COND.-1	600X500X400	493
136	78112/2	LOOSE ITEMSLOWER DOME WALL (FWB) COND.-2	600X500X400	484
137	78113/1	LOWER DOME WALL(RWB)(CONDENSER-1)	7970X1780X700	3600
138	78113/2	LOWER DOME WALL(RWB)(CONDENSER-2)	7960X1780X300	3722
139	78114/1	LOWER DOME WALL(RWB)(CONDENSER-1)	7396X2800X1000	4494
140	78114/2	LOWER DOME WALL(RWB)(CONDENSER-2)	7396X2700X1000	4472
141	78115/1	LOWER DOME WALL(RWB)CONDENSER-1	6598X3200X700	4776
142	78115/2	LOWER DOME WALL(RWB)CONDENSER-2	6598X3200X700	4767
143	78116/1	LOWER DOME WALL(RWB)CONDENSER-1	5800X400X50	583
144	78116/2	LOWER DOME WALL(RWB)CONDENSER-2	5864X400X50	583
145	78117/1	LOWER DOME WALL(RWB)CONDENSER-1	7600X1300X300	1725
146	78117/2	LOWER DOME WALL(RWB)CONDENSER-2	7600X1500X300	1920
147	78118/1	LOOSE ITEMSLOWER DOME WALL (RWB) COND.-1	2100X2100X1800	880
148	78118/2	LOOSE ITEMSLOWER DOME WALL (RWB) COND.-2	2100X2100X1800	880
149	78121/1	DOME INTERNAL STIFFENINGCONDENSER-1	5500X2300X1100	6500
150	78121/2	DOME INTERNAL STIFFENINGCONDENSER-2	5500X2300X1100	6500
151	78122/1	DOME INTERNAL STIFFENINGCONDENSER-1	2400X1200X2100	4308
152	78122/2	DOME INTERNAL STIFFENINGCONDENSER-2	5500X550X1050	3300
153	78123/1	DOME INTERNAL STIFFENINGCONDENSER-1	2000X800X550	1170
154	78123/2	DOME INTERNAL STIFFENINGCONDENSER-2	1300X600X400	360
155	78124/1	DOME INTERNAL STIFFENINGCONDENSER-	5300X450X250	1170

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156	78124/2	DOME INTERNAL STIFFENINGCONDENSER-2	2250X1000X1200	3000
157	78125/1	DOME INTERNAL STIFFENINGCONDENSER-1	5300X800X800	1900
158	78125/2	DOME INTERNAL STIFFENINGCONDENSER-2	500X500X1000	400
159	78126/1	DOME INTERNAL STIFFENINGCONDENSER-1	2700X1600X1000	4400
160	78126/2	DOME INTERNAL STIFFENINGCONDENSER-2	2700X1200X1200	5600
161	78127/1	LOOSE ITEMS DOME INTERNALSTIFFENING COND.-1	3150X1500X1600	2750
162	78127/2	LOOSE ITEMS DOME INTERNALSTIFFENING COND.-2	3150X1600X1200	4250
163	78129/1	LP HEATER SUPPORT ARRANGEMENTLOOSE ITEMS	1000X800X500	745
164	78129/2	LP HEATER SUPPORT ARRANGEMENTLOOSE ITEMS	1000X800X500	745
165	78130/1	LP HEATER SUPPORT ARRANGEMENTLOOSE ITEMS	7500X1100X500	1880
166	78130/2	LP HEATER SUPPORT ARRANGEMENTLOOSE ITEMS	7500X1100X500	1880
167	78132/1	UPPER DOME WALL (TURBINE SIDE)CONDENSER-1	8232X300X950	2730
168	78132/2	UPPER DOME WALL (TURBINE SIDE)CONDENSER-2	8232X300X950	2730
169	78133/1	UPPER DOME WALL(GEN SIDE)CONDENSER-1	8232X300X950	2730
170	78133/2	UPPER DOME WALL(GEN SIDE)CONDENSER-2	8232X300X950	2730
171	78136/1	UPPER DOME WALL (FWB)CONDENSER-1	5755X300X950	1931
172	78136/2	UPPER DOME WALL (FWB)CONDENSER-2	5755X300X950	1931
173	78137/1	UPPER DOME WALL(RWB)CONDENSER-1	5755X300X950	1931
174	78137/2	UPPER DOME WALL(RWB)CONDENSER-2	5755X300X950	1931
175	78142/1	FRONT W/BOX HINGE ARRANGEMENT	2200X900X1100	6346
176	78142/2	FRONT W/BOX HINGE ARRANGEMENT	2200X900X1100	2588
177	78143/1	REAR W/BOX HINGE ARRANGEMENT	1800X800X800	2948
178	78143/2	REAR W/BOX HINGE ARRANGEMENT	1800X800X800	1308
179	78144/1	FRONT W/BOX HINGE ARRANGEMENT	1000X800X700	318
180	78144/2	FRONT W/BOX HINGE ARRANGEMENT	1000X800X700	318
181	78145/1	REAR W/BOX HINGE ARRANGEMENT	1000X800X700	318
182	78145/2	REAR W/BOX HINGE ARRANGEMENT	1000X800X700	318

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183	78146/1	FRONT W/BOX HINGE ARRANGEMENT	2400X700X400	552
184	78146/2	FRONT W/BOX HINGE ARRANGEMENT	2400X700X400	552
185	78147/1	REAR W/BOX HINGE ARRANGEMENT	2400X700X400	552
186	78147/2	REAR W/BOX HINGE ARRANGEMENT	2400X700X400	552
187	78150/1	FRONT W/BOX HINGE ARRANGEMENT	1495X1240X400	1037
188	78150/2	FRONT W/BOX HINGE ARRANGEMENT	1495X1240X400	1037
189	78151/1	REAR W/BOX HINGE ARRANGEMENT	1495X1140X400	890
190	78151/2	REAR W/BOX HINGE ARRANGEMENT	1495X1140X400	890
191	78157/1	CONDENSER (LOOSE ITEMS)	1000X1000X600	435
192	78157/2	CONDENSER (LOOSE ITEMS)	1000X1000X600	435
193	78158/1	COND. LOOSE ITEMS (RUBBER CORD FOR BOTH CONDENSER)	1700X1700X500	92
194	78158/2	COND. LOOSE ITEMS (RUBBER CORD FOR BOTH CONDENSER)	1700X1700X500	92
195	78159/1	FASTENERS (CONDENSER)	1200X1100X850	2300
196	78159/2	FASTENERS (CONDENSER)	1200X1100X850	2300
197	78165/1	CONDENSER LOOSE ITEMS	3000X1000X400	762
198	78165/2	CONDENSER LOOSE ITEMS	3000X1000X400	762
199	78166/0	CONDENSER STAND PIPE NO.1 LOOSE ITEMS FOR(FOR BOTH COND)	3500X800X600	324
200	78167/1	STAND PIPE NO.1(CONDENSER 1&2)	3350X550X500	122
201	78167/2	STAND PIPE NO.2(CONDENSER 1&2)	3500X600X600	122
202	78169/0	CONDENSER STAND PIPES NO.2 LOOSE ITEMS FOR(FOR BOTH COND)	3500X800X600	324
207	78301/0	GLAND STEAM CONDENSER	1750X1700X1700	1510
208	78304/0	LOOSE ITEMS OF GSC	700X300X200	34
209	78305/0	LOOSE ITEMS OF GSC (FRAGILE)	600X500X350	10
210	78315/1	LP HEATER-1	17100X2200X2000	31400
211	78315/2	LP HEATER-2	17100X2200X2000	32200
212	78316/1	LP HEATER-1 STAND PIPE	2200X350X350	100
213	78316/2	LP HEATER-2 STAND PIPE	2200X350X350	100
214	78317/1	LP HEATER-1 LOOSE ITEMS	500X400X400	110
215	78317/2	LP HEATER-2 LOOSE ITEMS	500X400X400	110
216	78318/1	LP HEATER-1 INSTRUMENTATION(FRAGILE)	700X400X400	50
217	78318/2	LP HEATER-2 INSTRUMENTATION(FRAGILE)	700X400X400	50
218	78319/1	LP HEATER-1 INSTRUMENTATION(NON FRAGILE)	2100X500X400	120
219	78319/2	LP HEATER-2 INSTRUMENTATION(NON FRAGILE)	2100X500X400	120
220	78320/1	TROLLEY FOR LP HEATER-1	1350X800X200	664
221	78320/2	TROLLEY FOR LP HEATER-2	1350X800X200	664
222	78424/0	HYDROGEN COOLER	4900X1270X1150	4155

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223	78425/0	HYDROGEN COOLER	4900X1270X1150	4155
224	78428/0	LOOSE ITEMS (HYDROGEN COOLER)	1270X1150X600	800
225	78431/0	EXCITER AIR COOLER	3250X950X650	450
226	78432/0	EXCITER AIR COOLER	3250X950X650	450
227	10001/0	STARTER CABINET FOR DC S.OILMOTOR	1230X1060X2550	450
228	10002/0	GEN INSTRUMENTATION CABINET	1230X1060X2550	450
229	10004/0	LOOSE INSTRUMENTS	1000X800X400	26
230	10005/0	STARTER CABINET FOR DC JOPMOTOR	1230X1060X2550	450
231	10006/0	STARTER CABINET FOR DC EOPMOTOR	1230X1060X2550	450
			<b>Total Weight (in Kgs)</b>	<b>938788</b>

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**ANNEXURE-IIB**

<b>(E) TURBINE - <u>Applicable for Unit No. 2 ( Package –B)</u></b>				
<b>SN O</b>	<b>PACKAG E NO</b>	<b>DESCRIPTION</b>	<b>DIMENSIONS - LXWXH (IN MM)</b>	<b>NET WT</b>
1	75001/1	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X1500X600	960
2	75001/2	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2600X600X600	1020
3	75001/3	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2400X800X700	2305
4	75001/4	ARRANGE.OF EMBED(ANCHOR POINT)- ANCHOR BOX TYPE-A	2300X920X1050	1073
5	75001/5	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	1600X800X600	715
6	75001/6	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	2400X800X850	1720
7	75001/7	ARRANGE.OF EMBED(ANCHOR POINT)- EMBED.FOR LPC GUIDE BOLT	1450X1375X1230	740
8	75001/8	ARRANGE.OF EMBED(ANCHOR POINT)- EMBED.FOR LPC GUIDE BOLT	1450X1370X1230	650
9	75001/9	ARRANGE.OF EMBED(ANCHOR POINT)- LOOSE ITEMS	1350X1150X950	1140
10	75001/10	ARRANGE.OF EMBED(ANCHOR POINT)- ANCHOR RODS/NUTS (L=3000)	1450X1370X1230	676
11	75001/11	ARRANGE.OF EMBED(ANCHOR POINT)ARRANGE.OF EMBED(ANCHOR POINT)	3300X1000X1000	3300
12	75003/1	BASE PLATE ASSEMBLY	2500X2000X1500	990
13	75003/2	BASE PLATE ASSEMBLYBASE PLATE ASSEMBLY	600X500X500	270
14	75004/0	BASE PLATE ASSEMBLY	2200X1550X500	4800
15	75102/1	CASING UPPER PART	8600X3000X3000	14150
16	75102/2	CASING UPPER PART	8600X3000X3000	14150
17	75103/1	CASING UPPER PART	8600X3000X3000	13950
18	75103/2	CASING UPPER PART	8600X3000X3000	13950
19	75104/0	RUPTURE DIAPHRAGM ASSEMBLY	2150X2150X1500	584
20	75107/1	CASING SIDE WALL (LEFT)	6000X5500X200	7900
21	75107/2	CASING SIDE WALL (LEFT)	6000X5500X200	7900
22	75108/1	CASING SIDE WALL (RIGHT)	6000X5500X200	7900

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23	75108/2	CASING SIDE WALL (RIGHT)	6000X5500X200	7900
24	75109/1	FRONT WALL LP-1(TS)	8560X5040X1000	17000
25	75109/2	FRONT WALL LP-2(TS)	8560X5040X1000	17000
26	75110/1	FRONT WALL LP-1(GS)	8560X5040X1000	17000
27	75110/2	FRONT WALL LP-2(GS)	8560X5040X1000	17000
28	75111/1	LP SHAFT SEAL CASING - TS	2000X1650X750	730
29	75111/2	LP SHAFT SEAL CASING - TS	2000X1650X750	730
30	75112/1	LP SHAFT SEAL CASING - GS	2000X1650X750	730
31	75112/2	LP SHAFT SEAL CASING - GS	2000X1650X750	730
32	75113/1	LP SHAFT SEAL COMPENSATOR (TS)	2800X2800X800	1452
33	75113/2	LP SHAFT SEAL COMPENSATOR (TS)	2800X2800X800	1452
34	75114/1	LP SHAFT SEAL COMPENSATOR (GS)	2800X2800X800	1452
35	75114/2	LP SHAFT SEAL COMPENSATOR (GS)	2800X2800X800	1452
36	75116/1	CASING FRAME SECTION	8200X4900X250	6427
37	75116/2	CASING FRAME SECTION	8200X4900X250	6427
38	75116/3	CASING FRAME SECTION	2000X3000X1000	3231
39	75116/4	CASING FRAME SECTION	2000X700X1100	4822
40	75201/0	HP/IP BEARING PEDESTAL	4000X1800X2100	10600
41	75202/0	HP/IP BEARING PEDESTAL (PARTS)	1000X600X600	250
42	75315/0	AUXILIARIES OF LP TURBINE	2500X1500X1200	782
43	75401/0	IP-LP BEARING PEDESTAL ASSLY IP-LP BEARING PEDESTAL ASSLY	7100X1900X2400	20000
44	75402/0	BEARING PEDESTAL (PARTS)	2200X1700X600	1000
45	75501/0	LP/GEN. PEDESTAL ASSEMBLY	7100X1800X2400	18000
46	75502/0	BEARING PEDESTAL (PARTS)	2200X1500X500	400
47	75503/0	LP/LP PEDESTAL ASSEMBLY	6250X2000X2100	19055
48	75505/0	BEARING PEDESTAL (PARTS)	1500X1000X500	818
49	75601/1	FRONT BEARING PEDESTAL	3400X1400X1600	10958
50	75601/2	HYDRALLIC TURNING MOTOR	1300X800X1500	519

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51	75601/3	FRONT BEARING PEDESTALS(PARTS)	1000X600X600	200
52	75705/1	LP EXTRACTION A1	3050X1430X1430	945
53	75705/2	LP EXTRACTION A1	3050X1430X1430	945
54	75706/1	LP EXTRACTION A1	2490X1330X1120	465
55	75706/2	LP EXTRACTION A1	2490X1330X1120	465
56	75707/1	LP EXTRACTION A1	3050X1430X1430	945
57	75707/2	LP EXTRACTION A1	2490X1330X1120	465
58	75707/3	LP EXTRACTION A1	3050X1430X1430	945
59	75707/4	LP EXTRACTION A1	2490X1330X1120	465
60	75708/1	LP EXTRACTION A2	2850X1400X1400	1060
61	75708/2	LP EXTRACTION A2	2850X1400X1400	1060
62	75709/1	LP EXTRACTION A2	2900X1000X1600	884
63	75709/2	LP EXTRACTION A2	2900X1000X1600	884
64	75710/1	LP EXTRACTION A2	5630X1150X1150	1210
65	75710/2	LP EXTRACTION A2	5630X1150X1150	1210
66	75711/1	LP EXTRACTION A3	2860X1200X1200	935
67	75711/2	LP EXTRACTION A3	2860X1200X1200	935
68	75712/1	LP EXTRACTION A3	4620X1120X1120	903
69	75712/2	LP EXTRACTION A3	4620X1120X1120	903
70	75713/1	LP EXTRACTION A3	1580X930X810	156
71	75713/2	LP EXTRACTION A3	1580X930X810	156
72	75716/1	EXTRACTION PIPE SHEATHING A3	5500X2800X1000	1611
73	75716/2	EXTRACTION PIPE SHEATHING A3	4200X5200X800	1684
74	75716/3	EXTRACTION PIPE SHEATHING A3	4200X3300X750	930
75	75716/4	EXTRACTION PIPE SHEATHING A3	4400X2500X1200	1033
76	75716/5	EXTRACTION PIPE SHEATHING A3	5500X2800X1000	1611
77	75716/6	EXTRACTION PIPE SHEATHING A3	4200X5200X800	1684
78	75716/7	EXTRACTION PIPE SHEATHING A3	4200X3300X750	930

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79	75716/8	EXTRACTION PIPE SHEATHING A3	4400X2500X1200	1033
80	75717/0	COMPENSATORS FOR CASING GUIDE	3000X2000X400	924
81	75720/1	LP INNER CASING (U/H)	5510X3957X3250	25206
82	75720/2	LP INNER CASING (U/H)	5510X3957X3250	25206
83	75721/1	LP INNER CASING (L/H)	5610X5482X3288	48500
84	75721/2	LP INNER CASING (L/H)	5610X5482X3288	48500
85	75722/1	ASSEMBLY OF GUIDE BLADE CARRIERS 2L&3L FOR LP1(U/H)	4200X2300X1000	2830
86	75722/2	ASSEMBLY OF GUIDE BLADE CARRIERS 2R & 3R FOR LP1(U/H)	4200X2300X1000	2830
87	75722/3	ASSEMBLY OF GUIDE BLADE CARRIERS 2L & 3L FOR LP2(U/H)	4200X2300X1000	2830
88	75722/4	ASSEMBLY OF GUIDE BLADE CARRIERS 2R & 3R FOR LP2(U/H)	4200X2300X1000	2830
89	75722/5	ASSEMBLY OF GUIDE BLADECARRIER LP1L(U/H)	2920X1660X1265	4040
90	75722/6	ASSEMBLY OF GUIDE BLADECARRIER LP1R(U/H)	2920X1660X1265	4040
91	75722/7	ASSEMBLY OF GUIDE BLADECARRIER LP2L(U/H)	2920X1660X1265	4040
92	75722/8	ASSEMBLY OF GUIDE BLADECARRIER LP2R(U/H)	2920X1660X1265	4040
93	75723/1	LP CASING ASSEMBLY PARTS	3000X2000X1200	700
94	75723/2	LP CASING ASSEMBLY PARTS	1500X1000X800	770
95	75723/3	LP CASING ASSEMBLY PARTS LP CASING ASSEMBLY PARTS	500X500X400	6
96	75723/4	LP CASING ASSEMBLY PARTS	550X400X300	55
97	75724/1	LP INNER CASING ASSEMBLY(PARTS	1850X1850X600	2995
98	75724/2	LP INNER CASING ASSEMBLY(PARTS	600X600X500	329
99	75801/1	LP ROTOR	8174X4500X4456	74800
100	75801/2	LP ROTOR	8174X4500X4456	74800
101	75901/0	IP ROTOR	6520X2060X2065	35900
102	75902/0	IP OUTER CASING (U/H)	6040X4320X2200	35000
103	75903/0	IP OUTER CASING (L/H)	XX	35000
104	75904/0	IP INNER CASING (U/H)	XX	25000
105	75905/0	IP INNER CASING (L/H)	XX	29000
106	75906/0	SUPPORTING ARMS-IP OUTERCASING	1330X1472X880	1831

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107	75907/0	IP SHAFT SEALING	1400X1200X900	266
108	75908/0	IP TURBINE (PARTS)	3000X2500X1600	6900
109	75909/0	I.P. TURBINE PARTS I.P. TURBINE PARTS	1000X1000X750	365
110	76001/0	HP TURBINE	3700X5500X3800	105000
111	76002/0	HP INLET ASSEMBLY	1500X1500X500	120
112	76004/0	HP TURBINE PARTS	1000X1000X1000	500
113	76104/0	ESV & CV CASING WITH VALVES	4700X4700X2700	31600
114	76104/1	STEAM STRAINERS FOR MS VALVES	1600X700X700	286
115	76105/1	MOUNTING SUPPORT FOR MS VALVE	1200X800X700	895
116	76105/2	MOUNTING SUPPORT FOR MS VALVE	1200X800X700	895
117	76108/0	ESV & CV CASING WITH VALVES	4700X4700X2700	31600
118	76112/0	OVERLOAD VALVE CASING WITH VALVE	3000X2000X1400	5500
119	76201/0	SUSPENSION OF OVERLOAD VALVE	2500X2000X800	350
120	76202/0	IV & CV CASING WITH VALVES	6210X4870X3600	45000
121	76202/1	PARTS OF IV&CV CASING	1800X1000X200	88
122	76202/2	STEAM STRAINERS FOR INTERCEPTOR VALVES	2800X1300X1100	1248
123	76205/1	MOUNTING SUPPORT FOR HRH VALVE	2500X1500X700	2450
124	76205/2	MOUNTING SUPPORT FOR HRH VALVE	2500X1500X700	2450
125	76206/0	IV & CV CASING WITH VALVES	6210X4870X3600	45000
126	76206/1	PARTS OF IV&CV CASING	1800X1000X200	88
127	76301/1	SUSPENSION OF LPBP VALVE	3600X1700X800	986
128	76301/2	SUSPENSION OF LPBP VALVE	3600X1700X800	986
129	76412/0	LEAKAGE OIL TANK	1000X1000X3000	515
130	76413/0	WASTE OIL TANK	1000X1000X3000	515
131	76601/0	COMPONENTS OF COP ASSEMBLY	XX	3300
132	76602/0	COMPONENTS OF COP ASSEMBLY	XX	3150
133	76603/0	COMPONENTS OF COP ASSEMBLY	XX	5000
134	76604/0	COMPONENTS OF COP ASSEMBLY	XX	1700

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135	76605/0	COMPONENTS OF COP ASSEMBLY	XX	550
136	76606/0	COMPONENTS OF COP ASSEMBLY	XX	11000
137	76607/0	COMPONENTS OF COP ASSEMBLY	XX	3000
138	76608/0	COMPONENTS OF COP ASSEMBLY(PARTS)	XX	3000
139	76801/0	RATING,COLLABORATION ANDCOMPANY'S MONOGRAM	XX	50
140	76914/0	COMPENSATOR	600X600X900	27
141	77202/0	TEMP. & PRESSURE CONNECTIONS	1700X750X750	600
			Total weight (in Kgs)	<b>1123270</b>

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**ANNEXURE-IIIB**

<b>(F) GENERATOR - Applicable for Unit No. 2 ( Package –B)</b>				
SNO	PACKAGE NO	DESCRIPTION	DIMENSIONS - LXWXH (IN MM)	NET WT
1	801/0	FOUNDATION PLATES	6400X1680X950	10325
2	802/0	FOUNDATION BOLTS	2540X655X600	1008
3	803/0	FOUNDATION ITEMS	5800X1120X520	1670
4	805/0	GENERATOR STATOR	10015X4500X4290	443000
5	806/0	GENERATOR ROTOR	14610X1850X1910	87265
6	807/0	END SHIELD LOWER HALF (TE)	3800X1500X2240	8250
7	808/0	END SHIELD UPPER HALF (TE)	3800X1500X2240	7250
8	809/0	END SHIELD LOWER HALF (EE)	3800X1500X2240	8300
9	810/0	END SHIELD UPPER HALF (EE)	3800X1500X2240	7300
10	811/0	GENERATOR BEARING (EE & TE)	1180X1050X1170	1696
11	812/0	BAFFLE RING CARRIER & AIR GAPSEAL ASSY.	2035X1885X1200	914
12	813/0	TERMINAL BUSHINGS	2360X1624X735	870
13	814/0	TERMINAL BUSHING BOX	3500X2600X1740	5302
14	815/0	SHAFT SEALS (EE & TE) & OIL CATCHER (INNER & OUTER)	2260X1140X900	1200
15	816/0	BAFFLE RING ASSEMBLY	2170X1970X1180	738
16	817/0	GENERATOR ACCESSORIES	1500X1500X1000	100
17	818/0	ARRANGEMENT OF TERMINAL BUSHING COMPONENTS	3410X1800X835	1002
18	819/0	GENERATOR ACCESSORIES	950X950X450	500
19	820/0	GENERATOR ACCESSORIES	1000X750X500	725
20	821/0	GENERATOR ACCESSORIES	1700X1200X250	85
21	822/0	PRIMARY WATER TANK	1000X1000X2500	317
22	823/0	PW TANK PIPE LINES	4500X1800X500	430
23	824/0	PW TANK PIPE LINES	3000X600X500	530
24	826/0	COOLER HOUSING FRAME	4290X4450X1428	19992

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25	827/0	SEAL RINGS	750X750X200	65
26	828/0	CONNECTION PIECE ASSEMBLY	1522X1050X500	374
27	831/0	DRY AIR BLOWER	1100X1000X700	52
28	837/0	BRUSHLESS EXCITER SET	5850X2205X2657	26930
29	839/0	DRY AIR BLOWER AND ACCESSORIES	1800X1500X1100	392
30	840/0	EXCITER BED PLATE ACCESSORIES	4500X1700X1500	1752
31	842/0	EXCITER ACCESSORIES	2200X1200X1100	600
32	843/0	EXCITER FOUNDATION ACCESSORIES	1700X1000X800	440
33	844/0	RR WHEEL AIR GUIDE COVER	2000X1500X2000	815
34	845/0	SEAL OIL STORAGE TANK	5000X1800X1700	1940
35	846/1	PW PUMP AND FILTER UNIT-PART I	5000X3000X3600	3500
36	846/2	PW PUMP AND FILTERUNIT-PART II	4000X3000X3600	2500
37	846/3	ION EXCHANGER SKID	2000X2000X2000	500
38	848/1	DOUBLE FLOW S.O.U.-PART I	3910X2900X2800	4300
39	848/2	DOUBLE FLOW S.O.U. -PART II	2510X2500X3300	3525
40	848/3	DOUBLE FLOW S.O.U. -PART III	2510X2500X3300	3525
41	848/4	JB FOR SEAL OIL UNIT	2000X1000X1600	200
42	849/0	LIQUID DETECTOR RACK	2000X600X2000	460
43	849/2	JB FOR LDR	3500X1300X500	200
44	850/0	GAS UNIT	1980X1640X2420	630
45	851/0	CO2 VAPOURISER	1520X840X840	170
46	852/0	H2 DISTRIBUTOR	2400X900X2400	150
47	853/0	CO2 DISTRIBUTOR	3000X900X2400	163
48	855/0	DRAIN OIL COLLECTOR	2000X550X550	89
49	856/0	RESINS	1200X600X600	56
50	857/0	TG SYSTEM INTEGRAL PIPING VLV	2750X1400X1400	1986
51	858/0	TG SYSTEM INTEGRAL PIPING INST	1000X940X900	172
52	859/0	CONSUMABLES	800X400X200	40
			<b>Total weight (in Kgs)</b>	<b>664295</b>

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#### ANNEXURE-IV

<b>Hardwar BOI Unit No.1 (Applicable for Package-A)</b>				
SI No.	ITEM ID	QTY	UOM	ITEM DESC
1	BG001	215	NO	EMPTY H2 CYLINDER
2	BG002	100	NO	EMPTY CO2 CYLINDER
3	BG003	24	NO	EMPTY N2 CYLINDER
4	BG004	1	NO	PORTABLE GAS ANALYSER
5	BG005	1	ST	MOISTURE MEASURING EQUIPMENT
6	BG007	2	NO	VAPOUR EXHAUSTER
7	BG008	1	ST	MOTORISED TEMPERATURE CONTROL VALVE WITH ACTUATOR NB250 VAR-02
8	BG009	2	NO	H2 GAS ANALYSER CABINET
9	BG011	2	NO	REFRIGERATION GAS DRYER
10	BG018	1	NO	STARTING RESISTOR FOR DC S.O MOTOR
11	BG021	1	ST	GROUNDING BRUSH MONITOR
12	BG080	1	NO	STROBOSCOPE
13	BG090	1	ST	GENERATOR INTEGRAL PIPING
14	BG091	1	ST	HYDROGEN COOLERS PIPING
15	BG092	1	NO	PW TEMPERATURE CONTROL VALVE
16	BG093	1	ST	THREE PHASE UPS FOR GENERATOR
17	BG098	1	NO	EXCITER COVER COMPLETE WITH FA
18	BH001	59810	NO	WELDED AUSTENITIC S.S. TUBES G
19	BH010	4	NO	CONDENSOR AIR EVACUATION PACKAGE
20	BH012	2	NO	AIR EXHAUSTER WITH MOTOR
21	BH022	1	ST	MULTI BALL BEARING SUPPORT FOR
22	BT006	1	ST	BUTTERFLY VALVES
23	BT009	2	NO	NRV WITH ALUMINIUM FLAP
24	BT011	1	NO	OIL PURIFICATION UNIT
25	BT014	1	ST	SPRAY NOZZLES
26	BT015	1	NO	DIRT CATCHERS
27	BT016	1	ST	DAMPER
28	BT017	1	ST	VARIABLE LOAD SPRING CAGES
29	BT023	1	FL	TURBINE OIL
30	BT024	1	NO	DRY AIR PRESERVATION SYSTEM
31	BT025	1	NO	OIL PURIFICATION SYSTEM (CENTR
32	BT027	1	ST	TURBINE INTEGRAL PIPING
33	BT028	1	ST	H & S FOR TURBINE INTEGRAL PIP
34	BT029	1	ST	CALIBRATED FLOW NOZZLE ASSLY.
35	BT030	1	ST	DRAIN VALVES
36	BT043	1	FL	CONTROL FLUID (FRF)

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37	BT046	2	ST	LP BYPASS STOP & CONTROL VALVE
38	BT054	1	ST	STEAM TRAP
39	BT065	1	NO	GEAR PUMP (LUB. OIL RECIRCULATION
40	BT070	1	ST	LEVEL INSTRUMENTS FOR OIL SYST
41	BT071	1	ST	LEVEL INDICATORS FOR OIL TANKS
42	BT074	2	NO	VACUUM BREAKER VALVE WITH PNEU
43	BT081	1	NO	HPT STEAM EVACUATION VALVE
44	BT096	1	NO	OIL MODULE
45	BT097	1	ST	OIL THROTTLE VALVES
46	BT104	1	NO	SEAL STEAM CONTROL VALVE WITH
47	BT105	1	NO	LEAK STEAM CONTROL VALVE WITH
48	BT107	1	ST	PNEUMATIC GLOBE VALVE
49	BT108	1	ST	800 MW STEAM TURBINE GENERATOR
50	BT110	1	ST	HYDRAULIC POWER SUPPLY UNIT FO
51	BT117	2	NO	BUTTERFLY VALVE WITH LIMIT SWI
52	BT119	1	NO	OIL THROTTLE VALVE FOR JACKING
53	BT125	1	ST	BOROSCOPIC VIDEO IMAGE KIT (Inspection of both Units)

<b>Hardwar BOI Unit No.2 (Applicable for Package-B)</b>				
Sl No.	ITEM ID	QTY	UOM	ITEM DESC
1	BG004	1	NO	PORTABLE GAS ANALYSER
2	BG005	1	ST	MOISTURE MEASURING EQUIPMENT
3	BG007	2	NO	VAPOUR EXHAUSTER
4	BG008	1	ST	MOTORISED TEMPERATURE CONTROL VALVE WITH ACTUATOR NB250 VAR-02
5	BG009	2	NO	H2 GAS ANALYSER CABINET
6	BG011	2	NO	REFRIGERATION GAS DRYER
7	BG018	1	NO	STARTING RESISTOR FOR DC S.O MOTOR
8	BG021	1	ST	GROUNDING BRUSH MONITOR
9	BG080	1	NO	STROBOSCOPE
10	BG090	1	ST	GENERATOR INTEGRAL PIPING
11	BG091	1	ST	HYDROGEN COOLERS PIPING
12	BG092	1	NO	PW TEMPERATURE CONTROL VALVE
13	BG093	1	ST	THREE PHASE UPS FOR GENERATOR
14	BG098	1	NO	EXCITER COVER COMPLETE WITH FA
15	BH001	59810	NO	WELDED AUSTENITIC S.S. TUBES G
16	BH010	4	NO	CONDENSOR AIR EVACUATION PACKA
17	BH012	2	NO	AIR EXHAUSTER WITH MOTOR
18	BH022	1	ST	MULTI BALL BEARING SUPPORT FOR
19	BT006	1	ST	BUTTERFLY VALVES
20	BT009	2	NO	NRV WITH ALUMINIUM FLAP

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21	BT011	1	NO	OIL PURIFICATION UNIT
22	BT014	1	ST	SPRAY NOZZLES
23	BT015	1	NO	DIRT CATCHERS
24	BT016	1	ST	DAMPER
25	BT017	1	ST	VARIABLE LOAD SPRING CAGES
26	BT020	1	NO	THERMAL INSULATION OF TURBINE
27	BT021	1	ST	THERMAL INSULATION OF TIP
28	BT023	1	FL	TURBINE OIL
29	BT027	1	ST	TURBINE INTEGRAL PIPING
30	BT028	1	ST	H & S FOR TURBINE INTEGRAL PIPING
31	BT029	1	ST	FLOW NOZZLES FOR PG TEST
32	BT030	1	ST	DRAIN VALVES
33	BT043	1	FL	CONTROL FLUID (FRF)
34	BT046	2	ST	LP BYPASS STOP & CONTROL VALVE WITH EHA AND WATER INJECTION VALVE
35	BT054	1	ST	STEAM TRAP
36	BT065	1	NO	GEAR PUMP (LUB. OIL RECIRCULAT
37	BT071	1	ST	LEVEL INDICATORS FOR OIL TANKS
38	BT074	2	NO	VACUUM BREAKER VALVE WITH PNEU
39	BT081	1	NO	HPT STEAM EVACUATION VALVE
40	BT087	1	ST	TEMPERATURE TRANSMITTER AND AC
41	BT096	1	NO	OIL MODULE
42	BT097	1	ST	OIL THROTTLE VALVES
43	BT104	1	NO	SEAL STEAM CONTROL VALVE WITH
44	BT105	1	NO	LEAK STEAM CONTROL VALVE WITH
45	BT107	1	ST	SOLENOID VALVE
46	BT110	1	ST	HYDRAULIC POWER SUPPLY UNIT FO
47	BT111	1	ST	ELECTRO-HYDRAULIC ACTUATORS FO
48	BT117	2	NO	BUTTERFLY VALVE WITH LIMIT SWI
49	BT119	1	NO	OIL THROTTLE VALVE FOR JACKING

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**ANNEXURE-V**

**HYDERABAD SUPPLY (Applicable for Package-A and Package-B)**

Sl No.	Description	Qty/ Unit	Size			Weight (KG) for Unit #1	Weight (KG) for Unit #2
			L	W	H		
<b>(A)</b>	<b>HEAT EXCHANGERS</b>						
1.	TWIN OIL COOLER ASSLY FOR BFPDT	1	5250	650	2000	6200	6200
2.	HP HEATER - 6A	1	11550	2250	2800	52500	52500
3.	HP HEATER - 6B	1	11550	2250	2800	52500	52500
4.	HP HEATER - 7A	1	14250	2350	2850	87000	87000
5.	HP HEATER - 7B	1	14250	2350	2850	87000	87000
6.	HP HEATER - 8A	1	10750	2350	2850	73800	73800
7.	HP HEATER - 8B	1	10750	2350	2850	73800	73800
8.	LP HEATER - 3	1	13650	3300	3750	45500	45500
9.	LP HEATER - 4	1	14650	2100	2500	31500	31500
10.	DEAERATOR ST.TANK ASSLY (SEC-I)	1	13940	4100	4700	47600	47600
11.	DEAERATOR ST.TANK ASSLY (SEC-II)	1	10050	4100	4700	33850	33850
12.	DEAERATOR ST.TANK ASSLY (SEC-III)	1	10050	4150	4700	36150	36150
13.	DEAERATOR ST.TANK ASSLY (SEC-IV)	1	10050	4100	4700	33875	33875
14.	DEAERATOR ST.TANK ASSLY (SEC-V)	1	13940	4100	4700	46750	46750
15.	DEAERATOR HEATER ASSLY	1	13780	3550	3780	56600	56600
16.	DRAIN COOLER ASSLY	1	6450	1700	1200	10200	10200
			<b>TOTAL WEIGHT (IN KGs)</b>			<b>774825</b>	<b>774825</b>

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(B)	BOILER FEED PUMPS	Qty/ Unit	SIZE			Weight (KG) for Unit #1	Weight (KG) for Unit #2
			L	W	H		
1.	MDBFP	2	3300	3100	1800	38600	38600
2.	TDBFP	2	3400	3600	2000	52400	52400
3.	Booster Pump - MDBFP	2	2000	1800	1800	9600	9600
4.	Booster Pump - TDBFP	2	3000	2800	1700	17000	17000
				<b>TOTAL WT (IN KGS)</b>		<b>117600</b>	<b>117600</b>
(C)	<b>CONDENSATE EXTRACTION PUMP (CEP)</b>	3	8500	1500	1500	<b>55500</b>	<b>55500</b>
(D)	<b>HYDRAULIC COUPLING</b>	2	2500	2000	2500	<b>23000</b>	<b>23000</b>
(E)	<b>BFP DRIVE TURBINE &amp; AUX.</b> (Details given below)	2	4350	4900	4250	<b>237000</b>	<b>237000</b>
				<b>GRAND TOTAL (A+B+C+D+E) WT (IN KGS)</b>		<b>1207925</b>	<b>1207925</b>

**Note:** The detailed description of BFP drive turbine with accessories is given below:

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<b>BFP DRIVE TURBINE &amp; AUX (01 No) Details</b>				
<b>SL No.</b>	<b>ITEM DESCRIPTION</b>	<b>QTY</b>	<b>TOTAL WEIGHT (Kgs)</b>	<b>DIMENSIONS (mm) LXWXH</b>
1	Steam Turbine Assembly	1	65000	4350x4900x (4250 with Gov. Valves & 3500 w/o Gov. valves)
2	Gear Box	1	1300	1050x1400x1150
3	Lube Oil Console Package-I	1	10000	4800x2800x2900
4	Lube Oil Console Package-II	1	4000	3100x2800x1200
5	Emergency Oil Pump Assembly	1	1500	2100x1000x800
6	Jacking Oil Pump Assembly	1	600	650x1500x600
7	Oil Purification Unit	1	2500	1800x2000x1800
8	Oil Accumulators	1	350	800x600x1900
9	Governing Console	1	750	1300x1000x1500
10	Transition piece	1	2400	3500x2100x2300
11	Turbine Enclosure	1	4000	4550x6500x4000
12	DCSC for Emergency Lube Oil Pump	1	600	1600x750x2500
13	Total TDBFP Piping (i.e. Integral piping- Oil & Steam	1	25500	
	<b>Total Weight per BFP Drive Turbine</b>		<b>118500</b>	
	<b>Note:</b>			
<b>1</b>	<b>Weight &amp; Dimensions indicated above are for 1 No. of BFP Drive Turbine</b>			
<b>2</b>	<b>2 Nos. of BFP Drive Turbines are being supplied for every 800 MW Unit</b>			
<b>3</b>	<b>Turbine enclosure is supplied in dismantled condition</b>			

**Technical Conditions of Contract (TCC)**  
**Chapter-X : Annexures**

**ANNEXURE-VI**

**BHOPAL SUPPLY (Applicable for Package-A & Package-B)**

S.No.	ITEM DESCRIPTION	QTY/UNIT	DIMENSION (MM)	UNIT WT (KG)	WEIGHT FOR Unit#1	WEIGHT FOR Unit#2
			(L X W X H)			
<b>1</b>	<b>H.T. MOTORS</b>					
1.1	BFP MOTOR	2	4300 X 4500 X 2400	23,500	47000	47000
1.2	CEP MOTOR	3	2700 X 2300 X 1650	9,150	27450	27450
1.3	DMCW MOTOR	3	2650 X 2200 X 1500	7,850	23550	23550
1.4	ACW MOTOR	3	2650 X 2200 X 1500	7,850	23550	23550
1.5	DRIP PUMP MOTOR	2	2650 X 2200 X 1500	7,850	15700	15700
			<b>Total Wt (in Kgs)</b>		<b>137250</b>	<b>137250</b>
<b>2</b>	<b>RE JOINTS</b>					
2.1	REJ-OUTLET	1 SET	4200 X 3300 X 5650	23,200	23,200	23,200
2.2	REJ-INLET	1 SET	3500 X 3300 X 5750	25,000	25,000	25,000
			<b>Total Wt (in Kgs)</b>		<b>48,200</b>	<b>48,200</b>
<b>3</b>	<b>FLASH TANKS</b>					
3.1	HP DRAIN	1	4000 D X 6000 L	10,000	10000	10000
3.2	LP DRAIN	1	3200 D X 4500 L	6,300	6300	6300
3.3	UNIT	1	1700 D X 3600 L	1,700	1700	1700
3.4	STEAM DRAIN	1	3000 D X 5000 L	5,200	5200	5200
3.5	FWSVD	1	2200 D X 3500 L	2,100	2100	2100
			<b>Total Wt (in Kgs)</b>		<b>25300</b>	<b>25300</b>
<b>4</b>	<b>MISC TANKS</b>					
4.1	CLEAN OIL TANK (60 m3)	1	6000 x 3000 x 3920	10.54 Ton (Empty)	10540	0

## Technical Conditions of Contract (TCC)

### Chapter-X : Annexures

4.2	DIRTY OIL TANK (60 m3)	1	6000 x 3000 x 3920	10.54 Ton (Empty)	10540	0	
4.3	OIL UNLOADING VESSEL(1 m3)	1	2000 x 1000 x 500	0.584 Ton (Empty)	584	0	
4.4	DMCW TANK (10 m3)	1	2000 OD X 12 Tk X 7150 L	6 Ton (Empty)	6000	6000	
			<b>Total Wt (in Kgs)</b>		<b>27664</b>	<b>6000</b>	
<b>5</b>	<b>BF VALVES</b>						
5.1	2500- EA	4	3800 X 3200 X 800	13,565	54260	54260	
			<b>Total Wt. (in Kgs)</b>		<b>92850</b>	<b>92850</b>	

**Technical Conditions of Contract (TCC)**  
**Chapter-X : Annexures**

**ANNEXURE-VII**

**PEM SUPPLY (Applicable for Package A & Package B)**

SL NO	DESCRIPTION	QTY		WEIGHT (IN KGS)	
		U1	U2	U1	U2
1	ALUMINIUM SHEETS/COILS	LS	LS	15000	15000
2	CHAIN PULLEY BLOCK	4	4	1750	1750
3	CHEMICAL DOSING SYSTEM	1	1	1500	1500
4	COLTCS	2	2	24000	24000
5	ELECTRIC HOIST	11	11	5250	5250
6	HEAT EXCHANGERS(PLATE TYPE)	3	3	21000	21000
7	LUBE OIL TRANSFER PUMPS	2	2	850	850
8	MISC.PUMPS (HORIZONTAL)	9	6	45000	30000
9	SELF CLEANING STRAINERS	2	2	8000	8000
10	SUMP PUMPS/SUBMERSIBLE PUMPS	3	3	6000	6000
11	THERMAL INSULATION - R-MATTRESSES/P-SECN	LS	LS	20000	20000
12	THERMAL INSULATION - ANCILLARY MATERIAL	LS	LS	4000	4000
13	M.E. BELLOWS	19	19	46845	46845
14	BUTTERFLY VALVES (STEAM SERVICE)	2	2	14182	14182
			<b>TOTAL WEIGHT (IN KGS)</b>	<b>213377</b>	<b>198377</b>

**Notes:**

- The erection, welding and NDT of the Metallic Expansion Bellows and Butterfly valves shall be completed by this contractor, with no extra cost to BHEL.**
- The contractor shall have to assist in the VIS system setting during deck floating for both Turbine deck and BFP's .**

# Technical Conditions of Contract (TCC)

## Chapter-X : Annexures

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### ANNEXURE-VIII

#### PC Chennai Scope:

SL No.	PG	Description	WT(KG) for Unit No. 1	WT(KG) for Unit No. 2
1	80-468	MAIN CIRCULATION WATER PIPING	264,798	264,798

#### TRICHY VALVES (Applicable for Package A & Package B)

SL No.	Description	Qty/Unit	Weight (in Kgs) for Unit No. 1	Weight (in Kgs) for Unit No. 2
1	Valves for Integral Piping	188	17160	17160
2	Safety Valves	24	6000	6000
	TOTAL WEIGHT (IN KGS)		<b>23160</b>	<b>23160</b>

#### Note :

1. The above mentioned pipes and valves of Annexure VIII are to be erected as part of the Lumpsum contract rate schedule.
2. Any valves, root valves, control Valves of Trichy scope supply, which are required to complete the above systems in all respects, has to be erected by the contractor, with no extra cost to BHEL. Other valves shall fall in the piping scope.

**Technical Conditions of Contract (TCC)**  
**Chapter-X : Annexures**

**ANNEXURE-IX**

<b>TG INTEGRAL PIPING (FOR ONE UNIT) – APPLICABLE FOR PACKAGE-A &amp; PACKAGE - B</b>				
<b>Sl No</b>	<b>Description</b>	<b>Weight (in Kgs) for Package -A</b>	<b>Weight (in Kgs) for Package -B</b>	<b>P91 Piping Details (in Kgs) per Unit</b>
<b>1</b>	<b>Seal Steam System</b>	<b>19850</b>	<b>19850</b>	<b>5700</b>
<b>2</b>	<b>Overload Valve Piping</b>	<b>10015</b>	<b>10015</b>	<b>10015</b>
<b>3</b>	<b>Lube Oil Piping</b>	<b>7350</b>	<b>7350</b>	
<b>4</b>	<b>Turbine Drainage Piping</b>	<b>12000</b>	<b>12000</b>	<b>4500</b>
<b>5</b>	<b>Cooling Water</b>	<b>1320</b>	<b>1320</b>	
<b>6</b>	<b>Control Fluid System</b>	<b>1360</b>	<b>1360</b>	
<b>7</b>	<b>Condensate Spray System</b>	<b>2570</b>	<b>2570</b>	
<b>8</b>	<b>Overload Valve Piping (Flushing)</b>	<b>125</b>	<b>125</b>	
<b>9</b>	<b>Control Fluid System (LP Bypass Valves)</b>	<b>610</b>	<b>610</b>	
<b>10</b>	<b>Lube Oil Flushing</b>	<b>275</b>	<b>275</b>	
	<b>Total (Weight in Kgs)</b>	<b>55475</b>	<b>55475</b>	<b>20215</b>

**Notes:**

1. Any valves, root valves, strainers , fittings of PEM and Trichy scope supply, which are required to complete the above systems in all respects, has to be erected by the contractor, with no extra cost to BHEL.
2. The C&I contract scope shall start after the provision of root valves (single/double as per drg. requirement), by this contractor, for the equipments and piping erected under this contract. Erection upto root valves is in the scope of this contract

# Technical Conditions of Contract (TCC)

## Chapter-X : Annexures

### ANNEXURE-X

#### **SPECIAL T&Ps to be provided as supplied from M/s Siemens Ltd.**

<b>1.</b>	<b>SPECIAL T&amp;Ps to be provided by M/s Siemens Ltd</b>		
<b>1.1</b>	<b>For Generator</b>		
	Designation	Application	Qty
1.1.1	Pin Spanner	To tighten the nuts for bolted joint union of seal rings	1
1.1.2	Socket wrench insert	For seal ring holder attachment	1
1.1.3	Elongation	For seal ring holder attachment	1
1.1.4	Elongation	For seal ring holder attachment	1
1.1.5	Handle	For seal ring holder attachment	1
1.1.6	Hydraulic Unit	To tighten foundation anchors	1
1.1.7	Lifting Eye	To tighten end shield bearing joint bolts	4
1.1.8	Load Shackle	To lift bearing shell	2
1.1.9	Wrench	To tighten end shield bearing joint bolts	1
1.1.10	Wrench	To tighten end shield bearing joint bolts	1
1.1.11	Rotor Assembly	Device for insertion in of rotor into stator	1
1.1.12	Assembly device for high voltage bushings	To mount the high voltage bushing	1
1.1.13	Hydraulic Jack, pump and accessories	To align the stator housing and insert or remove the rotor	1
1.1.14	Socket Wrench Insert	To mount seal ring holder	1
1.1.15	Manual Lever Press	To fill seal grooves end shield bearing against housing with sealing compound	1
1.1.16	Slide Plate	For rotor insertion and removal	1
1.1.17	Guide Pulley	For rotor insertion and removal	1
1.1.18	Slide Shoe	For rotor insertion and removal	1
1.1.19	Slide Pedestal	For rotor insertion and removal	1
1.1.20	Support Bracket	To Lower the bearing end shield	1
1.1.21	Bracket for Seal Ring Holder	To mount the seal ring holder	1
1.1.22	Bracket for inner labyrinth ring	To mount the inner labyrinth ring	1
1.1.23	Support Bracket (for baffle ring)	Bracket to install baffle ring segments	1
1.1.24	Assembly bracket	To mount the inner labyrinth rings, seal ring holders, bearings and end shield bearing covers	1
1.1.25	Spreader beam rotor	To lift and insert generator rotor	1
1.1.26	Cross beam for rotor insertion, TE	To insert and remove the bearing shell	1
1.1.27	Cross beam for rotor insertion, EE	To insert and remove the bearing shell	1

## Technical Conditions of Contract (TCC)

### Chapter-X : Annexures

1.1.28	Oil Purging System	To bypass the EE bearing when purging the oil pipes	1
1.1.29	Ropes for Rotor	To lift and insert generator rotor	2
1.1.30	Ropes for Stator	To lift and insert generator stator	2
1.1.31	Assembly baffle ring and baffle ring carrier		1
<b>1.2</b>	<b>FOR TURBINE</b>		
1.2.1	Alignment shaft for inspection		
1.2.2	Lifting Device (cross beam)		
1.2.3	Lifting Device for shaft seal casing (LP-Turbine)		
1.2.4	Wire rope for transport and installation (1 <sup>st</sup> Turbine Section)		
1.2.5	Wire rope for inspection (1 <sup>st</sup> Turbine Section)		
1.2.6	Wire rope for transport and installation (2 <sup>nd</sup> Turbine Section)		
1.2.7	Wire rope for inspection (2 <sup>nd</sup> Turbine Section)		
1.2.8	Wire rope for transport and installation (LP Turbine Section)		
1.2.9	Wire rope for inspection (LP Turbine Section)		
1.2.10	Hydraulic Package for Turbine alignment		
1.2.11	Installation Device, HP Turbine		
1.2.12	Barrel Turning Device, HP Turbine		
1.2.13	Casing Support, HP Turbine		
1.2.14	Heating Device, casing joint bolts		
1.2.15	Heating Device for breechblock nut		
1.2.16	Axial adjustment device for LP Shaft		
1.2.17	Inspection support device for valves		
1.2.18	Support of breechblock nut		
1.2.19	Tension Device for breechblock nut		
1.2.20	Assembly Frame, bearing shell		
1.2.21	Shaft Support, HI Shaft/I Shaft		
1.2.22	LP Shaft support		
1.2.23	Boroscope ports tools for opening		
1.2.24	Wire rope for transport of main steam valves		
1.2.25	Wire rope for transport of reheat steam valves		
1.2.26	Wire rope for transport of overload steam valves		
1.2.27	Installation Device, main steam stop valve		
1.2.28	Installation Device, main steam control valve		
1.2.29	Installation Device, reheat stop valve		
1.2.30	Installation Device, reheat control valve		
1.2.31	Installation Device, turbine valves		
1.2.32	Blow-out device main steam stop valve		
1.2.33	Blow-out device reheat stop valve		
1.2.34	Blow-out device cold reheat check valve		
1.2.35	Sealing device main steam stop valve		
1.2.36	Sealing device reheat stop valve		

## Technical Conditions of Contract (TCC)

### Chapter-X : Annexures

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Note:

1. Above T&Ps are the indicative T&Ps as supplied from M/s Siemens Ltd.
2. These T&Ps shall be issued to contractor on sharing basis and free of hire charges for Unit No.1 and Unit No. 2
3. Contractor is required to handle the T&Ps with care and return the same to BHEL's store in good working condition. If any T&P damages during work execution the cost of repair & maintenance of the same shall be borne by the contractor.

**Technical Conditions of Contract (TCC)**  
**Chapter-XI : Rate Schedule**

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“ANNEXURE-A”

**RATE SCHEDULE FOR PACKAGE –A (UNIT No. 1)**

S.No.	Description of Item	QTY	Total Amount “A” in Rupees (in figures and words)
	<b>PACKAGE-A</b>		
11.1	<b>Lumpsum price</b> for complete scope of work for Erection, Testing, Commissioning, Trial operation and handing over of STG Unit No. 1 including integral piping, & auxiliaries and Supply of paints/primers at 2X800 MW, Gadarwara STPP, Distt. Narsinghpur, M.P. as per tender specification	1 set	/
11.2	<b>Note:</b>		
11.2.1	The rates of different items for the entire scope shall be worked out & awarded as per Annexure “B”.		

**Technical Conditions of Contract (TCC)**  
**Chapter-XI : Rate Schedule**

“ANNEXURE-B”

Calculation ratio for different items based upon the total value as per rate schedule

<b>RATE SCHEDULE FOR PACKAGE –A (UNIT NO. 1)</b>				
<b>S.No.</b>	<b>Description of Item</b>	<b>Qty.</b>	<b>UNIT RATE per 800 MW set in Rupees</b>	<b>Total Amount ( in RS.)</b>
<b>11.3</b>	<b>PACKAGE-A</b>			
<b>11.3.1</b>	<b>SERVICE PORTION</b>			
<b>11.3.1.1</b>	<b>Lumpsum price</b> for complete scope of work for Erection, Testing, Commissioning, Trial operation and handing over of STG Unit No. 1 including integral piping, & auxiliaries at 2X800 MW, Gadarwara STPP, Distt. Narsinghpur, M.P. as per tender specification  <b>(Items as per Annexure IA, IIA, IIIA and IV to IX )</b>	<b>1 set</b>	<b><u>A*97412.9490</u></b>  <b>100000</b>	/
<b>11.3.1.2</b>	<b>Rate in Rs / MT for fabrication and installation of additional platforms, structures, ladders as per site requirement and which are not indicated in the drawing (Approximately 50 MT)</b>	<b>50 MT</b>	<b><u>A*31.7410</u></b>  <b>100000</b>	/
	<b>TOTAL FOR SERVICE PORTION</b>			
<b>11.3.2</b>	<b>SUPPLY PORTION</b>			
<b>11.3.2.1</b>	Supply of all paints, primers & other consumables required for complete painting of Unit No. 1 as per Tender specification	Lumpsum	<b>A*.01</b>	/
		<b>Total price in Rs</b>		/

## Technical Conditions of Contract (TCC)

### Chapter-XI : Rate Schedule

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<b>11.3.3</b>	<b>NOTES:</b>
<b>11.3.3.1</b>	The quantities indicated above are tentative and are liable to vary depending upon the site requirement. The contractor has to handle / erect / commission all the items indicated by BHEL for achieving the milestones and completion of work.
<b>11.3.3.2</b>	Evaluation of bids shall be done on the total price of Package A and Package B, against this Rate Schedule / BOQ.
<b>11.3.3.3</b>	The contractor while quoting the above rates, categorically confirms having understood the fullest implications of price escalation provisions contained in tender. Accordingly taking into consideration all aspects thereof quoted above rates. Further contractor confirms that he will not come with any other claim/compensation on account of any increase whatsoever during the entire period of execution including extended period if any.

**Technical Conditions of Contract (TCC)**  
**Chapter-XI : Rate Schedule**

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“ANNEXURE-C”

**RATE SCHEDULE FOR PACKAGE –B (UNIT No. 2)**

<b>S.No.</b>	<b>Description of Item</b>	<b>QTY</b>	<b>Total Amount “A” in Rupees (in figures and words)</b>
	<b>PACKAGE-B</b>		
<b>11.4</b>	<b>Lumpsum price</b> for complete scope of work for Erection, Testing, Commissioning, Trial operation and handing over of STG Unit No. 2 including integral piping, & auxiliaries and Supply of paints/primers at 2X800 MW, Gadarwara STPP, Distt. Narsinghpur, M.P. as per tender specification	<b>1 set</b>	
<b>11.5</b>	<b>Note:</b>		
<b>11.5.1</b>	The rates of different items for the entire scope shall be worked out & awarded as per Annexure “D”.		

**Technical Conditions of Contract (TCC)**  
**Chapter-XI : Rate Schedule**

“ANNEXURE-D”

Calculation ratio for different items based upon the total value as per rate schedule

<b>RATE SCHEDULE FOR PACKAGE –B (UNIT NO. 2)</b>				
<b>S.No.</b>	<b>Description of Item</b>	<b>Qty.</b>	<b>UNIT RATE per 800 MW set in Rupees</b>	<b>Total Amount ( in RS.)</b>
<b>11.6</b>	<b>PACKAGE-B</b>			
<b>11.6.1</b>	<b>SERVICE PORTION</b>			
11.6.1.1	Lumpsum price for complete scope of work for Erection, Testing, Commissioning, Trial operation and handing over of STG Unit No. 2 including integral piping, & auxiliaries at 2X800 MW, Gadarwara STPP, Distt. Narsinghpur, M.P. as per tender specification  <b>(Items as per Annexure IB, IIB, IIIB and IV to IX )</b>	1 set	<b>A*97412.9490</b>  100000	/
11.6.1.2	<b>Rate in Rs / MT for fabrication and installation of additional platforms, structures, ladders as per site requirement and which are not indicated in the drawing (Approximately 50 MT)</b>	50 MT	<b>A*31.7410</b>  100000	/
	<b>TOTAL FOR SERVICE PORTION</b>			
<b>11.6.2</b>	<b>SUPPLY PORTION</b>			
11.6.2.1	<b>Supply of all paints, primers &amp; other consumables required for complete painting of Unit No. 2 as per Tender specification</b>	Lumpsum	<b>A*.01</b>	/
		<b>Total price in Rs</b>		/

## Technical Conditions of Contract (TCC)

### Chapter-XI : Rate Schedule

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<b>11.6.3</b>	<b>NOTES:</b>
<b>11.6.3.1</b>	The quantities indicated above are tentative and are liable to vary depending upon the site requirement. The contractor has to handle / erect / commission all the items indicated by BHEL for achieving the milestones and completion of work.
<b>11.6.3.2</b>	Evaluation of bids shall be done on the total price of Package A and Package B, against this Rate Schedule / BOQ.
<b>11.6.3.3</b>	The contractor while quoting the above rates, categorically confirms having understood the fullest implications of price escalation provisions contained in tender. Accordingly taking into consideration all aspects thereof quoted above rates. Further contractor confirms that he will not come with any other claim/compensation on account of any increase whatsoever during the entire period of execution including extended period if any.

## TECHINICAL CONDITIONS OF CONTRACT (TCC)

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD, TRANSPORTATION TO SITE, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF STEAM TURBINE, GENERATOR, INTEGRAL PIPING AND OTHER AUXILIARIES OF THE SYSTEM AND FINAL PAINTING OF UNIT NO. 1 (PACKAGE-A) AND UNIT NO.2 (PACKAGE-B) INCLUDING SUPPLY OF PAINTS

OF 2X800 MW GADARWARA STPP OF NTPC AT DISTT. NARSINGHPUR, GADARWARA M.P.

### PART- II OF TCC



Bhel  
(Maharatna Company)  
Power Sector – Northren Region,  
Plot No. 25 , Sector - 16A ,  
Distt. Gautam Budh Nagar, NOIDA – 201 301 (INDIA)

## Technical Conditions of Contract (TCC)

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<b>SI</b>	<b><u>DESCRIPTION</u></b>	<b><u>Chapter No.</u></b>	<b><u>PAGES</u></b>
	<b>Part-II: Technical Specifications</b>		
1.	GENERAL	Chapter-I	
2.	CIVIL WORKS, FOUNDATION, GROUTING	Chapter-II	
3.	ERECTION	Chapter-III	
4.	WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NDT	Chapter-IV	
5.	APPLICATION OF INSULATION	Chapter-V	
6.	PAINTING INCLUDING FINISH PAINTING	Chapter-VI	
7.	TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING	Chapter-VII	
8.	PAINTING SCHEDULE	Chapter-VIII	
9.	DRAWINGS	Chapter-IX	

# Technical Conditions of Contract (TCC)

## Chapter- I : General

<b>1.0</b>	<b>GENERAL</b>
1.1	The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification supplied by BHEL from time to time.
1.2	<b>HOUSE KEEPING-</b> The erection materials issued to the contractor and kept near the work area should also be staged properly at site. Compliance report on above shall be submitted by the contractor to BHEL on Daily basis. In case the contractor fails to do so, BHEL have rights to carryout the same from the other party at the Risk and cost of the contractor. The cost applicable with BHEL overheads shall also be recovered from the monthly running bills of contractor.
1.2.1	<b>HOUSE KEEPING- Siemens is providing Technical Field Assistance for erection, commissioning works at site. The contractor has to ensure high standards of safety and housekeeping, in line with pre-requisites of the TFA Personnels of Siemens at site.</b>
<b>1.3</b>	<b>PRELIMINARY WORKS</b>
1.3.1	The contractor shall, as a first field activity check the foundations for turbine, generator and all auxiliaries for the correctness of the same as per the drawings and satisfy himself in all aspects. He should ensure location of foundations, their consolidation, absence of voids, levels, correctness of boltholes, pockets levels and centerlines etc. All measurements should be recorded and submitted to Engineer for approval before erection.
1.3.2	Before starting erection job, contractor shall ensure that TG area is sufficiently enclosed against ingress of dust and water, and all debris have been cleared off from the floor to a designated area as per instruction of Engineer. The contractor shall arrange to get the working area and surroundings cleaned daily to ensure a dust free atmosphere for working.  Contractor shall first cover all openings on operating floor and put temporary hand railings on all sides of the floor to avoid any accident to the personal working. Material for above work, if available can be issued by BHEL on returnable basis.
1.3.3	The contractor shall provide his tool stores for special tools and instruments at a convenient location near to the place of working in TG hall. Necessary area shall be provided to contractor by BHEL. This is to be cleared after completion of the work. If so required he will have shift the same if required to give fronts to other agencies engaged at site.
1.3.4	The contractor shall set up longitudinal and transverse axes and two or more level bench marks accurately on TG floor. BHEL Engineer shall certify these. The certified TG-Center lines and datum level shall be the reference

## Technical Conditions of Contract (TCC)

### Chapter- I : General

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	for TG and all auxiliaries' erection and alignment work. The contractor shall transfer these axes to all the floors to facilitate further execution.
1.3.5	All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filing and blue matched wherever required. Wherever necessary sealing/ lubricating/ anti-seize compounds shall be applied as per recommendation of Engineer. Machining/ grinding required for fitting of keys, pins, packers & dowels etc. shall be carried out by contractor at his cost. The contractor is expected to have his own arrangements for machining activities.
1.3.6	The accuracy of all equipment/ instruments and their functioning shall be established before they are permitted for use on the job. The calibration certificates of all precision equipments and other measuring equipments have to be submitted to BHEL, before start of work. If the Engineer doubts the accuracy of the precision tools, any time during erection, the contractor shall arrange the checking/ calibration of tools/ equipment/ instruments at his cost.

## Technical Conditions of Contract (TCC)

### Chapter- II : Civil works, Foundation, Grouting

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2.0	<b>CIVIL WORKS, FOUNDATION, GROUTING</b>
2.1	BHEL shall provide all equipment foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor.
2.2	While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with Prussian blue to get the required contact with frames.
2.3	The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to aligned and fixed on the foundations using special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm. The material required for this has to be arranged for by the contractor at his cost.
2.4	<b>FOR Package A &amp; Package B:</b> The Grouting of BFP, TG and other equipments will have to be carried out by the Contractor. The contractor has to arrange for all materials required for carrying out the grouting including the supply of the Special Grout as indicated in the drawings and as approved by the BHEL Engineer. <b>Although supply and application of approximately 15 MT of approved Non- Shrink Grout (for ex. Fosroc Conbextra GP2 or equivalent)per unit has been envisaged, the contractor will be required to supply and apply actual quantity as per the site requirement without any extra cost.</b>
2.5	The contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor.
2.6	The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used

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**Chapter- II : Civil works, Foundation, Grouting**

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	during post grouting check up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer.
2.7	Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation/ casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc / foundations required for temporary pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.

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## Chapter- III : Erection

<b>3.0</b>	<b>ERECTION</b>
3.1	<p>All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include,</p> <ul style="list-style-type: none"><li>➤ Scaffolding and rigging operations,</li><li>➤ Machine / flame / electric cutting, grinding, welding, radiography and stress relieving</li><li>➤ Fitting, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, leveling, blue matching, aligning and assembly.</li><li>➤ Machining, surface grinding, drilling, doweling, shaping.</li><li>➤ Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.</li></ul>
3.2	<p>Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.</p>
3.3	<p>No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.</p>
3.4	<p>The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion &amp; removed from work site.</p>
3.5	<p>Corrections like straightening of ladders, tube support plates adjustment / removal of ovulates in pipes and opening or closing the fabricated bends of piping to suit the layout shall be considered part of the work and the contractor is required to carry out such work within finally accepted price / rate as per instructions of Engineer.</p>
3.6	<p>The contractor shall carry out assembly and erection of condenser components normally on the condenser foundation directly. This includes</p> <ul style="list-style-type: none"><li>➤ Assembly and welding of bottom plate, side plates, hot well,</li></ul>

# Technical Conditions of Contract (TCC)

## Chapter- III : Erection

	<p>springs and steam throw device.</p> <ul style="list-style-type: none"><li>➤ Complete fabrication and welding of shell out of loose side-walls dome walls, and stand pipes.</li><li>➤ Assembly and welding of water chambers and water-boxes.</li><li>➤ Assembly and welding of support plates, baffles and stiffening structure,</li><li>➤ Tubes insertion, expansion and cutting/ trimming.</li><li>➤ Water Box Handling system</li><li>➤ The NDT requirement is to be met as per the FQP, Drawings. In addition to other NDT requirements, MPI of all field joints may be required to be carried out by the contractor for the condensers and auxiliaries.</li></ul> <p>Hydraulic test and water fill test and any other fitting/ assemblies required to complete the assembly. <b>Water fill test has to be carried out by filling the steam space with water up to 300 mm above the final joint of the condenser exhaust hood with turbine. It should be such as all field welding joints are covered in the test.</b></p>
3.7	<p>The contractor shall carry out the condenser tube insertion and expansion at site after the installation of condenser on its foundation. Condenser tubes shall be handled strictly as per instructions of BHEL Engineer. Before installation of tubes, the contractor shall check for any dents, mechanical damages or any other defects of tubes caused during storage. These should be thoroughly internally and externally cleaned for all extraneous matter as per the directions of the engineer.</p>
3.8	<p>Before insertion of tubes, the contractor shall clean the surface of the holes in the main tube plates and tube support plates for paint, corrosion spots oxide scale etc. as per the instructions of the engineer. <b>Even reaming of support plates if required for smooth insertion of tubes is to be carried out by contractor at his cost and reaming and its arrangement is to be arranged by contractor.</b></p> <p>The contractor shall carry out the tube insertion &amp; expansion of the condenser strictly in accordance with the instructions issued by the engineer. Tubes may require adjustment of length on both ends. The contractor shall ensure to provide covering above the top row of tubes to avoid any damage to the tubes prior to tube insertion as per instruction of BHEL Engineer at his cost. The equipment and consumables required for condenser tube cutting and expansion/flaring has to be arranged by the contractor, with no extra cost to BHEL.</p> <p>Fluorescent dye test may be required to conduct after completion of tube expansion for detection of any leakages from the tubes. Contractor has to</p>

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### Chapter- III : Erection

	do all arrangement of filling of water to the condensers and than draining it as per customer Requirement. The supply of fluroscent dye (specification to be taken from BHEL Engineer) and the UV lamp for detection has to be arranged by contractor, with no extra cost to BHEL.
3.9	The contractor shall carry out the condenser neck welding with casing only after final installation of casing. However the contractor shall adjust the gap between condenser neck and LP exhaust hood uniformly by suitably lifting the condenser as directed by engineer. Also the makeup pieces required for this purpose shall be fabricated and welded to the dome walls by the contractor.
3.10	The feed water storage tank will be supplied in five sections with feed pipe, heating steam header, spray nozzles, supports etc., in loose components. These are to be erected, pre-assembled, aligned & welded in position. Welding, NDT & heat treatment if required shall be carried out by the contractor within quoted rate. IBR / statutory requirements, if any, shall be in the scope of contractor and necessary drawing/ details only will be given by BHEL.
3.11	Erection of platform and supporting structures around FST / Deaerator is covered in the scope of contract and shall be erected by the contractor within the quoted rate of sl. No. 11.3.1.2 & 11.6.1.2 of Rate schedule. Any platforms supplied by the Manufacturing Units/vendors with the equipment ,auxiliaries has to be erected as per clause 11.3.1.1 & 11.6.1.1 of Rate schedule.
3.12	LP Heater No. 1 is to be erected inside the condenser in rear side, for which contractor may require 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
3.13	<p>Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with petrol or some other reagent. If necessary, dismantling some of the parts of the equipment would be necessary. He shall arrange for re-greasing / lubricating them with recommended lubricants and for assembling back the dismantled parts, at quoted rate. Lubricants will, however, be supplied free of cost by BHEL.</p> <p>All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of Engineer, the equipment is to be checked for</p>

## Technical Conditions of Contract (TCC)

### Chapter- III : Erection

	<p>clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.</p>
3.14	<p>The turbine Integral Piping and Overload piping of Turbine are of SA335P91 material specification. The erection, welding, heat treatment, NDT, H&amp;S of these are in scope of this contract only. The contractor has to arrange for the IBR requirements. Also, the consumables such as electrodes and filler wire, thermocouple, ceramic pads and insulation, induction coil etc. for SA335P91 welding has to be arranged by the contractor only. The contractor has also to arrange for spot welding of the thermocouples. BHEL will only provide induction heating Machine and DG set with recorder.</p> <p>For other integral piping of this contract scope of Haridwar and Hyderabad scope, all the consumables have to be supplied by contractor at no extra cost. BHEL may only supply any consumables which are supplied by the MU's and vendors as part of the package. BHEL will not supply any electrode / filler for P91/T91 as per clause no. 4.1.4 of chapter IV (Obligation of Contractor) of SCC of this contract.</p> <p>All the welding consumable such as electrodes/filler wires to be used in welding has to be of BHEL approved brand. Before procuring contractor shall ensure the same with BHEL.</p>
3.15	<p>All the shafts of rotating equipment shall be properly aligned to those of the matching equipment to as perfect and as accurately as practical. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.</p>
3.16	<p>All the motors and equipment shall be suitably doweled after alignment of shafts with tapered/parallel machined dowels. The contractor at his own cost shall arrange for the machining of dowel pins required for the same. However the materials for dowel pins shall be issued by BHEL free of cost.</p>
3.17	<p>The bearings shells will be blue matched at site and checked for bearing clearances. The contractor shall carry out scraping of bearing housing, if required to any extent. No extra claim for blue matching of any two surfaces up to 1mm initial gap will be entertained. The contractor shall also check air gap and adjustment of stator/ rotor to magnetic center shall be carried out as part of erection.</p>

## Technical Conditions of Contract (TCC)

### Chapter- III : Erection

3.18	The contractor shall fabricate and weld pipes, special bends, as required for installing lube oil systems. The contractor shall also service the lube oil system, carry out the hydraulic test of oil coolers and piping systems as required.
3.19	The contractor as part of the scope of work if required or if directed by BHEL shall carry out the servicing and realignment of skid-mounted equipment.
3.20	All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR value, before they are installed and energized. Bearings, slip rings commutators and other exposed parts shall be protected against ingress of moisture and corrosion during storage and periodically inspected.
3.21	The contractor shall completely erect and test all the piping systems including their hangers, supports, valves, insulation, and accessories including sampling lines and coolers as per specifications and drawings. The services will include welding, pre-heating, stress relieving, bolting, testing, cleaning insulation and painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged screwed or other type joints are specified or shown on the drawings. All piping shall be erected true to the lines and elevation as indicated in the drawings
3.22	Most of the pipes shall be supplied un-fabricated in running lengths without beveling. It shall be responsibility of contractor to carry out fabrication by cutting to size, bevel / prepare edges, fabricate support pads, drill holes for drains, vents and other stubs, welding, carryout NDT & SR as per site requirement & as directed by BHEL. Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends upto 80 mm nb will be fabricated at site wherever required.
3.23	The connection to the pipes terminal points including edge preparation, fit-up, welding applicable NDE etc are in the scope of work. Certain adjustments in length may be necessary while erecting pipelines. The contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges afresh at no extra cost. Minor adjustment like removal of ovality in pipes is in the scope of work. All drains / vents / relief

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### Chapter- III : Erection

	tubes / escape pipes / air relief valves/ safety valve/ piping to various tanks / sewage / drain canal / flash box / sump / atmosphere etc. from the piping and equipments erected by the contractor is completely covered in the scope of work.
3.24	Certain adjustments in length may be necessary while erecting high-pressure pipelines. The contractor should remove the extra lengths/ add extra lengths to suit the final layout after preparing edges a fresh by adopting specified heat treatment procedures, at no extra cost.
3.25	It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.
3.26	The contractor shall be responsible for any modifications of shop fabricated pipes prior to installation to accommodate minor site alteration in pipe routing at no extra cost
3.27	All vents and drains for piping equipment covered in the scope whether shown in the drawings or not, shall be terminated outside the TG hall in atmosphere and at sump-pit as directed by the engineer.
3.28	Wherever equipment/piping erected by the contractor is connected to equipment/ piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor of this specification.  The erection, welding (Both joints) and NDT of all Metallic Expansion Joints, Butterfly valves of drive turbine exhaust system shall be the responsibility of the contractor of this specification only.
3.29	Normally the high-pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like 'T' pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes/valves for welding.
3.30	The valves will have to be checked, cleaned or overhauled (including lapping of seat) in full or in part before erection and/or after chemical cleaning and during commissioning.
3.31	The contractor shall be responsible for correct orientation of all valves so that seats, stems & hand wheels are in desired direction. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are

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### Chapter- III : Erection

	installed.
3.32	Steel for suspensions for piping, will be supplied in running lengths. These are to be cut to suitable sizes and adjusted as per requirement.
3.33	No temporary supports should be welded on the piping. In case of absolute necessity prior approval should be taken from BHEL Engineer. In such cases heat treatment, if required, shall be carried out by the contractor
3.34	All hangers, supports and anchors shall be installed as per drawing to obtain safe and reliable and complete pipe installation as per instructions of Engineer. Any additional support as called for by Engineer shall have to be fabricated and erected by the contractor. The raw materials required for fabricating such supports shall be supplied by BHEL free of cost.
3.35	Spring suspensions/ constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any adjustments, removal of temporary arrestors/ lockers etc., have to be carried out as and when required.
3.36	Contractor shall install piping in such a way that no excessive or destructive expansion forces exist either in the cold condition or under conditions of maximum temperature and pressure. All bends, expansion joints and any other special fittings necessary to take care of proper expansion shall be incorporated as per the advice of Engineer. During installation of expansion joints, anchors, care must be taken to see that full design movement is available at all times from maximum and minimum temperature.
3.37	The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The procedure to be followed, the tools and the equipment deployed shall be subject to the approval of Engineer. All the torque wrenches shall be calibrated as per requirement and before they are put in use on any job.
3.38	<p>The contractor shall ensure that all supporting elements, anchors &amp; restraint have been installed and adjusted in accordance with the drawings / sketches &amp; other written instructions of the Engineer. The contractor shall inspect the hangers associated with the piping systems as follows:</p> <ul style="list-style-type: none"><li>• After hydraulic test, with the piping in the cold position, with all travel stops removed, with the pipe completely insulated and complete in all respect ready for start up.</li><li>• Piping in the hot position with the unit operating at the maximum load.</li></ul>

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### Chapter- III : Erection

	<ul style="list-style-type: none"><li>• Piping in the cold position during the first complete shut down.</li></ul>
3.39	The hanger assemblies shall not be used for attachment of rigging to hoist the pipes into position. Separate temporary supports shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the building structure.
3.40	Layout of small bore piping as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines even after completion of erection or from aesthetic point of view. Contractor at no extra cost should carry this out.
3.41	Erection, testing and commissioning of power cylinders, electrically operated valves and their actuators etc. coming under various groups is covered under the scope of this specification
3.42	All valves, including valves, flap valves, dampers and actuators, shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates
3.43	The contractor shall also or grind the valve seat, if required, to ensure satisfactory performance of valves at no extra cost. All parts such as gaskets, gland packing which form the permanent part of equipment shall be supplied by BHEL free of cost.
3.44	<p>Erection and welding of necessary instrumentation tapping points, thermocouple pads, thermo-wells, valves, battery of first root valves, condensing vessels, flow nozzles and control valves to be provided on TG, auxiliaries and pipe lines covered within the scope of this specification, will also be the responsibility of the contractor. The welding of all the above items will be contractor's responsibility even if the:</p> <ul style="list-style-type: none"><li>• Product groups, under which these items are released, are not covered in the scope of this tender.</li><li>• Items are supplied by any agency other than BHEL.</li></ul> <p><b>NOTE: ADDITIONAL THERMOWELLS AS REQUIRED FOR CONDUCTANCE OF THE PERFORMANCE GUARANTEE TEST ARE TO BE INSTALLED BY THE CONTRACTOR.</b></p>

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### Chapter- III : Erection

3.45	Erection of CO <sub>2</sub> , N <sub>2</sub> and H <sub>2</sub> systems complete in all respects, including cylinders stands, connecting piping, valves, distribution headers, main control panels etc. is in the scope of contractor. The delivery of gas cylinders is to be taken from BHEL / its client stores, their handling and filling of gases in the system as and when required, till unit is commissioned and handed over, shall be the responsibility of the contractor. The empty cylinders are to be returned to BHEL/its client stores. Filling / Refilling of H <sub>2</sub> cylinders from the Hydrogen plant inside power house is also in the scope of contract.
3.46	Additional platforms and ladders of permanent nature incidental to the job for approaching different equipment / valves as per site requirement, which may not be indicated in drawings, shall be fabricated and installed by the contractor. The materials required will be supplied by BHEL free of cost. The contractor will be eligible for payment for such additional platform and ladders at the rate applicable against item No. 11.3.1.2 & 11.6.1.2 of the rate schedule.
3.47	The contractor shall carry out Kerosene oil / dye penetration tests of all the bearing housing of turbine & generator. The Kerosene oil DPT kit for the tests shall also be arranged by the contractor at his cost.
3.48	The contractor is strictly prohibited in using the TG / Aux. Components for any temporary supporting or scaffolding works etc. In case of such misuse a sum of determined by Engineer will be recovered from contractor's bills.
3.49	<p>The calibration of skid mounted instruments shall be arranged by BHEL through other agency engaged for C&amp;I. Contractor will be informed by BHEL engineer about the details of C&amp;I agency. The contractor shall coordinate with the C&amp;I agency for removal, calibration and re-installation of the instruments. Though C&amp;I agency may remove and reinstall the instruments after calibration, the contractor for this package will maintain the list of all the instruments removed &amp; reinstalled. Instruments prior to removal and after reinstallation shall be considered in custody of the contractor for this package.</p> <p>For all other instrumentation, erection up to root valves (single/double), thermo-wells is the responsibility of this contractor.</p>
3.50	The feed storage tank will be received in 5 pieces and is to be assembled, welded and tested at site. Besides the provisions under T&P Clause, all other arrangements for erection of feed storage tank and deaerator has to be made by contractor with in their finally accepted price.
3.51	The contractor shall assist BHEL in preparation of as built piping drawing.

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**Technical Conditions of Contract (TCC)**  
**Chapter- IV : Welding, heat treatment, Radiography, NDT**

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<b>4.0</b>	<b>WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NDT</b>
4.1	The equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
4.2	Welding of equipment, piping, high tensile structural steel shall be done by certified high pressure welders who possess valid certificate of CIB of the State in which the equipment is erected as per provision of IBR. The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high-pressure works.
4.3	All welders like structural and high pressure welder shall be tested as per ASME section IX / IBR and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.
4.4	Engineer may stop any welder from the work if his performance is unsatisfactory for any reason or if there is a high percentage of rejection in the joints welded by him. The welder having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
4.5	Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor's expense. The Engineer, prior to any repair being made, shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the engineer.

## Technical Conditions of Contract (TCC)

### Chapter- IV : Welding, heat treatment, Radiography, NDT

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4.6	The contractor shall carry out the root run welding of all HP / LP piping, valves by TIG welding method only. The contractor shall have to carry out full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.
4.7	All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of raw material required for making test pieces will be supplied by BHEL free of cost.
4.8	The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.
4.9	<b>Only BHEL/ CUSTOMER approved electrodes and filler wire are to be arranged and used by the contractor, within the finally quoted price.</b> BHEL/ NTPC reserves the right to test from the certified lab of approved electrode being used by the contractor. Testing charges for the same shall be borne by the contractor. All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation with the lot number/ batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved/ accredited test house traceable to National/ International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.
4.10	All butt / fillet welds shall be subject to dye penetration test as per the instructions of the engineer at no additional cost.
4.11	The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld. He has to maintain a record indicating the number of welds, the names of welders who welded the same,

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**Chapter- IV : Welding, heat treatment, Radiography, NDT**

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	date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final.
4.12	The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting should be done. Gas cutting will be allowed only wherever edge preparation otherwise is impractical. All slag / burrs shall be removed from the edge and all the hand cuts shall be ground smooth to the satisfaction of engineer.
4.13	All welds shall be painted with anticorrosive red oxide paint once radiography and stress relieving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his own cost.
4.14	Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.
4.15	Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, thermocouple attachment units, graphs, sheets insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. The contractor should take a note of the following:
4.15.1	Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
4.15.2	All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his

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### Chapter- IV : Welding, heat treatment, Radiography, NDT

	<p>cost.</p> <p>The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of SR operations.</p>
4.16	<p>The contractor shall also be equipped for carrying out other NDT like LPI / MPI / Hardness test/Ultrasonic testing etc. as required as per welding schedules / drawings within the finally accepted price / rates. MPI OF ALL FIELD WELD SEAMS OF CONDENSER and field joints of other auxiliaries and piping may BE required to be conducted depending on customer requirement, with no extra cost to BHEL.</p>
4.17	<p>The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.</p>
4.18	<p>Contractor for radiography work shall use iridium-192/cobalt-60/any other source as may be required/ specified. The geometric un-sharpness shall not exceed 1.5 mm. The contractor should take adequate safety precautions while carrying out radiography. Contractor at his cost shall arrange necessary safe guards required for radiography (including personnel from BARC).</p>
4.19	<p>Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between 1.5 to 2.0.</p>
4.20	<p>All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.</p>
4.21	<p>Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.</p>
4.22	<p>Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification.</p>
4.23	<p>The joint is to be marked with permanent mark A, B, C to identify the segments. For this a low stress stamp shall be used to stamp the pipe on</p>

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### Chapter- IV : Welding, heat treatment, Radiography, NDT

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	the down streamside of the weld.
4.24	For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.
4.25	Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.
4.26	All arrangements for carrying out radiography work including dark room, film development facility and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.
4.27	The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.
4.28	Contractor shall note that 100% radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / IBR / Customer's requirements. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography of LP piping joints MAY also BE required as per customer requirement other than Drawing/NDT requirement of FQP. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out.
4.29	All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL / customer.

## Technical Conditions of Contract (TCC)

### Chapter- IV : Welding, heat treatment, Radiography, NDT

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4.30	Since radioisotopes are being used, all precautions and safety rules as prescribed by BHEL/BARC/ Customer shall be strictly followed. BARC / DRP certificate to be provided before taking up the work.
4.31	Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of HP welders. If the performance of welder is unsatisfactory, he is to be replaced immediately.
4.32	Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re- submitted for evaluation.
4.33	However, if the defect persists after first repair, further repair work followed with radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.
4.34	If the contractor does not carry out radiography work due to non-availability of source / film / chemical / operator etc., BHEL will get the work done departmentally or through some other agency at the risk and cost of the contractor.
4.35	Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.
4.36	The contractor shall assist BHEL Engineer in preparing complete field welding schedule for all the field welding activities to be carried out in respect of piping and equipment erected by him involving high pressure welding at least 30 days prior to the scheduled start of erection work at site. The contractor shall strictly adhere to such schedules.
4.37	The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
4.38	<b>Check shots as per the requirement of BHEL/ NTPC will be taken at the</b>

**Technical Conditions of Contract (TCC)**  
**Chapter- IV : Welding, heat treatment, Radiography, NDT**

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	contractor's cost.
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## Technical Conditions of Contract (TCC)

### Chapter- V : Insulation

<b>5.0</b>	<b>APPLICATION OF INSULATION</b>
5.1	All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length. Application of red oxide paint including supply of paint on welded portions as directed by BHEL is also included in scope of work.
5.2	The mineral wool mattresses (bonded / un-bonded) / LRB mattresses are received at site in standard sizes. These are to be dressed / cut to suit site requirements by the contractor.
5.3	The number of layers / thickness of mineral wool / LRB mattresses for auxiliaries, pipe lines, valves and other vessels shall be as per various drawings and as directed by Engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of rings/ hooks shall be fixed as directed and as per drawings and spec.
5.4	The contractor should ensure, proper finishing of surface of the insulation, sheeting and cementing.
5.5	The contractor should ensure that the finished surface of the insulation works conforms to the dimensions and tolerances given in the drawings. Aesthetic finish and accuracy of work are most important.
5.6	It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions. Closed / semi closed sheds or any other arrangements required for this will be by him at his cost. If any damage occurs to the material due to improper storage or due to any causes attributable to the contractor except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor
5.7	Aluminum sheet cladding will be fabricated to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets, crowning the sheets if necessary will be carried out by him. Two coats of anti-corrosive black bituminous paint are to be applied on inner surfaces of the cladding. Bitumen sealing compound on the joints if necessary is included in the scope of this work. <b>Contractor may note that he will also have to supply anti-corrosive black bituminous paint &amp; bituminous sealing compound required for above works at his cost.</b>
5.8	Aluminum sheet metal cladding over insulation will consists of plain / ribbed / corrugated sheets. The sheets will be supplied in standard sizes. Cutting

## Technical Conditions of Contract (TCC)

### Chapter- V : Insulation

	them to required size, grooving, fabricating bends, boxes etc., for proper covering is contractors responsibility. Any cutting / bending / welding of fabricated skin casing sheets if required will also covered within the scope of this contract.
5.9	A logbook shall be maintained by the contractor to obtain clearance for application of insulation. If the contractor does the work on his own accord without prior permission the area may have to be redone at his cost.
5.10	Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Wastage allowance for the material issued are as below:  1. Wool / LRB mattresses and cladding sheets 2%
5.11	The entire surplus, unused materials etc., supplied by BHEL shall be returned to BHEL after the work is over. Materials like gunny bags and packing materials, empty containers may be returned at periodical intervals.
5.12	The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.
5.13	If during erection and commissioning any of the parts are to be insulated temporarily fixed and then replaced by permanent ones at a later date or if any of the parts are to be removed for modification, rectification, adjustment and then refitted or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the erection rate quoted shall be inclusive of such contingencies.
5.14	Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL Engineer.
5.15	All temporary pipelines required during testing, pre-commissioning and commissioning should be insulated as directed by BHEL at no extra cost to BHEL. However required insulation material shall be issued by BHEL free of cost.
5.16	Though for Haridwar scope of equipments and piping, the application of insulation is not in the scope of this contract, but the transportation of the

## Technical Conditions of Contract (TCC)

### Chapter- V : Insulation

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	HWR scope insulation and arrangement of scaffolding for the insulation of equipments and integral piping is in the scope of this contract.
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**Technical Conditions of Contract (TCC)**  
**Chapter- VI : Painting including Finish painting**

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<b>6.0</b>	<b>PAINTING INCLUDING FINISH PAINTING</b>
6.1	<p>All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted after thoroughly cleaning the dust, rust, scales, grease, oil and other foreign materials by wire brushing, scrapping and any other method approved by BHEL Engineer.</p> <p>Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant paint. However, due to aging, the same may have got deteriorated for peeled off. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.</p>
6.2	<p>After applying the primer paints all structure / equipment / items, shall be finish painted with two coats of alloyed resin machinery enamel paints as specified by BHEL engineer. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish is achieved. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.</p>
6.3	<p>Before applying the subsequent coats as per specification the thickness of each coat shall be measured and recorded with BHEL/Customer. <b>The instrument for checking the thickness of coats(DFT measurement, alcometer) to be procured by the contractor and should be calibrated after periodical intervals.</b></p>
6.4	<p>Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.</p>
6.5	<p>Contractor shall supply all paints, primers for the plant as per rate schedule for supply portion of this contract. All tools and other consumables including scaffolding materials required for finish painting are to be arranged by the</p>

**Technical Conditions of Contract (TCC)**  
**Chapter- VI : Painting including Finish painting**

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	contractor with no extra cost to BHEL. Paint is to be BHEL/NTPC approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting.
6.6	The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.
6.7	The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.
6.8	The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.
6.9	The contractor shall ensure availability of : <ul style="list-style-type: none"> <li>• Ford Cup-4 to measure consistency of paint,</li> <li>• Automatic magnetic gauge to measure the dry film thickness and</li> <li>• SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.</li> </ul>
6.10	All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.
6.11	The Turbines, Generator and all auxiliaries of this contract scope, are also to be painted as per the paint schedules.
6.12	<b>CONDENSER PAINTING</b>

**Technical Conditions of Contract (TCC)**  
**Chapter- VI : Painting including Finish painting**

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6.12.1	<p>The condenser main tube plates will be dispatched to site from the works with surface protection only on water box side. The same shall be removed adopting one of the suitable methods indicated elsewhere in this specification. The contractor shall do the surface protection of these tube plates after the completion of the tube insertion and expansion activities. The surface shall be first painted with at least two or more coats of approved quality chemical resistant epoxy zinc chromate primer after thoroughly cleaning all such parts of all dirt, rust scales greases, oils and other foreign materials by adopting suitable methods as approved by BHEL. Afterwards the above parts shall be finished with two or more coats of approved quality high build black coal tar coating. Before the painting is taken up, the contractor shall plug all the holes with suitable tapered plastic / wooden plugs to avoid any damage to the tube ends. The plastic / wooden plugs and paints required for the above operations shall have to be arranged by the contractor at his cost. <b>The above paints are also to be applied on water chamber / box.</b> The thickness is to be confirmed by suitable measurement. <b>The inside of water box has to be painted with High build Black Coal Tar epoxide paint. Of thickness DFT= 0.25mm.</b></p>
6.12.2	<p>The condenser steam space shall be surface protected with at least two coats of suitable steam washable paint. Before the painting is taken up, the contractor shall clean the surfaces to be coated by adopting suitable methods. The contractor at no extra cost shall procure paint to BHEL</p>

**Technical Conditions of Contract (TCC)**  
**Chapter- VI : Painting including Finish painting**

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## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

7.0	<b>TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING</b>
7.1	<b>The contractor shall carry out the following tests &amp; activities for commissioning of Steam Turbine Generator &amp; its auxiliaries:</b>
7.1.1	TRIAL RUN OF FEED PUMPS, CEP, AND VARIOUS ROTATING MACHINERIES / PUMPS.
7.1.2	TRIAL RUN AND COMMISSIONING OF MOTORS/ DRIVES FOR VARIOUS AUXILIARIES. THIS INCLUDES TESTING OF MOTORS INCLUDING CT TESTING ETC, WITH SUPPLY OF TEST KITS.
7.1.3	HYDRAULIC TEST OF PIPELINES, CLOSED SYSTEMS, TANKS AND VESSELS. ANY CALIBERATED PRESSURE GAUGES REQUIRED FOR THE HYDROTESTS ARE TO BE ARRANGED BY THE CONTRACTOR AT HIS COST.
7.1.4	FLUSHING OF ALL PIPELINES BY AIR/OIL/WATER/STEAM AS THE CASE MAY BE.
7.1.5	SERVICING OF ALL VALVES AND FITTINGS.
7.1.6	MANUAL/ MECHANICAL CLEANING OF OIL TANKS, DEAERATOR, FST, SUCTION STRAINERS /FILTER ELEMENTS OF CEP, BFP, BOOSTER PUMP AND OTHER VARIOUS EQUIPMENTS AND TANKS ERECTED BY THE CONTRACTOR. THIS MAY HAVE TO BE REPEATED SEVERAL TIMES DURING THE COMMISSIONING PROCESS.
7.1.7	CHEMICAL CLEANING (ALKALI/DETERGENT FLUSHING) OF PIPING SYSTEMS, DEAERATOR AND FST SHALL BE CONDUCTED BY SEPARATE AGENCY AND NOT IN THE SCOPE OF THIS CONTRACT. AS PER REQUIREMENT. CONTRACTOR SHALL EXTEND MANPOWER HELP DURING THE PROCESS AND CARRY OUT DISASSEMBLY AND REASSEMBLY OF VULNERABLE COMPONENTS LIKE DEAERATOR SPRAY NOZZLES, GAUGES, INSTRUMENTS ETC. AS INSTRUCTED BY BHEL DURING THIS PROCESS. CLEANING OF STRAINERS, HOTWELL AND OTHER EQUIPMENTS OF THIS SCOPE SHALL REMAIN IN THE SCOPE OF THIS CONTRACT THROUGHOUT THE PROCESS.
7.1.8	PUTTING TURBINE ON BARRING GEAR.
7.1.9	ROLLING AND SYNCHRONISATION.

## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

7.1.10	FULL LOAD OPERATION.
7.1.11	TRIAL OPERATION
7.1.12	<p>These would also include hydraulic test of condenser and water flushing of piping, oil flushing of oil system etc. as instructed by BHEL.</p> <p>All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications.</p> <p><b>Specialized test equipment which are supplied by Manufacturer's as special T&amp;P for Erection and Commissioning shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to him.</b></p> <p><b>Any other T&amp;P, MME, Precision equipment, Testing kit other than that provided by BHEL/client has to be arranged by contractor, as and when required with no extra cost to BHEL, and ensuring uninterrupted flow of work.</b></p>
7.2	<p>The contractor shall carry out the air-tightness test on assembled generator to the satisfaction of BHEL Engineer. The necessary arrangement for testing with dry-clean air shall be made by the contractor at his cost. Compressed air for testing can be taken by the contractor from the existing system.</p> <p><b>Helium Leakage Test-</b> The contractor shall carry out the Helium Leakage Test on assembled generator to the satisfaction of BHEL Engineer. The necessary arrangement/ test kit for carrying out the Helium Leakage test shall be made available by the contractor at his cost.</p>
7.3	<p>All the tests may have to be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. The contractor shall repairs all joints (shop welded or site welded) failed during testing.</p>
7.4	<p>While the Detergent cleaning operation including the required looping in piping , draining and disposal will be carried out by another agency , the Contractor will have to ensure the readiness and availability of CEP ,associated systems and the piping which is erected under this scope and is to be cleaned . Any work required on the permanent system will have to be carried out by the Contractor. Cleaning of strainers and any support required for detergent flushing of the systems/equipment which come under this contract has to be done by the contractor.</p> <p>All temporary piping along with their supports for steam blowing in the systems erected by the Contractor, and the required loops for chemical cleaning of the piping erected by the contractor will have to be erected</p>

## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

	<p>within the quoted rates.</p> <p><b>For completing the chemical cleaning/oil flushing contractor may have to do some temporary piping /welding will be in the scope of work.</b></p> <p>The Contractor will also be responsible for their installation wherever required. He will dismantle the total system and return the same to BHEL / their customer store as directed. No separate payment will be released for erection &amp; dismantling of the required equipment &amp; piping.</p>
7.5	<p>Thermal shocks will be required during oil flushing operations. The contractor is required to make all arrangements for the same. This would include fabrication of heating tank with nozzles and requisite piping with supports. Complete erection with pumps, tanks, electrical fittings including and other accessories is to be carried out. All material and equipment will be provided on returnable basis by BHEL.</p>
7.6	<p>The scope of pre-commissioning activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, steam blowing or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents</p>
7.7	<p>All arrangement required for steam blowing including removal, reinstallation and welding of CRH NRV and installation of steam blowing arrangements, temporary piping including steam blow off piping is included in the scope of work.</p>
7.8	<p>It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.</p>
7.9	<p>The pre-commissioning activities will start prior to oil flushing of the TG and various trials, commissioning operations shall continue till the TG is handedover 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.</p> <p>All these works need specialised 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 mobilisation of these commissioning gangs shall be sufficient</p>

## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

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	<p>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.</p> <p>Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.</p>
7.10	<p>It shall be specifically noted that the employees of the contractor may have to work round the clock along with BHEL/Customer Engineers and hence overtime payment by the contractor may be involved. The contractor's finally accepted rates/ price shall be inclusive of all these factors also.</p>
7.11	<p>In case, any rework is required because of contractor's faulty erection that is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle/open up the equipment / part and reassemble / redo the work without any extra claim.</p>
7.12	<p>During commissioning, opening / closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. This is included in the scope of work.</p>
7.13	<p>The contractor shall make all necessary arrangements including making of temporary closures on piping / equipment for carrying out the hydro-static testing on all piping equipment covered in the specification at no additional cost.</p>
7.14	<p>The water boxes of the condenser will be tested hydraulically to 1.5 or 1.3 times (as per NTPC requirement) the design pressure after its assembly at site. The arrangement of all the blanking for carrying out the hydraulic test shall be the responsibility of the contractor at no additional cost. However only the main blanking flanges with fasteners for CW inlet and CW outlet of the condenser shall be provided by BHEL free of cost. Fabrication of blanks will be carried out by the contractor.</p>

## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

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7.15	The water-fill test of the steam space shall be carried out by filling the water upto 300 mm above the final joint of the exhaust hood with the turbine or as required above the top row of tubes to facilitate leak detection. It should be done so that all the field welding joints are covered in the test. Hydraulic testing shall be carried out on the condenser water boxes. Dummy plates shall be provided by BHEL.
7.16	The contractor shall fill the condenser upto the specified level as many times as called for by the Engineer for checking of the turbine at no additional cost
7.17	In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment including repair, rectification and replacement work are necessary, the contractor shall carry out the same as per Engineer's instructions. The parts to be replaced shall be provided by BHEL.
7.18	During hydraulic testing of pipes, all piping having variable spring type supports shall be held securely in place by temporary means while constant spring type support hangers shall be pinned or blocked solid during the test.
7.19	The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left un-serviced.
7.20	Cleaning & servicing of all the filters / strainers, toppings of oils coming in the system shall be done by the contractor till the completion of trial operation and handing over of the unit within the quoted price .

## Technical Conditions of Contract (TCC)

### Chapter- VII : Testing, pre-commissioning, commissioning, post-commissioning

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7.21	The contractor shall incorporate all the changes / decisions proposed by BHEL Engineer at no additional cost.

## Technical Conditions of Contract (TCC)

### Chapter- VIII : Painting Scheme

## 8.0 PAINTING SCHEME

### 8.1 Condenser

<b>Sl No</b>	<b>Reference : NTPC doc. No. CS-9548/9549/9566/9573-110-2.</b>						
	Following painting scheme is selected based on NTPC specification for all components except Gland steam Condenser :						
	<b>Paint (Coat)</b>	<b>Paint Type</b>		<b>No. of coat</b>	<b>DFT*</b>		
	Primer Paint	: Epoxy base Zinc rich Primer Paint		2 Coats	70		
	Intermediate Paint	: Epoxy TiO <sub>2</sub> Pigmented Polyamide Cured Paint		1 Coat	70		
	Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint		2 Coats	60		
					Total DFT 180 microns min.		
	For Gland Steam Condenser:						
	<b>Paint (Coat)</b>	<b>Paint Type</b>		<b>No. of coat</b>	<b>DFT*</b>		
	Primer Paint	: Epoxy base Zinc rich Primer Paint		2 Coats	70		
	Intermediate Paint	: Epoxy TiO <sub>2</sub> Pigmented Polyamide Cured Paint		1 Coat	70		
	Finish (Final)	: Aluminum paint		2 Coats	40		
					Total DFT 160 microns min.		
	* DFT – Dry Film Thickness (final) in microns.						
<b>A. Details of Color Scheme (Outside Surfaces):</b>							
<b>(Legend : W-at BHEL works; V- at vendor's works; S-at site; NA-Not applicable)</b>							
	<b>Assembly</b>	<b>Shade as per IS-5 or Eq.</b>	<b>Primer</b>	<b>Int. Paint</b>	<b>Final Paint</b>	<b>Touch-up</b>	<b>Re-marks</b>
01	Condenser	Blue RAL 5012	W	W	S	NA	
	L.P.Heater No. 1/2	-- Do --	W	W	W	S	
	Gland Steam Condenser	-- Do -- and Aluminum paint	W	W	W	NA	
	Hydrogen Coolers	Grey RAL 9002	W	W	W	S	
	Air Exhauster for Gland Steam Condenser	Grey RAL 9002	V	V	V	S	
02	For painting work at Site, paint & painting materials are to be arranged at site by BHEL-Site.						
<b>Following Items are imported. Sea worthy packing &amp; painting is done as per standard practice of vendor:</b>							
# Condenser Air Evacuation Equipment.							
# Multi-Ball Bearing Support for Condenser							
# Turbine Oil Cooler							

## Technical Conditions of Contract (TCC) Chapter- VIII : Painting Scheme

B. Details of Painting (Inside Surfaces):							
	Assembly	Shade as per IS-5 or Eq.	Primer	Int. Paint	Final Paint	Touch-up	Remarks
01	<u>Condenser</u>						
	# Cooling water side surfaces (water boxes inside)	<b>Black</b>	<b>W</b> (DFT 70 microns)	--	<b>S</b> (High Build Black Coal Tar Epoxide Paint, Total DFT 0.25mm)	<b>NA</b>	
	# Tube plate surface towards water box side.	<b>-do-</b>	<b>S @</b>	--	<b>-do-</b>	<b>-do-</b>	After tubing.
	# Shell side inside surfaces (steam side)	Shell side inside surfaces are supplied coated with Steam Washable Paint at Works. This paint is to be washed before commissioning.					
02	L.P.Heater No. 1/2 & Gland Steam Condenser	Shell side & Water box inside surfaces are supplied coated with Steam Washable Paint at Works. This paint is to be washed before commissioning.					
03	For painting work at Site, paint & painting materials are to be arranged at site by BHEL-Site.						

@ Tube plate surface is supplied painted with steam washable paint which is to be cleaned before applying Primer on water box side surface.

# Technical Conditions of Contract (TCC)

## Chapter- VIII : Painting Scheme

### 8.2 Turbine Integral Piping & Auxiliaries

<b>Painting Scheme</b>							
<b>Paint (Coat)</b>	<b>Paint Type</b>	<b>No. of coat</b>		<b>DFT*</b>			
Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35				
Intermediate Paint	: Epoxy TiO <sub>2</sub> Pigmented Polyamide Cured Paint	1 Coat	70				
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75				
<b>For details on Colour And Coding Scheme, Refer NTPC Document no. QS-01-DIV-W-4/Rev-0/Dt-20.09.02</b>							
* DFT – Dry Film Thickness (final) in microns.							
<b>Details of Color Scheme :</b>							
<b>(Legend : W-at BHEL works; V- at vendor's works; S-at site; NA-Not applicable)</b>							
<b>No</b>	<b>Assembly</b>	<b>Shade as per RAL</b>	<b>Primer</b>	<b>Int. Paint</b>	<b>Final Paint</b>	<b>Touch-up</b>	<b>Remarks</b>
P1	Turbine Integral Piping for Control Fluid System	Grey 9002	V	V	V	S	Refer Annexure-B of NTPC doc. For Tag / Band Colour
P2	Turbine Integral Piping for Lube Oil System	Grey 9002	V	V	V	S	Refer Annexure-B of NTPC doc. For Tag / Band Colour
P3	Turbine Integral Piping for Condensate Spray System	Grey 9002	V	V	V	S	Refer Annexure-B of NTPC doc. For Tag / Band Colour
P4	Turbine Integral Piping for CW to Lub Oil Coolers.	Grey 9002	V	V	V	S	Refer Annexure-B of NTPC doc. For Tag / Band Colour
P5	Turbine Integral Piping for CW to HPSU	Grey 9002	V	V	V	S	Refer Annexure-B of NTPC doc. For Tag / Band Colour

## Technical Conditions of Contract (TCC)

### Chapter- VIII : Painting Scheme

P6	Turbine Integral Piping for Turbine Drainage System	Grey 9002	V	V	V	S	Pipes are insulated at site.
P7	Turbine Integral Piping for Seal Steam System	Grey 9002	V	V	V	S	Pipes are insulated at site.
P8	Turbine Flash Tank	Grey 9002	V	V	V	S	
P9	Spring Cages	Black 9011	V	V	V	S	
P10	Hangers and supports for turbine integral piping	Black 9011	V	V	V	S	
P11	Dampers	Black 9011	V	V	V	S	
P12	Valves of Turbine Integral Piping	Grey 9002	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
P13	3-way Temperature Control Valve (Motorised) for Lube Oil (with Actuator)	Grey 9002	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
P14	Control Panel For Lube Oil Purifier	<u>External (Front &amp; Rear)</u> - Grey 9002 <u>External (Side)</u> - Blue 5012 <u>Internal</u> - Brilliant white glossy	V	V	V	S	
P15	Lube Oil Purifier	Grey 9002	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.

## Technical Conditions of Contract (TCC)

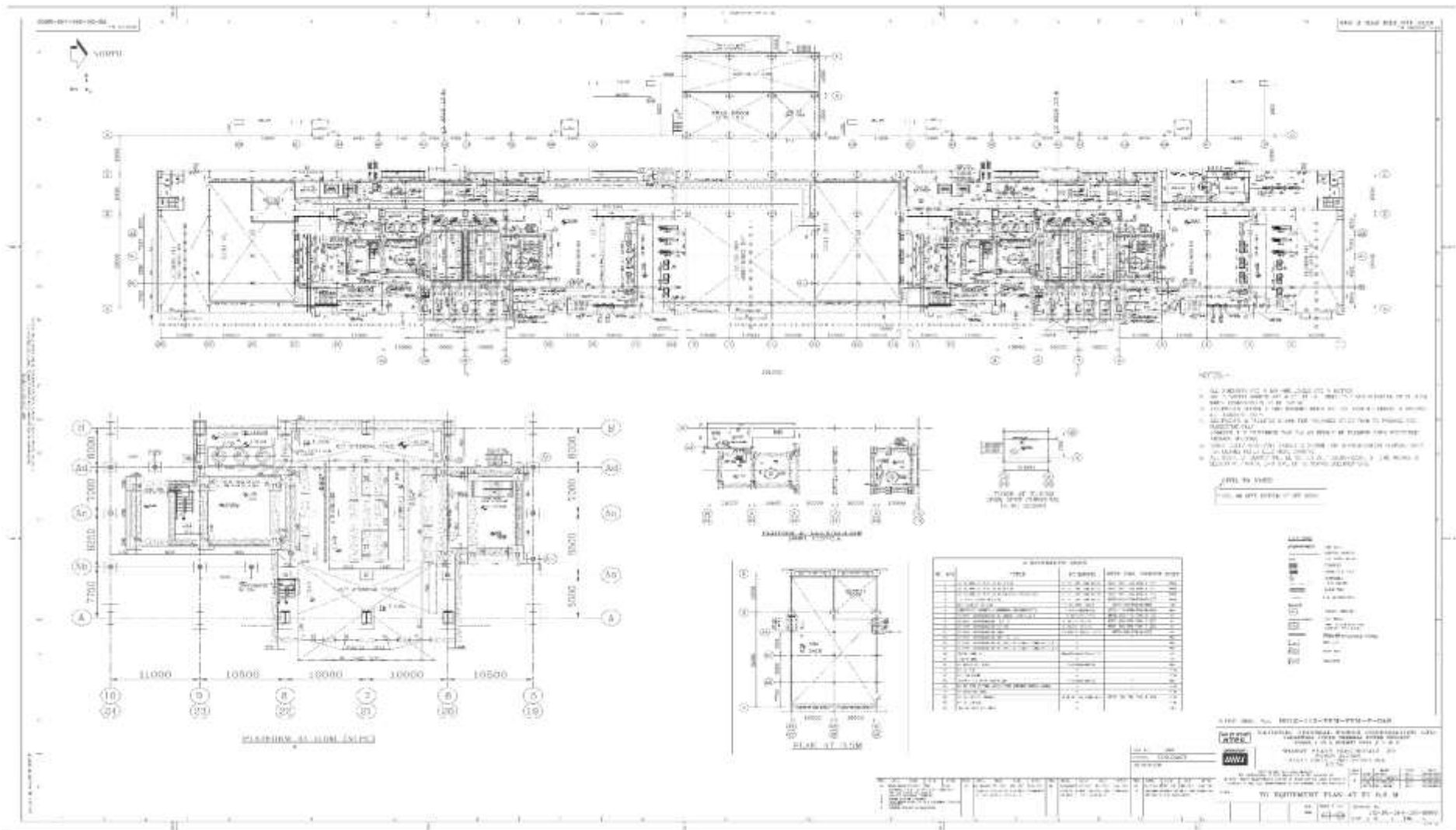
### Chapter- VIII : Painting Scheme

P16	Gear Pump & return Pump (with motors)	<u>Pumps :</u> Grey 9002 <u>Motors :</u> Blue 5012	V	V	V	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
P17	Angle Valve (For Turbine Drain)	Grey 9002	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.

P18	Spray Nozzel	Grey 9002	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.
P19	HPT Steam Evacuation Valve	Grey 9002	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.
P20	Oil tank (MOT), Dirty oil tank , waste oil tank	Grey 9002	W	W	W	S	Identification Tag/Band of White 9010 colour. Legend in black letters.
P21	Oil Module						BOI-Imp
	Oil tank (MOT)	Grey 9002	W	W	W	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.
	AOP,EOP, JOP (With Motors)	<u>Pumps :</u> Grey 9002 <u>Motors :</u> Blue 5012	V	V	V	S	BOI-Imp Identification Tag/Band of White9010 colour. Legend in black letters.
	Oil Vapour Exhauster (including Motor)	<u>Exhauster :</u> Grey 9002 <u>Motors :</u> Blue 5012	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.
	Duplex Filter (Lub oil)	Grey 9002	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.
	Duplex Filter (Jacking Oil)	Grey 9002	V	V	V	S	BOI-Imp Identification Tag/Band of White 9010 colour. Legend in black letters.

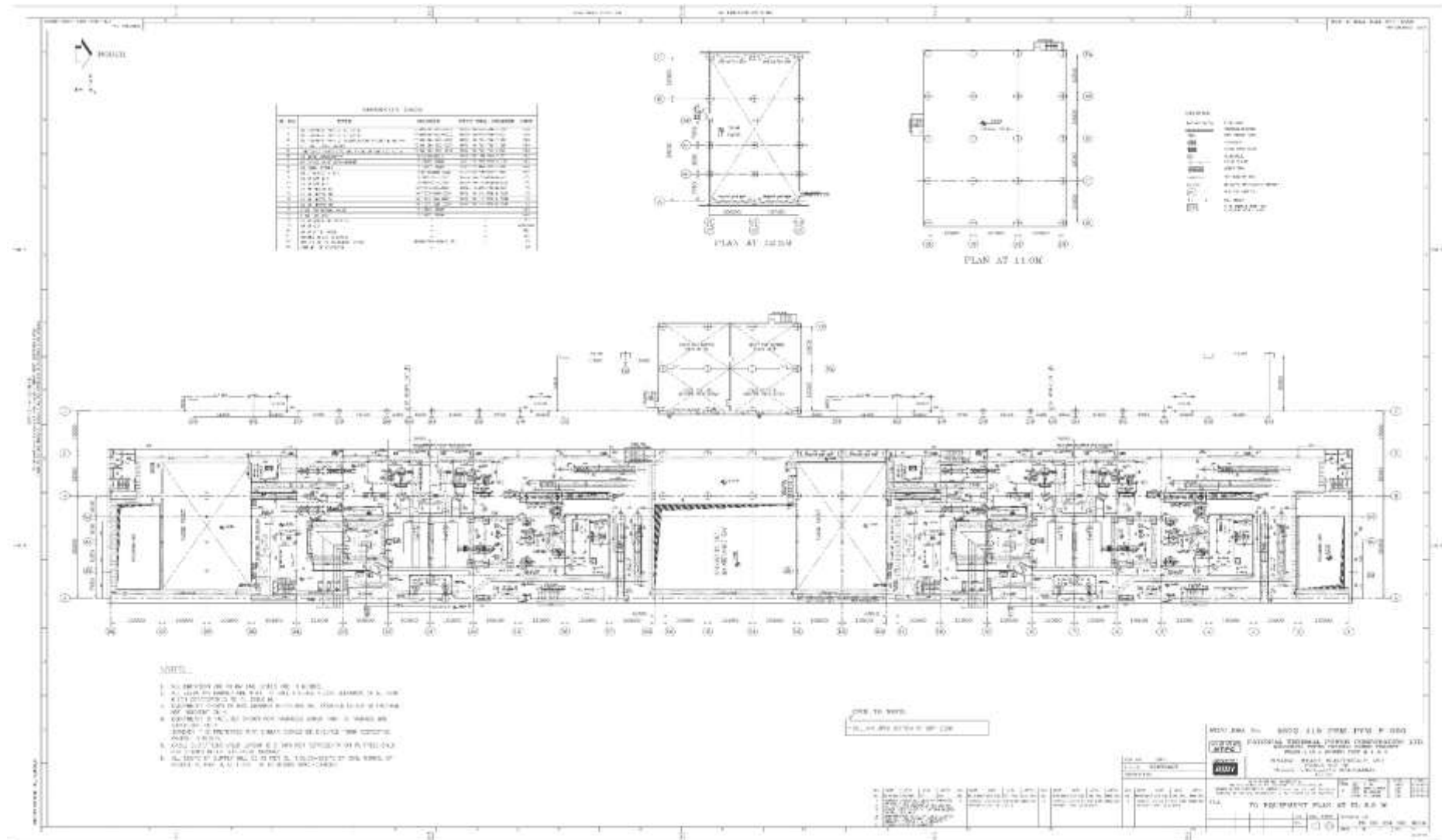
# Technical Conditions of Contract (TCC)

## Chapter- IX : Drawings



# Technical Conditions of Contract (TCC)

## Chapter- IX : Drawings





# Technical Conditions of Contract (TCC) Chapter- IX : Drawings

