

TENDER SPECIFICATION

BHEL: PSSR: SCT: 1867

FOR

Handling of materials at storage yard, transportation to site, Erection, Testing & Assistance for commissioning and Trial Operation of Main Boiler and its Auxiliaries, Air pre heaters, Ducts and Dampers, Fuel piping, Boiler integral piping, Fans, Mills and Feeders, Rotating equipment, SCR system (Selective Catalytic Reduction), ESP, Auxiliary Boiler and application of Insulation & Refractory, including supply & application of final painting, Fabrication and Erection of Mill Bunker etc. for Unit-5 of 5 X 800MW Yadadri TPS

At

Veerlapalem Village, Dameracherla Mandal, Nalgonda Dist, Telangana State

VOLUME – I BOOK – I

TECHNOCOMMERCIAL BID - Consists of Book-I & Book-II

Book- I Consists of

- Notice Inviting Tender
- Volume-IA: Technical Conditions of Contract

Book-II consists of

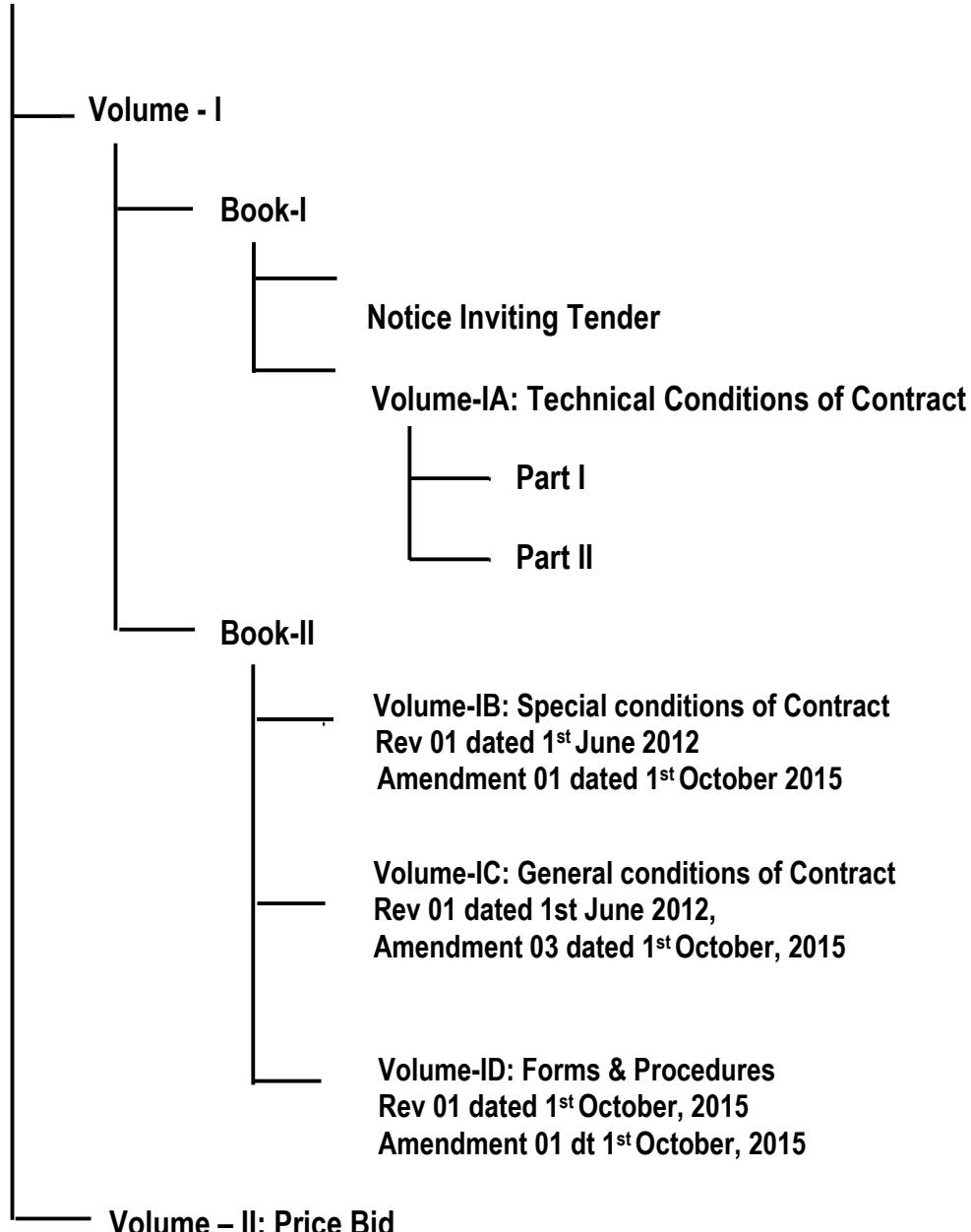
- Volume-IB : Special conditions of Contract, Rev 01 dated 1st June 2012
- Volume-IC : General conditions of Contract Rev 01 dated 1st June 2012, Amendment 01 dated 15th April, 2013
- Volume-ID : Forms & Procedures Rev 01 dated 1st June 2012 Amendment 01 dt 1st October, 2015



BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region 690,
Anna Salai, Nandanam, Chennai – 600 035

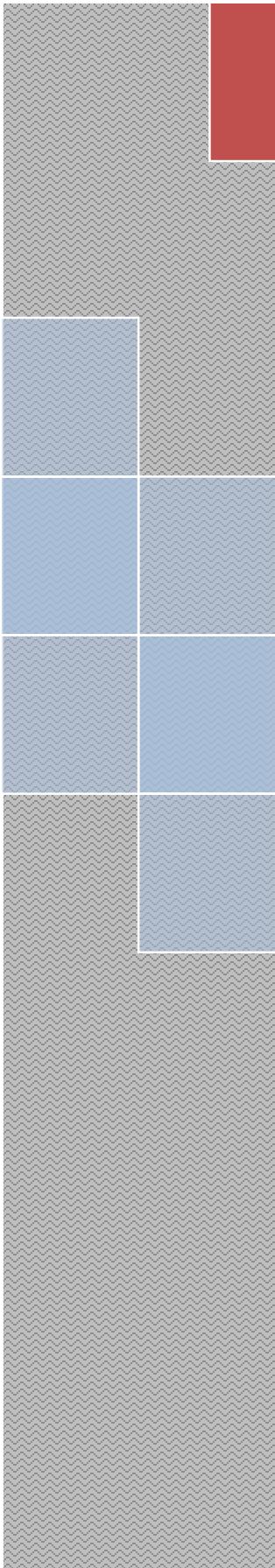
TENDER SPECIFICATION CONSISTS OF

Tender Specification



NOTICE INVITING TENDER

NOTICE INVITING TENDER



BHARAT HEAVY ELECTRICALS LIMITED



NOTICE INVITING TENDER

Ref: BHEL: PSSR: SCT: 1867

Date: 01.11.19

NOTICE INVITING TENDER (NIT)

Submission only through E-Procurement Portal

<https://bhel.abcprocure.com>

Note: Bidder may download Tender Document from web sites

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To

Dear Sir/Madam

Sub: NOTICE INVITING TENDER

Online Sealed offers in two part bid system (National competitive bidding (NCB)) are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-I) **through E-Procurement Portal** <https://bhel.abcprocure.com> only, 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	BHEL: PSSR: SCT: 1867	
ii)	Broad Scope of job	Handling of materials at storage yard, transportation to site, Erection, Testing & Assistance for commissioning and Trial Operation of Main Boiler and its Auxiliaries, Air pre heaters, Ducts and Dampers, Fuel piping, Boiler integral piping, Fans, Mills and Feeders, Rotating equipment, SCR system (Selective Catalytic Reduction), ESP, Auxiliary Boiler and application of Insulation & Refractory, including supply & application of final painting, Fabrication and Erection of Mill Bunker etc. for Unit-5 of 5 X 800MW Yadadri TPS at Veerlapalem Village, Dameracherla Mandal, Nalgonda Dist, Telangana State	
iii) DETAILS OF TENDER DOCUMENT			
A	Volume-IA	Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	Applicable

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B	Volume-IB	Special conditions of Contract, Rev 01 dated 1st June 2012, Amendment 01 dated October 01, 2015	Applicable
C	Volume-IC	General conditions of Contract Rev 01 dated 1st June 2012, Amendment 03 dated October 01, 2015	Applicable
D	Volume-ID	Forms & Procedures Rev 01 dated 1st June 2012 Amendment 01 dated October 01, 2015	Applicable
E	Volume-II	Price Schedule (Absolute value).	Applicable
iv)	Issue of Tender Documents	<p>1. This is an E-tender floated online through our E-Procurement Portal https://bhel.abcprocure.com</p> <p>2. Sale Start: 02.11.19 Close: Tender documents can be downloaded till closing time for offer submission.</p> <p>3. From: BHEL website (www.bhel.com -> Tender Notifications). Tender documents for bidder's reference can be downloaded from this website till due date of submission.</p>	Applicable
gv)	Due Date & Time of Offer Submission	<p>Date: 23.11.2019, Time: 15.00 Hrs The bidder should submit their offer online in e-Procurement portal at https://bhel.abcprocure.com.</p> <p>Bidders are requested to upload their offer well in advance in order to avoid last minute congestion at this website. Hard copy bid or bids through E-mail / fax shall not be accepted.</p>	Applicable
vi)	Opening of Tender	<p>Date: 23.11.2019, Time: 15.30 Hrs Notes:</p> <p>(1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time.</p> <p>(2) Bidder may record their presence online, during tender opening. However, this being an e-tender it shall be opened online.</p>	Applicable

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vii)	EMD Amount	Rs 85,90,000 (Rupees Eighty five Lakhs ninety thousand only). <ul style="list-style-type: none"> - Refer Vol-1A Part-II Chapter-1 of Technical Conditions of Contract (Volume-I, Book-I) for mode of payment of EMD. - Exemption of EMD for MSEs is not applicable for this tender. - One time EMD is not applicable for this tender. 	Applicable
viii)	Cost of Tender	Rs. 2,000/- (Rupees Two Thousand Only) <ul style="list-style-type: none"> - Cost of tender shall be remitted through, Electronic Fund Transfer credited in BHEL account or Banker's cheque or Pay order or Demand draft, in favour of BHEL. - <u>Exemption of Cost of Tender for MSEs is not applicable for this tender.</u> 	Applicable
ix)	Last Date For Seeking Clarification	Bidders may submit their queries in https://bhel.abcprocure.com at least 7 days before the due date of offer submission or two days before the scheduled date of pre-bid meeting whichever is earlier along with soft version also, addressing to undersigned & to others as per contact address given above.	Applicable
x)	Schedule of Pre Bid Discussion (PBD)	Date: 13.11.2019 Time 11.00AM at BHEL:PSSR:Chennai-35	Applicable

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i) Integrity Pact & Details of Independent External Monitor (IEM)	<p>a. Integrity Pact (IP) is a tool to ensure that activities and transactions between the company and its Bidders / Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL. The IP as enclosed with the tender is to be submitted (duly signed and stamped by the authorized signatory who signs in the offer) along with Techno Commercial Bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this pact would be a preliminary qualification. Details of IEM for this tender is furnished below:</p> <p>1) Shri Arun Chandra Verma, IPS (Retd.) Flat No. C -1204, C Tower, Amrapali, Platinum, Complex, Sector 119, Noida (U.P.) Ph: +91 8130386387 <u>acverma1@gmail.com</u></p> <p>2) Shri Virendra Bahadur Singh, IPS (Retd.) H. No. B-5/64, Vineet Khand, Gomti Nagar, Lucknow – 226010 Ph: +91 8853760730; 9818377360 <u>vbsinghips@gmail.com</u></p> <p>b. Please refer section- 8 of the IP (refer the format given at Volume IA Part II of this tender) for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.</p> <p>Note: No routine correspondence shall be addressed to the IEM (Phone / Post / E mail)</p>	Applicable
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		<p>regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification / issued shall be posted in https://bhel.abcprocure.com. Any other queries may be addressed directly to the tender issuing (Procurement) department as mentioned below:</p>	
	Contact Details	<p>For all clarifications / issues related to the tender, please contact:</p> <ol style="list-style-type: none"> 1. Mr. Anil Kumar DGM / SCT BHEL-PSSR, 690 Anna Salai, Nandanam, Chennai-35 Ph: 044-28286759 anil.kr@bhel.in 2. Mr. Sandipan Biswas AGM / Purchase & SCT BHEL-PSSR, 690 Anna Salai, Nandanam, Chennai-35 Ph:044-28286757 / 24348943 bsandipan@bhel.in 	
xii	Latest updates	<p>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), CPP Portal (https://eprocure.gov.in) & portal https://bhel.abcprocure.com. These will not be published in the newspapers. Bidders to keep themselves updated with all such information. This also form part of tender hence the same shall be enclosed with their offer.</p>	

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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 through, Electronic Fund Transfer credited in BHEL account or Banker's cheque or Pay order or Demand draft, in favour of BHEL.

4.0 Unless specifically stated otherwise, bidder shall deposit **Earnest Money Deposit (EMD) as mentioned in Volume IA, Part-II, Chapter-1** of Technical Conditions of Contract (Volume-I Book-I) under the heading 'Modes of Deposit of EMD'. Please note that 'One Time EMD' shall not be considered. **It is to be noted that proof of remittance for EMD shall be made available at BHEL PSSR Office prior to tender opening.**

5.0 **Procedure for Submission of Tenders:** This is an E-tender floated online through our E-Procurement portal <https://bhel.abcprocure.com> . The bidder should respond by submitting their offer online only in our e-Procurement portal at <https://bhel.abcprocure.com> . Hard copy bid or bids through email/ fax shall not be accepted.

I. Pre-requisite for Offer Submission: -

Digital Certificate: To access an e-Tender, you need to have a Class-II/III Digital Signature Certificate (DSC) for Signing & Encryption (Required both digital signature certificate: Signing & Encryption) of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India. Valid Digital Signature Certificate (DSC) must be installed in a computer system from where you want to access the website.

MINIMUM REQUIREMENT: (Mandatory)

- Computer with good Internet Connection.
- Operating System should be Windows Vista / Windows 7 and above.
- Web Browsers: Internet Explorer 9.0 (32-bit Browser only) & above

At first time login, to verify and approve your login profile & DSC, you

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are requested to contact e-Procurement Service Provider.

Also please Refer “Bidder Manual for BHEL Bidders” and “Minimum System Requirements and Settings Document for BHEL user & Bidders” available at <https://bhel.abcprocure.com> .

II. Digital Signing of e-Tender

Tenders shall be uploaded with all relevant documents in PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class-II/III Digital Signature Certificate (DSC) for Signing & Encryption.

i) The Requirement:

- a. A PC with Internet connectivity &
- b. DSC (Digital Signature Certificate) Class-II/III Digital Signature Certificate (DSC) for Signing & Encryption)

Vendors are also requested to go through bidder manual available on
https://bhel.abcprocure.com

III. E-procurement service

Provider-: Address:

e-Procurement Technologies Limited (abcProcure),
Head Office: B-704/705, Wall Street - II, Opp. Orient Club,
Nr. Gujarat College, Ellis Bridge, Ahmedabad - 380 006, Gujarat
(India)

Timing:

Indian Standard Time (+5:30 GMT): 10:00 AM - 07:00 PM (Monday to Friday)
Indian Standard Time (+5:30 GMT): 10:00 AM - 04:00 PM (Saturday)

The contact details of the service provider are given below:

Contact: +91-79-68136819/809/862/867/823/872/842

E-Mail: Bhel.Support@abcProcure.com

Further contact details can be obtained by visiting the following webpage:
<https://bhel.abcprocure.com/EPROC/contactus>

IV. Documents Comprising the e-Tender

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The tender shall be submitted online – only except tender fee & EMD (in physical form) as mentioned below:

i) Technical Tender (UN priced Tender)

Bidders shall furnish the following information along with technical tender (preferably in pdf format):

- i). Tender Cost and Earnest Money Deposit (EMD) furnished in accordance with **NIT Clause 3.0 & 4.0**.
- ii). All Technical details (eg. Eligibility Criteria requested, Technical Conditions of Contract) should be attached in e-tendering module (**As detailed in Clause 6.0 below**), failing which the tender stands invalid & may be REJECTED.

ii) Price Bid:

- a. Prices are to be quoted as per the Price Bid Form available on e-tender portal.
- b. The price should be quoted for the accounting unit indicated in the e-tender document.
- c. The item description, Quantity and Unit of measurement, as mentioned in Price bid uploaded by BHEL and subsequent revisions issued by BHEL, shall be binding on the bidder.

Note:

- i). It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- ii). A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- iii). A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.
- iv). In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, same shall not be considered.

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V. DO NOT'S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered.

Vendors are also requested to go through bidder manual available on <https://bhel.abcprocure.com>

6.0 DOCUMENTS TO BE UPLOADED & MODALITY OF UPLOADING in E-PROCUREMENT PORTAL <https://bhel.abcprocure.com> SHALL BE AS DETAILED BELOW

SI No	Description	Remarks
	Techno-Commercial Bid CONTAINING THE FOLLOWING:-	
i.	Covering letter / Offer forwarding letter of Tenderer.	Refer "Bidder Manual for BHEL Bidders" available at https://bhel.abcprocure.com
ii.	Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. Note: <ol style="list-style-type: none">1. 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 attached along with document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained.2. BHEL reserves the right to accept / reject the deviations without assigning any reasons, and BHEL decision is final and binding.<ol style="list-style-type: none">(i) In case of acceptance of the deviations, appropriate loading shall be done by	Refer "Bidder Manual for BHEL Bidders" available at https://bhel.abcprocure.com

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	<p>BHEL</p> <p>(ii) In case of unacceptable deviations, BHEL reserves the right to reject the tender.</p>	
iii.	<p>Supporting documents / annexure / schedules / drawing etc as required in line with Pre-Qualification criteria. (Technical & Financial)</p> <p>As detailed in Clause No. 25 of NIT, 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 phone no, FAX no, E-mail ID, etc.</p>	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
iv.	All Amendments / Correspondences / Corrigenda / Clarifications / Changes / Errata etc pertinent to this NIT.	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification / NIT	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
vii.	Notice inviting Tender (NIT)	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
ix.	Volume – I B : Special Conditions of Contract (SCC)	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>
x.	Volume – I C : General Conditions of Contract (GCC)	<p>Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com</p>

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xi.	Volume – I D : Forms & Procedures	https://bhel.abcprocure.com
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only ‘QUOTED’ or ‘UNQUOTED’ against each item	Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com
xiii.	Any other details preferred by bidder with proper indexing.	Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com
		https://bhel.abcprocure.com
Caution to Bidders: -		
The duly signed & stamped copies of Volume – 1 Book 1 & Volume 1 Book 2 are to be attached as a part of your offer, in their respective sections. Also for any further queries, please refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com		

	PRICE BID consisting of the following shall be attached as mentioned below	
i	<p>Price/ Total Amount corresponding to the total works as specified in “Part C: Bill of Quantities” available in “Volume II – PRICE BID (latest Revision) shall be quoted in the Price Bid Form available in e-Procurement portal.</p> <p>Bidders to note that documents uploaded under the Price Bid Form shall be considered for commercial evaluation of offer.</p>	Refer “Bidder Manual for BHEL Bidders” available at https://bhel.abcprocure.com

SPECIAL NOTE:

- i. All documents / annexures submitted with the **offer shall be properly attached / entered / uploaded in the respective sections**. BHEL shall not be responsible for any missing documents.
- ii. **Your offer & documents submitted along with offer shall be signed & stamped in each page by your authorized representative.**

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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:

Bidder's 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 cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -
(Note: For example, if latest bid submission is in Jan 2017, then the 'load' shall be calculated up to and inclusive of Oct 2016)-

Total number of Packages in hand = Load (P)

Where 'P' is the sum of all unit wise identified packages (refer table-1) under execution with BHEL Regions as on the cut off month defined above, including packages yet to be commenced, excepting packages which are on Long Hold.

- II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all 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 and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:
(Note: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table I))

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

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

- a) $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ etc. be the packages (under execution/ executed during the 'Period of Assessment' in all Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = P_T (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
- b) Number of Months 'T₁' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P₁. Similarly T₂ for package P₂, T₃ for package P₃, etc. for the tendered scope. Now calculate cumulative total months 'T_T' for total similar Packages 'P_T' for all Regions (i.e. $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
- c) Sum 'S₁' of 'Monthly Performance Evaluation' Scores (S₁₋₁, S₁₋₂, S₁₋₃, S₁₋₄, S₁₋₅.... S_{1-T1}) for similar package P₁, for the 'period of assessment' 'T₁' (i.e. $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-T1}$). Similarly, S₂ for package P₂ for period T₂, S₃ for package P₃ for period T₃ etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages 'P_T' for all Regions (i.e. ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$.)
- d) **Overall Performance Rating 'R_{BHEL}' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL
Aggregate of Performance scores for all similar packages in all the Regions
= -----
Aggregate of months for each of the similar packages for which performance should have been evaluated in all the Regions
 S_T
= -----
 T_T

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

f) **Table showing methodology for calculating ‘a’, ‘b’ and ‘c’ above**

Sl. No.	Item Description	Details for all Regions								Total
		(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No. of similar packages for all Regions = P _T i.e. 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 Packages (as in row 1)	T ₁	T ₂	T ₃	T ₄	T ₅	...	T _N	Sum (Σ) of columns (iii) to (ix) = T _T	
3	Monthly performance scores for the corresponding period (as in Row 2)	S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , ... S _{1-T1}	S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , ... S _{2-T2}	S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , ... S _{3-T3}	S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , ... S _{4-T4}	S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , ... S _{5-T5}	...	S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , ... S _{N-TN}	-----	
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅	...	S _N	Sum (Σ) of columns (iii) to (ix) = S _T	

ii). Calculation of Overall ‘Performance Rating’ (R_{BHEL}) in case at least 6 evaluation scores for ‘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’

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

- a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
- b) 12 months preceding and including the cut-off month
- c) 24 months preceding and including the cut-off month

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

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

Sl. no.	Overall Performance Rating (R_{BHEL})	Corresponding value of 'L'
1	=60	NA
2	> 60 and \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:

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

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

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Note: For the transition period of 1 year (i.e. for all the NITs floated between 11th May 2019 to 10th May 2020), in addition to above, 'Assessment of Capacity of Bidder' shall also be calculated considering 'performance scores' till 36 months as per Sl. no II ii).

Higher of the results obtained out of both shall be considered for 'Assessment of Capacity of Bidder'.

IV. Explanatory note:

- i). Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I 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, C&I, 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 (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.
- ii). Identified Packages (Unit wise)

Table-1

Civil	Electrical and C&I	Mechanical
<ul style="list-style-type: none">i). Enabling worksii). Pile and Pile Capsiii). Civil Works including foundationsiv). Structural Steel Fabrication & Erectionv). Chimneyvi). Cooling Towervii). Others (Civil)	<ul style="list-style-type: none">i). Electricalii). C&Iiii). Others (Elect. and C&I)	<ul style="list-style-type: none">i). Boiler & Aux (All types including CW Piping if applicable)ii). Power Cycle Piping/Critical Pipingiii). ESPiv). LP Pipingv). Steam Turbine Generator set & Auxvi). Gas Turbine Generator set & Auxvii). Hydro Turbine Generator set & Auxviii). Turbo Blower (including Steam Turbine)ix). Material Management

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x). Others (Mechanical)

iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, 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 completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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 ‘Assessment of Capacity of Bidders’.

iv). Consequent upon applying the criteria of ‘Assessment of Capacity of Bidders’ detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than four, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are “not qualified” as per criteria of ‘Assessment of Capacity of Bidders’ and for this, procedure described in following three options shall be followed:

- a) All the bidders having Overall Performance Rating (R_{BHEL}) ≥ 60 shall be considered qualified against criteria of ‘Assessment of Capacity of Bidders’.
- b) If even after using option “a”, the number of qualified bidders remains less than four, then in addition to bidders considered as per option “a”, “First

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“First timer” bidders having average of available performance scores ≥ 60 upto and including the Cut Off month shall also be considered qualified against criteria of ‘Assessment of Capacity of Bidders’.

- c) If even after using option “a” and “b”, the number of qualified bidders remains less than four, then in addition to bidders considered as per option “a” and “b”, “First timer” bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of ‘Assessment of Capacity of Bidders’.

Note:- In case, the number of bidders qualified against Technical and Financial Qualification criteria itself is less than four, then all bidders (a)- having Overall Performance Rating (R_{BHEL}) ≥ 60 , (b)- First timer” bidders having average of available performance scores ≥ 60 upto and including the Cut Off month, (c)- “First timer” bidders for whom no performance score is available in the system upto and including the Cut Off month, shall be considered qualified against criteria of ‘Assessment of Capacity of Bidders’ for further processing of tender.

- v). ‘Under execution’ shall mean works in progress as per the following:
 - a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages
 - b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages
 - c. Up to Synchronization in all Balance Packages

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

- vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.
- vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 25th of Evaluation Month or 3 days

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after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.

- viii). Project on Hold due to reasons not attributable to bidder -
 - a. **Short hold:** Evaluation shall not be applicable for this period, however Loading will be considered.
 - b. **Long hold:** Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.
- ix). 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 Performance evaluation in Clause 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work.

11.0 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.

12.0 For any clarification on the tender document, the bidder may seek the same in clarification provision available in procurement portal <https://bhel.abcprocure.com> or 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.

13.0 BHEL may decide holding 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

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of pre-bid discussion (PBD) shall also form part of tender.

- 14.0** 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.
- 15.0** Unless specifically mentioned otherwise, bidder's quoted price shall deem to be in compliance with tender including PBD.
- 16.0** Bidders shall submit Integrity Pact Agreement, (Duly signed by authorized signatory who signs in the offer), along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The Integrity pact is to be submitted by Prime Bidder & Consortium / Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder. The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**
- 17.0** 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-1(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.
- 18.0** In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful / Disqualified bidders under intimation to the respective bidders.
- 19.0** Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 20.0** BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com)instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation

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in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. **The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.**

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

- 21.0** On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 22.0** 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.
- 23.0** The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 24.0** Void
- 25.0** The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized

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signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents / proofs, these shall be submitted immediately.

- 26.0 The bidder may have to produce original document for verification if so decided by BHEL.
- 27.0 The offers of the bidders who are under suspension as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site "www.bhel.com < tender notification".
- 28.0 It may be noted that guidelines / rules in respect of 'Suspension of Business dealings' available on BHEL web site "www.bhel.com < **Supplier Registration**", 'Vendor evaluation format', Quality, Safety & HSE guidelines', etc may undergo change from time to time and the latest one shall be followed.
- 29.0 The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.
- 30.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection. All overwriting/cutting, etc., will be numbered by bid opening officials and announced during bid opening.
- 31.0 Integrity commitment, performance of the contract and punitive action thereof:
 - 31.1 Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.
 - 31.2 Commitment by Bidder / Supplier / Contractor:
 - 31.2.1 The bidder / supplier / contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

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31.2.2 The bidder / supplier / contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

31.2.3 The bidder / supplier / contractor will perform / execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business / money / reputation, to BHEL.

If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder / supplier / contractor as per extant guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

32.0 For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract/ PO/ WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and/ or local content in respect of this procurement, same shall be applicable.

33.0 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

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Rev. 01 Dt. 01 Jun 2012; Amendment: 01 Dt. 1st October 2015

f. General Conditions of Contract (GCC) —Volume-1C
Rev. 01 Dt. 01 Jun 2012; Amendment: 03 Dt. 1st October 2015

g. Forms and Procedures —Volume-1D
Rev. 01 Dt. 01 Jun 2012; Amendment: 01 Dt. 1st October 2015

For and on behalf of BHARAT HEAVY ELECTRICALS LTD

Additional General Manager / SCT & Purchase

Enclosure

1. Annexure-1: Pre Qualifying criteria.
2. Annexure-2: Check List.
3. Annexure-3 Technical Pre qualifying criteria.
4. Annexure-4 Annexure to Pre-Qualifying Criteria.
5. Annexure-5 Tender Schedule.
6. ~~Annexure-6~~ Declaration for Reverse auction – Not applicable and need not be submitted.
7. Other documents as per this NIT.

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ANNEXURE - 1 PRE QUALIFYING CRITERIA

JOB	Handling of materials at storage yard, transportation to site, Erection, Testing & Assistance for commissioning and Trial Operation of Main Boiler and its Auxiliaries, Air pre heaters, Ducts and Dampers, Fuel piping, Boiler integral piping, Fans, Mills and Feeders, Rotating equipment, SCR system (Selective Catalytic Reduction), ESP, Auxiliary Boiler and application of Insulation & Refractory, including supply & application of final painting, Fabrication and Erection of Mill Bunker etc. for Unit-5 of 5 X 800MW Yadadri TPS at Veerlapalem Village, Dameracherla Mandal, Nalgonda Dist, Telangana State		
Tender No.	BHEL: PSSR: SCT: 1867		
Sl. No.	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	Page no of supporting document. Bidder must fill up this column as per applicability
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium / Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	Applicable	
B	Technical		
	Refer Annexure 3 for details	Applicable	To be filled in Annexure-4

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C	FINANCIAL		
C-1	Turnover Bidders must have achieved an average annual financial turnover (Audited) of Rs.22,75,00,000/- (Rs. Twenty two Crores seventy five Lakhs only) or more over last three Financial Years (FY) i.e., 2016-17,2017-18 and 2018-19.	Applicable	To be filled in Annexure-4
C-2	Net worth (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive	Applicable	To be filled in Annexure-4
C-3	Profit Bidder must have earned profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1' above.	Applicable	To be filled in Annexure-4
C-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	Applicable	To be filled in Annexure-4
D	Assessment of Capacity of Bidder to execute the work as per Sl. No 9 of NIT (if applicable)	Applicable	By BHEL
E	Approval of Customer (if applicable) <u>Note:</u> Names of bidders who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	Applicable	
F	Price Bid Opening <u>Note:</u> Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E	Applicable	BY BHEL

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G	Consortium criteria (if applicable)	Not Applicable	
	<p><u>Explanatory Notes for the PQR (unless otherwise specified in the PQR):</u></p> <ol style="list-style-type: none"> 1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures. 2. In case audited financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years. 3. If Financial Statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant. 4. C-2:- NET WORTH: Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth =Paid up share capital* + reserves (* Share capital OR Partnership Capital OR Proprietor Capital as the case may be) (Net worth is required to be evaluated in case of companies). 5. C-3:- PROFIT : shall be PBT earned during any one year of the three financial years as in C-1 above 6. For Evaluation of PQR, the credential of the Bidder alone, and not that of the Group Company shall be considered. 7. Completion date for achievement of the technical criteria specified in the Common QR should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. 8. Boiler means HRSG or WHRB or any other types of Steam Generator 9. Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass. 10. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation. 11. In case the experience/PO/WO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply 		

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and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI.

12. Scope for capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine.
13. In case the tendered scope is not a Pulverized Fuel Bidder, experience of Oil/Gas Fired Boilers can be considered unless otherwise specifically indicated in the PQR.

Note:

- 1) **BIDDER SHALL SUBMIT PRE-QUALIFICATION CRITERIA FORMAT (Refer Annexure-4), DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK ORDER AND WORK COMPLETION CERTIFICATE ETC. IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.**
- 2) **Authenticity of Credentials submitted by the Bidder against 'Pre-Qualifying Criteria' shall be verified from the Issuing Authority, by BHEL. In case, any credential(s) is/are found to be unauthentic, offer of the bidder is liable to be rejected. BHEL reserves the Right to Initiate any further action as per the "Guidelines for Suspension of Business Dealings with Suppliers/Contractors" (Published in http://www.bhel.com/vender_registration/vender.php) and "Fraud Prevention Policy" (Published in <http://www.bhel.com/home.php>) as applicable**

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ANNEXURE - 2

CHECK LIST

NOTE: - Tenderers are required to either fill in or submit separately the following details. No column should be left blank.

1	Name of the Tenderer		
	Address of the Tenderer		
2	Details about type of the Firm / Company		
3a	Details of Contact person for this Tender: Name: Mr. / Ms. Designation: Telephone No/ Mobile No: E-mail ID:		
3b	Details of alternate Contact person for this Tender: Name: Mr. / Ms. Designation: Telephone No/ Mobile No: E-mail ID:		
4	EMD DETAILS <i>(Remittance of EMD should be in line with Mode of Deposit as detailed in Vol 1A, Part-2, Chapter-1)</i> a. Cash portion of EMD – online payment/ DD/ Cheque (Minimum Rs 2 Lakhs) b. Balance portion of EMD	a. Mode of Remittance: Ref No: Date : Amount: b. Mode of Remittance: Ref No Date :	
5	Validity of Offer	To be valid for six months from due date	
		Applicability (By BHEL)	Bidder Reply
6	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE-I & ANNEXURE-IV) is understood and filled with proper supporting documents referenced in the	Applicable	Yes/ No

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	specified format		
7	Submission of Copy of Balance sheet and Profit and Loss Account for the last three years (Refer “Explanatory Note for the PQR” in Annexure 1 of NIT)	Applicable	Yes/ No
8	Submission of Copy of PAN Card	Applicable	Yes/ No
9	Whether all pages of the Offer Documents are signed by the person authorized to sign this offer	Applicable	Yes/ No
10	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	Yes/ No
11	Submission of Integrity Pact	Applicable	Yes/ No
12	Submission of Declaration by Authorized Signatory	Applicable	Yes/ No
13	Submission of No Deviation Certificate	Applicable	Yes/ No
14	Submission of Declaration confirming knowledge about Site Conditions	Applicable	Yes/ No
15	Submission of Declaration for relation in BHEL	Applicable	Yes/ No
16	Submission of Non-Disclosure Certificate	Applicable	Yes/ No
17	Submission of Copy Bank Account Details for E-Payment	Applicable	Yes/ No
18	Submission of Capacity Evaluation of Bidder for current Tender	Applicable	Yes/ No
19	Submission of Tie Ups / Consortium Agreement are submitted as per format Form F22 of Book-II Vol-1D	Not Applicable	Yes/ No
20	Submission of Power of Attorney for Submission of Tender / Signing Contract Agreement	Applicable	Yes/ No
21	Submission of Analysis of Unit rates	Applicable	Yes/ No
22	Submission of Unquoted Price Bid	Applicable	Yes/ No
23	Tabular column showing Category-wise, month wise, man power deployment sub package wise planned for the execution of the scope of works.	Applicable	Yes/ No

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24	Declaration by bidder for price opening through Reverse Auction (Refer Annexure-6 of Notice Inviting Tender)	Not Applicable	Yes/ No
25	Copy of Organization Chart	Applicable	Yes/ No
26	Copy of Registration / Incorporation certificate, Partnership Deed (Certified by Notary Public) as applicable for firm.	Applicable	Yes/ No
27	Undertaking as per Financial C 4 Criteria of Annexure 1 of NIT regarding Bankruptcy Code Proceedings (IBC)	Applicable	Yes/ No

NOTE:

1. STRIKE OFF 'YES' OR 'NO', AS APPLICABLE.
2. TENDER NOT ACCOMPANIED BY THE PRESCRIBED **ABOVE APPLICABLE DOCUMENTS** ARE LIABLE TO BE SUMMARILY REJECTED.
3. For Sl. No.11 to 21 above, the formats are available in "Volume ID of Volume I Book-II – Forms and Procedures" of this tender specification.

DATE:

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

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Annexure-3

B Technical Pre-Qualification Criteria

The bidder as standalone bidder should have executed Erection and commissioning of at least one Boiler (consisting of “Pressure Parts” and Structure of same unit) of a unit rating of 400 MW or higher in a Thermal Power plant in the last seven years ending on the latest date of bid submission of tender irrespective of date of the start of work.

Note: 1. The term Executed in Technical PQR means achievement of the milestone Boiler Light up.

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ANNEXURE - 4

Additional Format to be submitted by Bidders in an additional separate cover superscribed "Annexure to Pre-Qualifying Criteria".

Name of the Bidder:

M/s.....

Sl. No.	PQR Ref	PQR (Reproduced from Annexure – 1)	Qualifying Experience	Work order Ref with page no in Offer for supporting documents	Completion certificate ref for the referred Work with page no in Offer for supporting documents	Details of work with Project, Unit, Quantity / rating & Period	Remarks
1	Technical B:						
		The bidder as standalone bidder should have executed Erection and commissioning of at least one Boiler (consisting of "Pressure Parts" and Structure of same unit) of a unit rating of 400 MW or higher in a Thermal Power plant in the last seven years ending on the latest date of bid submission of tender irrespective of date of the start of work. Note: 1. The term Executed in Technical PQR means achievement of the milestone Boiler Light up					

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Sl. No.	PQR Ref	PQR (Reproduced from Annexure – 1)	Qualifying Experience	Work order Ref with page no in Offer for supporting documents	Completion certificate ref for the referred Work with page no in Offer for supporting documents	Details of work with Project, Unit, Quantity / rating & Period	Remarks
2	<u>Financial C1</u>	TURNOVER Bidders must have achieved an average annual financial turnover (Audited) of Rs.22,75,00,000/- (Rs. Twenty two Crores seventy five Lakhs only) or more over last three Financial Years (FY) i.e. 2016-17, 2017-18 and 2018-19					
3	<u>Financial C2</u>	NET WORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive					
4	<u>Financial C3</u>	PROFIT Bidder must have earned profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1' above.					
5	<u>Financial C 4</u>	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.					

Note:

1. Non submission of this additional format will make the bid liable for rejection.
2. Indicate the page nos in the respective columns for the enclosed PQR supporting documents in the offer

NOTICE INVITING TENDER

ANNEXURE-5

Tender Schedule

Description	Schedule	Remarks
Technical Bid Opening	As mentioned in Notice Inviting Tender.	
Communication from BHEL for Clarifications, if any, required by BHEL	Within Three days from tender opening date	
Last date for Bidders to submit the clarifications / documents required	Within Six days from tender opening date	Bidders to note that their competent representative to be readily available in this week for offering clarifications / submitting the further documents, if any, required.
If Reverse Auction is applicable, then the tentative date for conducting Reverse Auction	Within Ten days from tender opening date	Reverse auction is not applicable

Note:

1. Bidders to note that the above schedule should be adhered to and no further extension will be given. To adhere to the schedule indicated below, Bidders should ensure the adequacy of the documents submitted in their offer, with proper validation.

VOLUME – IA
Part I & II

TECHNICAL
CONDITIONS OF
CONTRACT
(TCC)



TECHNICAL CONDITIONS OF CONTRACT (TCC)

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VOLUME - IA PART – I CHAPTER – I

PROJECT INFORMATION

5X800 MW SETS AT YADADRI TPS

1	Name of the Project	YADADRI Thermal Power Station
2	Station Capacity	5X800 MW (Coal based)
3	Owner	Telangana State Power Generation Corporation Limited (TSGENCO)
4	Site Location	Site is located 7 km from the NH565 (SH2). Veerlapalem village, Dameracherla Mandal, NALGONDA DISTRICT, TELANGANA STATE
5	Latitude	16° 42'20.40 N
6	Longitude	79° 34'41.56 E
7	Nearest Town	30 Km Miryalaguda
8	Nearest Railway Station	6.5 Km Damercherla
9	Nearest Airport	130 Kms (Vijayawada)
10	Site Conditions	
	Ambient Temperature	
	Daily minimum (average)	10°C
	Daily maximum (average)	47°C
	Design Ambient Temperature	50°C
	Ambient temperature (performance)	38°C
	Relative Humidity for design / efficiency	48-84 %
	Annual rainfall, mm	600 mm
	Plant Elevation above MSL	85 m above MSL
	Mean Wind Speed	8 km/h
	Wind Pressure	As per the latest revision of IS 875/1987
	Seismic co-efficient	Zone-II as per IS- 1893 (Part-IV)

VOLUME-IA PART-I CHAPTER – II

SCOPE OF WORKS

The scope of work shall comprise but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

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

1.2.1. The scope of work are as follows:

Handling of materials at storage yard, transportation to site, Erection, Testing & Assistance for commissioning and Trial Operation of Main Boiler and its Auxiliaries, Air pre heaters, Ducts and Dampers, Fuel piping, Boiler integral piping, Fans, Mills and Feeders, Rotating equipment, SCR system (Selective Catalytic Reduction), ESP, Auxiliary Boiler and application of Insulation & Refractory, including supply & application of final painting, Fabrication and Erection of Mill Bunker etc. for Unit-5 of 5 X 800MW Yadadri TPS at Veerlapalem Village, Dameracherla Mandal, Nalgonda Dist, Telangana State.

1.2.2 The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or pre-assembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipments at the pre-assembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, steam / air blowing, light up, chemical cleaning, passivation, steam blowing and safety valve floating including inter connection of all the termination points, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs of the Boiler & Aux, Rotating Equipments, SCR system (Selective Catalytic Reduction), ESP, Auxiliary Boiler with chimney and application of Insulation & refractory, supply and application of preservative & final painting and Mill Bunker Structure ***including obtaining statutory clearances if any***, for Unit-5 of 5 X 800MW Yadadri TPS at Veerlapalem Village, Dameracherla Mandal, Nalgonda Dist, Telangana State. The bidder shall visit the site and study the total area before quoting.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- 1.2.3 The quantities indicated in the tender specification are approximate and are liable for variation and alteration at the discretion of BHEL. The quoted unit rate shall be applicable for any additional product group also, if included at a later date integral to the main scope of work / package envisaged. The work executed shall be measured and priced as per the unit rate arrived at for each work area as mentioned in the relevant clauses.
- 1.2.4 The PG wise breakup of Boiler and Auxiliaries, Rotating Machinery, SCR, ESP, Auxiliary Boiler, etc are indicated in Chapter-IX, but the contractor is required to erect actual tonnage which may be necessary to complete the work in all respects as detailed in the tender specifications, for which payments shall be released on finally settled rates. Similarly, the Bill of Quantities (BOQ) for fabrication and erection of Mill Bunker is indicated in the Price Schedule. The qty, weights and dimensions of material shown are approximate and are liable to vary. No increase in quoted / accepted rates / prices shall be allowed due to change in weights and dimensions of the equipment / materials.
- 1.2.5 The BOQ quantities and weights given in the Volume-II (Price Bid) are approximate and these are subject to change as per site conditions.
- 1.2.6 During the course of execution of work, certain rework / modification / rectification / repairs / fabrication etc will be necessary on account of feedback from various relevant source, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours etc as applicable shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per conditions of contract and payments will be released as per the agreed rates.
- 1.2.7 Resources like manpower including Supervisors / Engineers, T&P, consumable etc shall be provided by the contractor for this scope of work. All the expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.
- 1.2.8 It shall be specially noted that the contractor's labour and staff may have to work round the clock to meet the completion schedules / plans, which may involve payment of considerable overtime. The contractor's quoted rates should be inclusive of all such contingencies.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.2.9 The terminal points can be inferred from the relevant drawings and any further clarifications can be obtained/decided by BHEL and that is **final and binding** on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals. Carrying out work as per the specification between equipments constituting terminal points, whether the terminal equipments fall within the scope of work/specification, contractor shall carry out the terminal joints at either end. Also, where the piping connection to the terminal points involve flanged joints, matching of flanges, fixing gaskets, welding, bolting and tightening as per BHEL Engineers instructions is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, within the quoted rate.

1.2.10 The contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.

1.2.11 The work shall conform to dimensions and tolerances given in various drawings and quality manuals provided by BHEL. If any portion of work is found to be defective in workmanship not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost, failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be effected from contractor's bill towards expenditure incurred including BHEL's overhead charges.

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

1.2.13 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The erection manuals for boiler pressure parts, structures ESP, etc., which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any failure to comply with the above might lead to rework and the cost for the same shall be borne by the contractor only. BHEL engineer, depending upon the availability of materials, fronts etc., will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- 1.2.14 Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less/more at a particular given time. Activities and erection program have to be planned in such a way that the milestone events like boiler light up, steam blowing, SV Floating, Coal Firing, etc., are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.
- 1.2.15 No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

1.2.16 For Fabrication and Erection of Bunker Structures

- 1.2.16.1 The works to be performed under this contract consist of providing all labour, supervision, material as indicated in BOQ / Price bid, scaffolding, construction equipment's, tools and plants, temporary works, supplies including POL (Petrol, Oil & Lubricants), transportation and all incidental items not shown or specified but reasonably implied or necessary for the proper completion of work in all respects. Testing of all materials, preparation of fabrication drawings etc. are included on the rates of items of work. Works shall only be carried out with approved structural fabrication drawings. Steel required for fabrication will be provided by BHEL free of cost.
- 1.2.16.2 Only basic structural drawing will be provided to the contractor by BHEL. Contractor shall prepare detailed engineering structural and fabrication drawings and get approval from BHEL before fabrication and erection of the same respectively. The cost of preparation of the drawings shall be within the quoted rates of the contract
- 1.2.16.3 All the works areas shall be adequately flood lighted to the satisfaction of the Engineer-in-Charge when the work is in progress during the night shifts.
- 1.2.16.4 The unit rates shall include all material equipment, fixtures, labour, construction T&Ps, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.
- 1.2.16.5 The unit rates quoted for various items of Rate Schedule shall include all the stipulations mentioned in technical specifications and nothing extra over Rate Schedule rates shall be payable.
- 1.2.16.6 Drawings showing enough details for the construction as per the specification shall be furnished to the contractor in a phased manner.

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1.2.16.7 The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications.

1.2.17 Ammonia Flue Gas injection system (AFGCS)

Typical scope of erection and commissioning in AFGCS is provided below for your information.

- 1.2.17.1 Pipes, Pipe fittings, Valves, Pipe supports etc. are to be erected for conveying Ammonia gas along with air into the ESP inlet ducting system (1" Sch. 40 SS pipes, 3" & 4" Sch. 40 pipes are used for above purpose). (PG MA: AI-101)
- 1.2.17.2 Air blowers have to be erected in situ with foundation bolts, base frames and anti-vibration pads. Blower components like Silencer, suction hood, outlet damper are to be assembled at site. (PG MA: AI- 105)
- 1.2.17.3 Two sets of Ammonia gas header assembly (1.5" SS pipe) has to be erected with valves and necessary supports. High pressure weld quality shall be ensured considering safety of the system. (PG MA: AI-104)
- 1.2.17.4 Gas piping with necessary supports, & clamps, pipe fittings, valves, instruments like Pressure reducing valve, Flow control valve, Rota meter, etc. are to be installed as part of Ammonia piping routing connecting the Gas header assembly with flanges leading to duct platform elevation (PG MA: AI-102)
- 1.2.17.5 Both air piping & Gas piping (4-inch Sch. 40 Carbon steel and Gas piping of 1-inch Sch. 40 Carbon steel) has to be erected from ground to duct elevation as per the erection drawing. (PG MA: AI-102)
- 1.2.17.6 Gas pipe (1 inch) is to be connected to Air piping and Rota meter is to be installed in the pipe line. Rota meter has to be placed with necessary supports & clamps at suitable location near duct to ensure easy access to the instrument for observation and maintenance. (PG MA: AI-102)
- 1.2.17.7 Injection probe assembly and header are to be erected at ESP inlet duct elevation. Care shall be taken to ensure proper erection of probes by ensuring straightness, levels and orientation of the nozzles as per the drawing. Necessary supports for the injection probes in the duct are to be welded as per the drawing. These probes are to be connected to Air Gas header with flanges with gaskets and fasteners to ensure leak proof flanged joints. Individual injection probes are envisaged as flanged joints with common header. (PGMA:AI-103)

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1.2.17.8 Approach platforms and ladders are to be erected for the Injection probe assembly's operation & maintenance. (PG MA: AI-203)

1.2.17.9 Movable trolleys are supplied with a capacity to hold eight cylinders. Each cylinder outlet is to be connected with tubing / metallic hose to the respective header as indicated in the erection Drg. Care shall be taken to ensure leak proof jointing. (PGMA:AI 201)

1.2.17.10 Water sprinkler arrangement to be erected and piping for this system will be just above the gas header assembly as shown in the erection drawing. Necessary plugs are to be welded in the pipe for mounting the Nozzles at the bottom of the pipe as indicated in the drawing. Additional plugs and Nozzles are envisaged to ensure adequate water spraying over ammonia cylinders with 100% coverage. 2"Sch 40 pipes, pipe fittings, 2" gate valve to connect to the incoming water line and necessary supports/clamps are envisaged in this PGMA. (PGMA:AI-202)

1.2.18 Roof Insulation

Insulation of E.S.P inner roof shall be applied before outer roof is placed. The work to be carried out as per the drawing and within the quoted rates.

1.2.19 Refractory and Thermal insulation

Refractory application (Castable& Pourable) in the Boiler furnace pent house, Goose neck, etc., Thermal insulation and cladding will be provided for the entire steam generator, flue gas / air ducting, SCR, ESP etc. The insulation selected will meet the functional requirement. The steam generator will be provided with ribbed aluminium cladding and the ducts will have plain aluminium cladding. Respective weight schedule may be referred for further details.

1.2.20 **Painting:** The scope of work shall include supply and application of touchup, preservative and final painting for all the components under the scope of work for the Boiler & ESP equipments and applicable painting as per the contract for the Mill Bunker works.

Note:

1. FOR FURTHER DETAILED SCOPE OF WORKS, REFER RELEVANT CHAPTERS IN THIS BOOK.

The bidder should visit site and acquire full knowledge & information about site conditions. 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.

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VOLUME IA PART – I CHAPTER – III

FACILITIES IN THE SCOPE OF CONTRACTOR / BHEL

(SCOPE MATRIX)

SI No.	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1	PART I			
1.3.1.1	ESTABLISHMENT			
1.3.1.1.1	FOR CONSTRUCTION PURPOSE:			
1.3.1.1.1.1	Open space for office	Yes		Free
1.3.1.1.1.2	Open space for storage	Yes		Free
1.3.1.1.1.3	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
1.3.1.1.1.4	Bidder's all office equipments, office / store / canteen consumables		Yes	
1.3.1.1.1.5	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
1.3.1.1.1.6	Firefighting equipments like buckets, extinguishers etc		Yes	
1.3.1.1.1.7	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.3.1.1.2	FOR LIVING PURPOSES OF THE BIDDER			
1.3.1.1.2.1	Open space	Yes		
1.3.1.1.2.2	Living accommodation		Yes	
1.3.1.2	ELECTRICITY			
1.3.1.2.1	<i>Electricity of Voltage 415 / 440 V For construction purposes</i>			
1.3.1.2.1.1	Single point source	Yes		Free
1.3.1.2.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	
1.3.1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

SI No.	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.3.1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	Calibration certificate to be provided
1.3.1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.3.1.2.2.4	Living facilities for office use including charges		Yes	
1.3.1.2.2.5	Demobilization of the facilities after completion of works		Yes	
1.3.1.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	Refer the relevant clauses elsewhere in this tender
1.3.1.3	WATER SUPPLY			
1.3.1.3.1	For construction purposes:			
1.3.1.3.1.1	Making the water available at single point	Yes		Free
1.3.1.3.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.3.2	Water supply for bidder's office, stores, canteen etc			
1.3.1.3.2.1	Making the water available at single point	Yes		
1.3.1.3.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.4	LIGHTING			
1.3.1.4.1	For construction work (supply of all the necessary materials) At office storage area At the preassembly area At the construction site /area		Yes	

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SI No.	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.4.2	For construction work (Execution of the lighting work / arrangements) At office storage area At the preassembly area At the construction site /area		Yes	
1.3.1.5	COMMUNICATION FACILITIES for site operations of the bidder			
1.3.1.5.1	Telephone, Fax, internet, intranet, email etc		Yes	
1.3.1.6	COMPRESSED AIR SUPPLY			
1.3.1.6.1	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc	-	Yes	
1.3.1.6.2	Installation of above system and operation & maintenance of the same	-	Yes	
1.3.1.6.3	Supply of the all the consumables for the above system during the contract period	-	Yes	

SI No.	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.2	PART II			
1.3.2.1	ERCTION FACILITIES			
1.3.2.1.0	Engineering works for construction	Yes		
1.3.2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		
1.3.2.1.2	Drawings for construction methods		Yes	
1.3.2.1.3	As-built drawings – wherever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	
1.3.2.1.4	Shipping lists etc for reference and planning the activities	Yes		In consultation with BHEL
1.3.2.1.5	Preparation of site erection schedules and other input requirements		Yes	

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SI No.	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments		Yes	
1.3.2.1.7	Weekly erection schedules based on SI No 1.3.2.1.5		Yes	
1.3.2.1.8	Daily erection / work plan based on SI No 1.3.2.1.7		Yes	
1.3.2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
1.3.2.1.10	Preparation of preassembly bay		Yes	
1.3.2.1.11	Laying of racks for gantry crane if provided by BHEL or brought by the contractor / bidder himself			Not applicable

1.3.3 OPEN SPACE:

- 1.3.3.1 Minimum Open space will be provided at free of charges to the contractor within the plant premises or adjacent to the plant boundary for construction of temporary office shed, contractor's stores shed(s). Contractor shall adopt pre-engineered / pre-fabricated constructions made of steel with single / double skin, insulated for un- insulated roof and wall coverings (fabricated out of permanently color coated metal sheets) for his site office, covered store or any other temporary building. Alternatively, contractor can adopt readymade 'porta cabin" or similar construction.
- 1.3.3.2 Only Land for Labour colony and staff colony will be provided by BHEL adjacent to the plant boundary to contractor at free of cost. Contractor has to make labour colony and residential accommodation to his staff at his cost.
- 1.3.3.3 Contractor has to furnish along with their offer, the details of requirements of area of space for his office, stores, storage shed, labour colony etc.
- 1.3.3.4 Location and area requirement for office/storage sheds/ fabrication yard shall be discussed and mutually agreed to.

1.3.4 ELECTRICITY:

The construction power (415V) will be provided at a single point for construction purpose free of charge. Construction power shall be provided

TECHNICAL CONDITIONS OF CONTRACT (TCC)

from the nearest Substation / tapping point within the plant premises. For the purpose of measurement of power consumed, the contractor shall provide Energy meter with valid calibration certificate. Distribution from this source to different locations is to be arranged by the bidder at his cost.

- 1.3.4.1 Electricity for labour colony and staff colony will be provided at single point on chargeable basis at the prevailing rate of TSGENCO. Distribution from this source to different locations is to be arranged by the bidder at his cost.
- 1.3.4.2 Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards to contractor's office shed also, all such expenditure shall be borne by the contractor. Demand charges if any to be borne by the contractor
- 1.3.4.3 Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.
- 1.3.4.4 BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage / frequency or interruptions in power supply.
- 1.3.4.5 Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.8 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.

1.3.5 CONSTRUCTION WATER

- 1.3.5.1 Water (Raw water) shall be provided by BHEL at one point within the plant premises free of charge for construction purpose and bidder has to make their own arrangement for further distribution by arranging required pipes, valves, pumps, etc.
- 1.3.5.2 Water (Raw water) for labour colony and staff colony shall be provided at single point on chargeable basis at the prevailing Government Tariff and bidder has to make their own arrangement for further distribution by arranging required pipes, valves, pumps, etc.
- 1.3.5.3 In case of non-availability of water, the contractor shall make his own arrangements for uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply. Contractor has to make his own arrangements for his water requirement for his labour colony at his cost.

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1.3.6 DRINKING WATER

1.3.6.1 Bidder shall provide drinking water at their cost.

1.3.7 ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM [SCMS]:

Contractor has to provide minimum 2 computers [along with one operator per PC] for online material management, reporting of daily progress, billing and other similar activities, within the quoted rate. Computers shall have minimum configuration of Windows 7 OS, 4GB RAM and Internet Explorer 8 or above.

1.3.8 CONSUMABLES:

- 1.3.8.1 Such of those consumables as indicated as consumables provided by BHEL alone will be provided to the contractor by BHEL free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.
- 1.3.8.2 All the required electrodes (in his scope) as approved by BHEL & Customer shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding, suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.
- 1.3.8.3 TIG welding wires for CS, AS & SS welding and Electrodes for P91 welding will be supplied by BHEL free of cost for applicable Boiler Pressure Parts as provided by BHEL manufacturing units. All other electrodes including stainless steel electrodes required for the scope of work under this tender shall be arranged by the contractor at his cost. The bidder shall use the Customer approved quality welding electrodes only. The utilization of the TIG welding wires issued by BHEL shall be duly accounted for exercising maximum care and ensuring economical usage for minimum wastage. If during erection, it is found that the consumption of filler wire is more than the actual requirement due to improper usage, the cost for the additional quantity so consumed shall be recovered from the contractor.
- 1.3.8.4 The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and

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pre-assembly materials, hardware items etc required for temporary works such as supports, scaffoldings, bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

1.3.8.5 All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.

1.3.9 MATERIAL SUPPLY:

BHEL will supply the materials/equipments indicated in the weight schedule from their respective manufacturing units which are to be executed/incorporated in the permanent system. In addition, the material such as lube oil, grease, Ammonia required for commissioning the erected equipments and chemicals required for chemical cleaning of equipments will be supplied free of cost by BHEL. Raw material will be supplied by BHEL for fabrication and erection of Mill Bunker works.

1.3.10 POSSESSION OF GENERATORS

As there are bound to be interruptions in regular power supply, power cut/load shedding in any construction sites, suitable extension of time, if found necessary only be given and contractor is not entitled for any compensation. It shall be the responsibility of the tenderer / contractor to provide, and maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be responsibility of the contractor to have one generator set to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderers. This may also be noted while quoting.

1.3.11 LIGHTING FACILITY:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly yard and contractor's material storage area etc. at his cost.

1.3.12 GASES:

1.3.12.1 All the required gases like Oxygen / Acetylene / argon /Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non- availability of gases cannot be considered as reason for not attaining the required progress.

1.3.12.2 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

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1.3.12.3 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

1.3.12.4 The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.

1.3.13 ELECTRODES SUPPLY AND STORAGE

1.3.13.1 **The bidder shall use the Customer approved quality welding electrodes only.**

1.3.13.2 It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL, details regarding type of electrodes, batch number and date of expiry etc.

1.3.13.3 Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate.

1.3.13.4 Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at their own cost by the contractor.

1.3.13.5 All low hydrogen electrodes shall be baked / dried in the electrode drying oven (range 375 deg. C - 425 deg. C) to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at his cost.

1.3.13.6 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.

1.3.13.7 BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

1.3.14 OTHER FACILITIES

1.3.14.1 Adequate water less urinals [at least 2 nos per level at suitable locations] shall be arranged by the contractor within quoted rates, at site of construction at different level and different areas like Boiler, ESP, with proper disposal arrangement.

1.3.15 BID DRAWINGS

Bid drawings published in this tender specification are for information and

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this may get revised during execution.

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T&Ps and MMEs TO BE DEPLOYED BY CONTRACTOR PER PACKAGE

1.4.1 The following minimum major Tools & Plants (T&P) shall be arranged by the Contractor for execution of items mentioned in Chapter IX of Technical Conditions of Contract including Bunker of this tender within the quoted rate.

Sl.No.	Description	Quantity	Deployment Duration
1	150 T Crawler Crane	2Nos.	One crane to be made available at Boiler from 2nd month of commencement of Boiler erection work to till completion of all physical works which require this capacity as decided by Engineer Incharge. Second crane to be made available at ESP from the start of ESP erection till completion of all physical works which require this capacity as decided by Engineer Incharge.
2	75 T Crawler Crane	2 Nos.	First crane to be made available at site from the Commencement of Boiler erection work to till completion of all physical works which require this capacity as decided by Engineer Incharge. Second crane to be made available from 3rd month from the start of Boiler erection work to till completion of all physical works which require this capacity as decided by Engineer Incharge

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Sl.No.	Description	Quantity	Deployment Duration
3	40 T Crawler Crane	2 Nos.	Each crane shall be made available at site from commencement of work till completion of all physical works which require this capacity as decided by Engineer Incharge
4	8 T to 14T Mobile Crane	As required (Minimum 4 nos.)	As per the site requirement
5	Trailer -60T	1 No.	the site requirement
6	Trailer -30T	1 No.	the site requirement
7	Trailer -Greater than 60T	01	the site requirement
8	Diesel Generator set of suitable capacity as decided by BHEL Engineer at site	1 No.	To be provided as stand by arrangement for P91 welding. Required operator and fuel are to be arranged by the contractor.
9	Passenger cum Goods Lift of min1000 Kgs capacity	1 Nos	To be made available for operation from 5th month from the start of Boiler erection work and maintained in operational condition till the end of contract period and extended period if any.
10	Boiler furnace inside maintenance platform (Sky Climber or equivalent make)	02 Nos	As per the site requirement
11	Resistance Heating Based Local PWHT Equipment with Flexible Ceramic Pad	6 Nos	As per the site requirement
12	Tube Expander for Aux Boiler	1 No	As per the site requirement

1.4.2 In the event of non-mobilisation of Tools, Plants, Machinery, Equipment, Material or non-availability of the same owing to breakdown and as a result

TECHNICAL CONDITIONS OF CONTRACT (TCC)

progress of work suffered, BHEL reserves the right to make alternative arrangement (available or higher capacity) in line with SCC clause no. 4.2.1. 7 and hire charges shall be applicable as under:

i) **BHEL provides its own Capital T&P:** If BHEL provides owned T&P then BHEL, hire charges (as per BHEL norms) will be recovered from the contractor as per the prevailing BHEL Corporate hire charges applicable (as enclosed in Volume I Book I TCC- Volume 1A Part II) as per following cases:

- In case the T&P is specifically listed in “T&Ps to be deployed by Contractor”, ‘Rates of hire charges applicable to outside agencies other than contractors working for BHEL’ will apply.
- In case the T&P is not specifically listed in “T&Ps to be deployed by Contractor”, ‘Rates of hire charges applicable to contractors working for BHEL’ will apply.

The hire charges of Capital Tools & Plants are exclusive of operating expenses e.g., Operator, fuel & Consumables and the same shall be arranged by the contractor at his cost.

ii) **BHEL provides hired T&P:** In all cases other than that specified in SI No. i above, actual expenses incurred by BHEL along with applicable overheads will be back-charged to the contractor.

- 1.4.3 All the tools and plants required for this scope of work including the above, except the Tools & Plants provided by BHEL are to be arranged by the contractor within the quoted rates. Which includes the T&Ps viz. Blast cleaning accessories with compressor along with Corrugated Galvanised Iron shed, Painting Equipment along with accessories, Plate Bending machine, Ultrasonography machine required for bunker structural works.
- 1.4.4 For loading, transportation, unloading, all necessary T&P such as Trailers, Cranes, Winches, Welding Machines, slings, jacks, sleepers, rails etc., are to be arranged by the contractor within the quoted rates.
- 1.4.5 Material handling including loading, transportation, & unloading of heavier Boiler, APH components / equipments like Ceiling girders, large dia pipes, Dampers & Gates, bunker, etc., the contractor has to make his own arrangements by deploying the required T&Ps at his cost. BHEL will not provide any crane / T & Ps for the above components.
- 1.4.6 The contractor has to furnish a list of Tools and plants including cranes / tractors / trailers / trucks etc which he has proposed to deploy for this work.
- 1.4.7 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes. **The crane load test has to be conducted as per statutory guidelines before deployment.**

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- 1.4.8 The contractor shall arrange crane operator, diesel, petrol and other consumables required for the tools and plants, equipments etc. Preventive and routine maintenance of T & P are also to be arranged by the contractor at his cost without any delay. Required number of experienced mechanics and helpers for routine maintenance of the above cranes shall be provided by the contractor within his quoted rate.
- 1.4.9 The contractor has to supply, erect and maintain the **passenger cum goods lift (temporary lift)**, as per instruction of BHEL Engineer. Civil Foundation, necessary grouting including supply of grout materials shall be in the scope of the bidder. The operation and maintenance shall be carried out during the deployment period at his cost. The contractor has to arrange operators, technicians for round the clock operation at his cost. The lift facility shall be used by BHEL/Customer/other Contractors as per the requirement as decided by BHEL.
- 1.4.10 Also refer following clauses published in Technical conditions of Contract Volume IA (Volume I Book I):
 - 1.4.10.1 Clause no 1.3.7 on SCMS in chapter III
 - 1.4.10.2 Clause no 1.5.4 on steel plates for crane movement in chapter V
 - 1.4.10.3 Clause no 1.5.5 on consumables for induction heating machine in chapter V
 - 1.4.10.4 Clause no 1.5.6.1 on crane operator and mechanic in chapter V
 - 1.4.10.5 Clause no 1.5.7 on replacement of spares for BHEL's T & P in chapter V
 - 1.4.10.6 Clause no 1.5.8 on annealing cable in chapter V
 - 1.4.10.7 Relevant clauses in Volume 1A -Special Conditions of Contract (SCC) shall also be referred.
- 1.4.10.8 *For uniform heating and better closed loop control, pre heating, post heating, controlled rate of heating & cooling and post weld heat treatment cycles for tube specifications SA213T91 & SA213T92 should be carried out using flexible ceramic pads with suitable heating machines.*
- 1.4.11 **FACILITY TO BE PROVIDED BY THE CONTRACTOR FOR P91 WELDING**
 - 1.4.11.1 Required no of operators/ Technicians/ Electrician for installation, commissioning & operating continuously all the equipments including the Induction Heating Machines.
 - 1.4.11.2 Gas Burners arrangement with required gas for maintaining temperature in the event of power failure.
 - 1.4.11.3 Ultrasonic Flaw detector with recording device & complete accessories (Digital Type – Krautkramer Model USN 50 or equivalent) capable of storing calibration data. All recordable indications will be stored in memory

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of digital flaw detector and in PC (to be provided by the contractor) for review at later period.

1.4.11.4 GE or Kraut Kramer or Microdur make or reputed brand ultrasonic hardness testing machine (Ultrasonic contact impedance (UCI)) or equivalent portable hardness tester.

1.4.11.5 MPI/LPI Kits with required consumables.

1.4.11.6 Only One set of Annealing cable for the entire scope of works of this contract for Induction Heating Equipments will be provided by BHEL. Additional requirement of annealing cables is to be arranged by the contractor within the quoted rates.

1.4.11.7 Digital Temperature Indicator.

1.4.11.8 Consumables

- 1.4.11.8.1 Glass fibre cloth – 1mm x 1000mm – Temp rating – 1260 °C.
- 1.4.11.8.2 Glass fibre cord – Dia 3mm (twisted) Temp rating – 1260 °C.
- 1.4.11.8.3 Ceramic fibre Blanket – RT Grade, density 96Kg/M³ - Temp rating – 1260 °C.
- 1.4.11.8.4 Ceramic fibre rope – Fibre Glass braided, Dia 12mm - Temp rating – 1260 °C.
- 1.4.11.8.5 K Type Thermocouple – 0.5mm Dia Single Strand individual fibre glass insulated.
- 1.4.11.8.6 Heavy duty TC connectors for - K Type Thermocouple – 0.5mm Dia Single Strand individual fibre glass insulated.
- 1.4.11.8.7 All other consumables/ equipments required to carry out the work.

1.4.12 CRANE OPERATOR

1.4.12.1 Must be capable of independently operating Hydraulic/Mechanical Crawler / Tyre mounted Cranes of respective categories.

1.4.12.2 Must have minimum 2 years' experience in Operation of Hydraulic/Mechanical Crawler / Tyre Mounted Cranes in respective categories & hold valid HMV / TRANS license. Should be able to read and interpret the operation and maintenance manual, boom load chart, boom angle and other indicating devices.

1.4.12.3 Operator shall have latest Physician's certification for their physical fitness in vision with/without Lenses & adequate hearing with or without hearing aid.

Note:

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1. Refer relevant clauses in Chapter-V regarding annealing cables and Facility to be provided by BHEL for P91 welding. Also refer the relevant clauses in Special Conditions of Contract (SCC) published in Volume IB of Book II.
2. The induction heating equipments and other equipments shall be drawn from BHEL stores, transported and installed & commissioned wherever required. For routine maintenance & attending all type of break-down maintenance, contractor shall deploy sufficient manpower, tools and plant within the quoted rate.
3. The contractor shall provide electrical cables & switches required for extending power supply to the induction heating equipments. All the equipments shall be protected by providing covers or sheds at site by the contractor with in the quoted rate.
4. The age of the contractor deployed cranes upto 150 MT should be within 15 years as on date of deployment.
5. Contractor has to provide documentary proof for the age of the crane at the time of deployment to BHEL Site.

Additional clause:

T&Ps mentioned above is tentative requirement considering parallel working in all areas mentioned in the scope of work. However, mobilization schedule and quantity / numbers as mutually agreed at site for major T&Ps, have to be adhered to. Numbers/ time of requirement of T&Ps will be reviewed time to time by BHEL site and contractor will provide required T&Ps / equipments to ensure completion of entire work within schedule / target date of completion without any additional financial implication to BHEL. Vendor will give advance intimation and certification regarding capacity etc. prior to dispatch of heavy equipments. Also on completion of the respective activity, demobilization of T&P in total or in part can be done with the due approval of the engineer incharge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.

VOLUME-IA PART-I CHAPTER - V

T&Ps & MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS PER PACKAGE

1.5.1 List of T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis is as below:

SI No	Description	Quantity
1	In addition to the cranes to be provided by the contractor, BHEL will provide additional cranes of capacity above 150T to the contractor as per site requirement on sharing basis free of hire charges.	As decided by BHEL
2	Hydraulic Pressure Testing Pump with accessories	As Required
3	Chemical Cleaning Pumps with Motor	As Required
4	Air Blower for Air Leak Test	As Required
5	Induction Heating Machine	As Required
6	Boiler fill pump	As Required
7	Huck bolting machine	As Required
8	Venturimeter	As Required

1.5.2 All the T&Ps mentioned in clause 1.5.1 above shall be given to contractor on sharable basis and the allotment is made by BHEL on need basis.

1.5.3 It is envisaged that 150 T cranes in the scope of contractor will be sufficient for execution of ESP works specified in the scope of the tender. However, in view of specific site condition forcing usage of higher capacity cranes, crane above 150 MT capacity will be provided free of cost, at the discretion of BHEL execution engineer. Decision of BHEL execution engineer in this regard is final.

1.5.4 Besides the T & P mentioned above, which is being made available to the contractor on free of hire charges, any additional crane and other T & P which may be required for successful and timely execution of the work covered within the scope of this tender shall be arranged and provided at site by the contractor at his cost. In case if the contractor fails to provide such equipments, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL overheads, as applicable from time to time which may vary even during contract period.

1.5.5 Levelled land in boiler area will be provided by BHEL/Customer for the cranes. Consolidation of the ground, if required, and preparation (including civil works and supply of required consolidation materials) for placing crane for operation shall be done by the contractor, at his cost. Necessary plates / sleepers required for marching and placing of crane for operation shall also be provided by the contractor within

TECHNICAL CONDITIONS OF CONTRACT (TCC)

quoted rates. REQUIRED NUMBERS OF MILD STEEL PLATES OF 40 MM THICK AND 12 METRE LENGTH X 3 METRE WIDTH (APPROXIMATELY 6 NUMBERS) FOR THE ABOVE PURPOSE IS TO BE ARRANGED BY CONTRACTOR WITHIN HIS QUOTED RATE.

- 1.5.6 Consumables for Induction Heating machines are to be provided by contractor within the quoted rates.
- 1.5.7 BHEL may provide either owned cranes or hired cranes at the discretion of BHEL as below:

- 1.5.7.1 In the event of providing BHEL Cranes:

- 1.5.7.1.1 For all BHEL's own cranes of capacity greater than 150T, BHEL shall provide operators, free of charges. Fuel and lubricants for BHEL's own cranes of capacity greater than 150T, are to be arranged by the contractor within the quoted rate.

- 1.5.7.1.2 Tentative List of consumables required to be provided by contractor is as below:

- a. Engine Oil 15 W 40
 - b. Fuel Filters
 - c. Air Filters
 - d. Hydraulic Filters
 - e. Hydraulic Oil –Servo 68
 - f. Gear Oil- Servo 90
 - g. Engine oil Filter
 - h. Oil Separator Filter
 - i. Rope- CRG 100 Grease
 - j. Grease- Servo Multi-Purpose Grease

- 1.5.7.1.3 Maintenance for the BHEL crane shall be carried out by BHEL. Bidder shall extend support (if required) required for routine maintenance works.

- 1.5.7.2 In the event of providing hired cranes:

- 1.5.7.2.1 Crane Operators for hired cranes will be provided by BHEL, on free of charges.

- 1.5.7.2.2 Fuel for cranes are to be arranged by the contractor within the quoted rate.

- 1.5.8 The day-to-day and routine maintenance including replacement of spares for the BHEL T&Ps (excepting cranes) will be carried out by the contractor at his own cost. However, BHEL shall supply spare parts free of charges for normal wear and tear only.

- 1.5.9 BHEL will provide only one set of 12mm and 16mm jaws per Huck bolting Machine. Further requirement of jaws to be arranged by the contractor at his cost. Consumables like O-ring, backup ring, springs, hydraulic fluid for top-up etc., required for maintenance of the Huck bolting machine to be arranged by contractor at his cost.

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1.5.10 **One set of annealing cable shall be provided by BHEL for the entire scope of works of this contract.** Additional annealing cables required, if any, till total work completion, shall be procured by the contractor, at his cost.

1.5.11 Any loss / damage of tools by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.

1.5.12 In case of non-availability of these equipments, due to any reason i.e., unavoidable breakdown, major overhaul or any other reason etc., the contractor should make arrangement at his own cost to meet the erection targets. No extra claim will be admitted due to non-availability of any of the above equipments. No delay in execution of work shall be accepted on this account.

1.5.13 Cranes are only for erection purpose and shall not be available for material handling or transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.

1.5.14 All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections for the BHEL issued T & Ps shall have to be arranged by the contractor at his cost.

1.5.15 The contractor at his cost shall arrange for grouting of anchor points of T&Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.

1.5.16 Filling pump for other than main boiler, for hydro test shall be arranged by the contractor, if required. For testing LP lines, necessary Hydraulic Test Pumps / Hand pumps are to be arranged by the contractor.

1.5.17 FACILITY TO BE PROVIDED BY BHEL FOR P91 Welding.

1.5.17.1 Induction Heating M/C with accessories as indicated in Clause 1.5.1 above.

1.5.17.2 The following consumables will be provided by BHEL

1.5.17.2.1 One set of annealing cable shall be provided by BHEL for the entire scope of works of this contract. Additional annealing cables required, if any, till total work completion, shall be procured by the contractor, at his cost.

1.5.17.2.2 Compensating Cables

1.5.17.2.3 Welding Electrodes for P91 welding

1.5.17.2.4 Spot Welding Machine for fixing thermocouple

PART-I CHAPTER - VI

TIME SCHEDULE

1.6.1. TIME SCHEDULE

- 1.6.1.1. The entire work of Boilers and auxiliaries, Aux Boiler, ESP, SCR, Rotating Machines, Application of Insulation and refractory work including Supply & Application of Final Painting as per rate schedule as detailed in the Tender Specification shall be completed within **30 (Thirty) months** from the date of commencement of work at site as per the below schedule.
- 1.6.1.2. During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.
- 1.6.1.3. The erection work shall be commenced on the mutually agreed date between the bidder and BHEL engineer and shall be deemed as completed in all respect only when the unit is in operation. The decision of BHEL in this regard shall be final and binding on the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.
- 1.6.1.4. The contractor is required to refer Form F15 in Volume-I Book -II for all the instructions to be taken immediately after receipt of fax LOI.

1.6.2. COMMENCEMENT OF CONTRACT PERIOD

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy, the decision of BHEL engineer is final.

1.6.3. MOBILISATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING ETC.,

- 1.6.3.1. The activities for erection, testing etc shall be started as per directions of Construction manager of BHEL.
- 1.6.3.2. The contractor has to augment his resources in such a manner that following major milestones of erection & commissioning are achieved on specified schedules:

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A: MILESTONES for Main Boiler

Milestone Activity	Milestone Month (Tentative)
	Unit-5
Start of Erection (Tentative)	Oct 2019 (First month)
Hydro Test drainable	13 th MONTH
Boiler Light Up	22 nd MONTH
Synchronisation	25 th MONTH
Coal firing and Full Load	27 th MONTH
Trial Operation	28 th MONTH
Punch points & Contractual Completion	30 th MONTH

B: Major Intermediate Milestones (for penalty)

Activity	Unit 5	Milestone
Hydro Test drainable	13 th Month	M1
Synchronisation	25 th Month	M2

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

1.6.4 CONTRACT PERIOD

The contract period for completion of entire work under this scope shall be 30 (Thirty) months from the “COMMENCEMENT OF CONTRACT PERIOD” as specified earlier for completion of the entire work.

1.6.5 GUARANTEE PERIOD

The guarantee period of Twelve months for workmanship shall commence from the date of handing over of each Unit to Customer or six months from the date of floating of all safety valves, whichever is earlier (Provided all erection, testing, and commissioning works are completed in all respects).

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VOLUME-IA PART-I CHAPTER - VII

TERMS OF PAYMENT

1.7 Terms of payment:

The progressive payment for erection, testing and commissioning on accepted price / rates of contract value will be released as mentioned below in Cl 1.7.1 to 1.7.3.

1.7.1 Progressive Payment against monthly running bills will be made up to 85% of the value of the erected tonnage Pro-rata as per Cl no 1.7.1.1 to 1.7.1.21 of the following table.

Cl. No.	Contract (Main Package) Identification	ESP		Boiler			Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
PRO RATA PAYMENTS (85%)								
1.7.1.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (if not applicable, this portion shall be clubbed with placement in position)	15%	15%	20%	20%	25%	15%	--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl. No.	Contract (Main Package) Identification Rate schedule Identification	ESP		Boiler			Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.1.2	PLACEMENT IN POSITION	20%	10%	15%	10%	10%	20%	50%
1.7.1.3	ALIGNMENT	15%	15%	15%	15%	10%	20%	15%
1.7.1.4	WELDING/BOLTING/FIXING	20%	30%	15%	20%	15%	20%	20%
1.7.1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)			5%	10%	--	--	--
1.7.1.6	ON DRUM / STEAM WATER SEPARATOR LIFTING			--	--	--	--	--
1.7.1.7	COMPLETION OF ATTACHMENT WELDING, FIN WELDING, SUPPORTS			--	5%	--	--	--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl. No.	Contract (Main Package) Identification	ESP		Boiler			Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.1.8	COMPLETION OF ROOF SKIN CASING			--	5%	--	--	--
1.7.1.9	INSTALLATION OF TEMPORARY PIPING			---	---	---	---	---
1.7.1.10	DISMANTLING OF TEMPORARY PIPING, EDGE PREPARATION AND RETURN TO BHEL STORES, AREA CLEANING			---	---	---	---	---
1.7.1.11	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG			--	--	25%	--	--
1.7.1.12	COMPLETION OF FURNACE ALIGNMENT AND FIRE BALL CHECKING			5%	--	--	--	--
1.7.1.13	COMPLETION OF BACK PASS ALIGNMENT			5%	--	--	--	--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl. No.	Contract (Main Package) Identification Rate schedule Identification	ESP		Boiler			Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.1.14	COMPLETION OF VIBRATION SNUBBERS, MECHANICAL SPACERS, CASSETTE BAFFLES, STEAM COOLED SPACERS			5%	--	--	--	--
1.7.1.15	COMPLETION OF HOPPERS ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS, ETC	5%			--	--	--	--
1.7.1.16	COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC	5%		--	--	--	--	--

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl. No.	Contract (Main Package) Identification Rate schedule Identification	ESP		Boiler			Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.1.17	ERECITION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES	5%		--	--	--	--	--
1.7.1.18	EQUIPMENT TRIAL OPERATION			--	--	--	10%	--
1.7.1.19	HYDRAULIC TEST OR PNEUMATIC TEST			--	--	--	--	--
1.7.1.20	FLOATING OF LINES, FINAL ADJUSTMENT OF SUPPORTS FOR COLD AND HOT VALUES (if not applicable, this portion to be clubbed along with hydraulic test/pneumatic test)			--	--	--	--	--
1.7.1.21	Hangers and supports etc. wherever necessary as per drawing.		15%					

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl. No.	Contract (Main Package) Identification	ESP		Boiler		Rotating Machine	Refractory & Insulation
	Rate schedule Identification	ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR at Boiler	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	85%	85%	85%	85%	85%	85%

1.7.2 Progressive Payment against monthly running bills for **air pre heater** will be made up to 85 % of the value of the erected tonnage Pro-rata as per Cl no 1.7.2.1 to 1.7.2.8 of the following table.

Cl.No.	AIR PRE HEATERS (PG 52) From the total amount payable for the erected PGMA weight at tonnage rates, payment will be regulated as under:	Percentage
1.7.2.1	Completion of Support steel squareness and levelling, Expansion arrangement, Housing panel erection and alignment, Erection, alignment and welding of pedestals	11%
1.7.2.2	Completion of Erection, alignment and welding of Support Bearing, Guide Bearing, Rotor post, Bottom and Top center sections, Hot and cold end connecting plates	14%
1.7.2.3	Completion of erection and alignment of modules	15%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl.No.	AIR PRE HEATERS (PG 52) From the total amount payable for the erected PGMA weight at tonnage rates, payment will be regulated as under:	Percentage
1.7.2.4	Completion of erection, alignment and welding of Pin Rack assembly and Drive assembly	12%
1.7.2.5	Completion of seals setting	17%
1.7.2.6	Erection, alignment and welding of Lube oil systems, Cleaning Device, Fire sensing device, Deluge and water wash lines, Observation port and lighting assemblies and other accessories	13%
1.7.2.7	Completion of PGMA	1%
1.7.2.8	Air pre heater Trial Run	2%
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	85%
1.7.3	Further 15 % payment on pro-rata basis common to all PGs of Boiler shall be released on achievement of the following stage / milestones events (as per Cl no 1.7. 3.1 to 1.7.3.20 of the following table) for the tonnage erected.	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl.No.	Contract (Main Package) Identification	ESP		Boiler				Rotating Machine	Refractory & Insulation
	Rate schedule Identification	ESP	NPP at ESP	Structure	Pressure Parts	Non Pressure Parts including SCR	Air Pre Heaters	1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
	STAGE/MILESTONE PAYMENTS (15%)								
1.7.3.1	Air & Gas Tightness Test	1%	5%	--	--	5%	--	--	--
1.7.3.2	Gas Distribution Test	1%		--	--	--	--	--	--
1.7.3.3	Charging of ESP Fields	4%		--	--	--	--	--	--
1.7.3.4	Completion of Air & Gas Tightness Test for Furnace			--	2%	--	--	--	--
1.7.3.5	Main Boiler Hydraulic Test (Drainable)			--	2%	--	--	--	--
1.7.3.6	Main Boiler Hydraulic Test (Non Drainable)			--	1%	--	--	--	--
1.7.3.7	Reheater Coils Hydraulic Test			--	2%	--	--	--	--
1.7.3.8	Clean Air Flow test			--	--	--	--	1%	--
1.7.3.9	Main Boiler Light Up			--	1%	--	2%	1%	1%
1.7.3.10	ABO / Chemical cleaning		1%	--	1%	1%	2%	1%	1%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl.No.	Contract (Main Package) Identification	ESP		Boiler				Rotating Machine	Refractory & Insulation
		ESP	NPP at ESP	Structure	Pressure Parts	Non Pres- sure Parts including SCR	Air Pre Heaters		
	Rate schedule Identification							1) RM 2) Handling Eqpts	1) Castable & Pourable, Fire Bricks 2) Iron Components 3) Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.3.11	Steam Blowing			--	--	2%	1%	1%	1%
1.7.3.12	SVF			--	2%	--	2%	--	1%
1.7.3.13	Coal Firing	2%	2%	--		2%	2%	2%	1%
1.7.3.14	Full Load			--	--	--	--	1%	1%
1.7.3.15	Trial Operation of Unit	1%	2%	--	--	--	--	2%	2%
1.7.3.16	Completion of sheet covering for Boiler roof, burner roof, lift shaft cladding, completion of gutters			3%	--	--	--	--	--
1.7.3.17	Painting	2%	1%	6%	--	1%	1%	2%	--
1.7.3.18	Area cleaning, temporary structures cutting / removal and return of scrap	1%	1%	1%	1%	1%	1%	1%	3%
1.7.3.19	Punch List points / pending points liquidation	1%	1%	2%	1%	1%	2%	1%	1%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Cl.No.	Contract (Main Package) Identification	ESP		Boiler				Rotating Machine	Refractory & Insulation
	Rate schedule Identification	ESP	NPP at ESP	Structure	Pressure Parts	Non Pres- sure Parts including SCR	Air Pre Heaters	1) RM 2)Handling Eqpts	1) Castable & Pourable, Fire Bricks 2)Iron Components 3)Wool mattresses, 4) Aluminium sheeting, Sealing Compound etc
1.7.3.20	Material Reconciliation	1%	1%	2%	1%	1%	1%	1%	2%
1.7.3.21	Completion of Contractual Obligation	1%	1%	1%	1%	1%	1%	1%	1%
	TOTAL FOR STAGE / MILESTONE PAYMENTS	15%	15%	15%	15%	15%	15%	15%	15%
	TOTAL of clause 1.7.1 / 1.7.2 and 1.7.3	100%	100%	100%	100%	100%	100%	100%	100%

1.7.4 The terms of payment for **Bunker** items (excepting PG34-Trichy supplied) is as below:

- 1.7.4.1 On Completion of items - 93% of the item rate.
- 1.7.4.2 For this 93 %, BHEL Site Engineer, at discretion, may operate the part rate of the items depending on material supply by BHEL or Contractor, receipt of the contractor supplied materials at site, installation etc.
- 1.7.4.3 5% of the item rate shall be released after submission of the quality check formats / documents as per the quality plan for the quantum of work billed and duly certified by engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.7.4.4 2 % on completion of material reconciliation and certified by BHEL Engineer.

Notes to Terms of payment:

For PVC, ORC, RA Bill payment, compensation for Quantity variation, Retention amount and Performance Security Deposit, please refer Part-II, Chapter-1: Corrections / Revisions in Special Conditions of Contract, General Conditions of Contract and Forms & Procedures of Technical Conditions of Contract (Volume-I, Book-I).

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART-I CHAPTER - VIII

TAXES AND OTHER DUTIES

1.8.1 Goods and service Tax (GST) & Cess

- 1.8.1.1 The successful bidder shall furnish proof of GST registration with GSTN Portal in the State in which the Project is being executed, covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work.
- 1.8.1.2 Contractor's price/rates shall be exclusive of GST & Cess (if applicable) (herein after termed as GST). Contractor shall submit to BHEL the GST compliant tax invoice/debit note/revised tax invoice on the basis of which BHEL will claim the input tax credit in its return. Since this is a works contract, the applicable rate shall be @ 18% GST, as applicable presently.
- 1.8.1.3 Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules wherein the 'Bill To' details will be as below:

BHEL GSTN - 36AAACB4146P1ZG

NAME - BHARAT HEAVY ELECTRICALS LIMITED

ADDRESS - BHEL Site Office

Yadadri Thermal Power Station, 5X800 MW (Coal based), Veerlapalem village, Dameracherla Mandal, Nalgonda District, Telangana State

- 1.8.1.4 GST charged in the tax invoice/debit note/revised tax invoice by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return.
- 1.8.1.5 In case BHEL has to incur any liability (like interest / penalty etc.) due to denial/reversal / delay of input tax credit in respect of the invoice submitted by the contractor, for the reasons attributable to the contractor, the same shall be recovered from the contractor.
- 1.8.1.6 Further, in case BHEL is deprived of the Input tax credit due to any reason attributable to contractor, the same shall not be paid or Recovered if already paid to the contractor. Tax invoice / debit Note / revised tax invoice shall contain all such particulars as prescribed in GST law and comply to the timelines for issue of same. Invoices shall be submitted on time to the concerned BHEL Engineer In Charge.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- 1.8.1.7 TDS under GST (if/ as & when applicable) shall be deducted at prevailing rates on gross invoice value from the running bills.
- 1.8.1.8 E-way bills / Transit passes / Road Permits, if required for materials / T&P etc., bought into the project site is to be arranged by the Contractor only.
- 1.8.1.9 BHEL shall not reimburse any amounts towards any interest / penalty etc., incurred by contractor. Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL.

1.8.2 All taxes and duty other than GST & Cess

The contractor shall pay all (except the specific exclusion viz GST & Cess) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. 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.

1.8.3 Statutory Variations

Statutory variations are applicable under the GST Acts, against production of proof. The changes implemented by the Central / State Government during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision are to be suitably paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.

1.8.4 New Taxes / Levies –

In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

1.8.5 Direct Tax

BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption Certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART-I CHAPTER IX

BILL OF QUANTITY

1.9.0 Weight Schedule – Summary of Boiler + Aux Boiler: -

Sl. No.	DESCRIPTION	Weight [MT]	Rate Schedule Id
1	BOILER & BUNKER STRUCTURES	18214.16	1.1
2	BOILER - PRESSURE PARTS	10220.79	1.2
3	BOILER - NON-PRESSURE PARTS	9119.03	1.3
4	ROTATING EQUIPMENTS	3980.08	1.4
5	ROTATING MACHINES HANDLING EQUIPMENTS	73.60	1.5
8	INSULATION - IRON COMPONENTS, etc.	132.20	1.8
9	INSULATION - MINERAL WOOL	1256.50	1.7
10	INSULATION - POURABLE AND CASTABLE REFRACTORY	302.90	1.6
11	INSULATION - ALUMINIUM SHEETS	289.40	1.9
TOTAL WEIGHT IN MT (Approximately)		43305.21	

WEIGHT SCHEDULE – ESP and Auxiliaries, Insulation Materials SUMMARY			
Sl.No.	DESCRIPTION	WEIGHT [MT]	Rate Schedule Id
1	ESP (PG - 79,89 & AI)	9214.201	1A
2	GATES & DAMPERS(PG-57), DUCT(PG - 48), EXTERNAL SUPPORTING STRUCTURES(PG-39)	2276.79	1B
3	INSULATION COMPONENTS	757.221	1C,1D,1E (refer price bid)
TOTAL WEIGHT IN MT (Approximately) per unit		12248.215	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Detail weight schedule for Main Boiler, ESP, Aux Boiler, NPP, Rotating Machines, Insulation, SCR, etc.

A) Detail weight schedule for Unit -5 Boiler, SCR, Insulation, Rotating Machines of 5x800MW Yadadri TPP

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
	PRESSURE PARTS		1.2	
04147	Supperts for Collectr & Separatr Vessel	20000	1.2	
04321	VERTICAL SEPARATOR	33200	1.2	
04323	STORAGE TANK	54800	1.2	
04347	Seperator/Collecting Vessel Supp DD	30	1.2	
04547	Seperator/Collecting Vessel Supp Shop	2500	1.2	
	Sub Total	110530	1.2	110.53
05137	EVAPORATOR INLET HDR - FRNT	14400	1.2	
05147	FUR LWR REAR INLET HDR	14200	1.2	
05155	FUR LWR SIDE INLET HDRS	14300	1.2	
05227	FUR UPPER REAR OUTLET HDR	11000	1.2	
05231	FUR UPPER FRNT OUTLET HDR	10700	1.2	
05251	FUR UPPER SIDE OUTLET HDRS	19300	1.2	
05327	FUR INTERMEDIATE REAR HDR	11800	1.2	
05330	FUR INTERMEDIATE FRNT HDR	12000	1.2	
05350	FUR INTERMEDIATE SIDE HDRS	20900	1.2	
	Sub Total	128600	1.2	128.6
06400	FUR BURNER PANELS	35600	1.2	
06401	Burner Panel- OS	200	1.2	
06431	Front Upper Ww Panel Attachment	250	1.2	
06434	Front Intermediate WW Panel -OS	56500	1.2	
06437	Front WW Lower Panel-OS	40500	1.2	
06441	Rear Upper WW Panel -OS	13000	1.2	
06444	Rear Intermediate WW Panel -OS	56500	1.2	
06447	Rear Lower WW Panel -OS	40000	1.2	
06451	Side Upper Ww Panel Attachment	600	1.2	
06452	Side Upper Inter WW Panel -OS	300	1.2	
06453	Side Intermediate WW Panel -OS	78500	1.2	
06455	Side Lower WW Panel -OS	20000	1.2	
06500	FUR SOFA PANELS	9000	1.2	
06501	Sofa Panels -OS	100	1.2	
06515	Corner SOFA panels	11000	1.2	
06731	FUR VERTICAL WALL PANELS - FRNT	45800	1.2	
06732	FRONT WW PNL + ATT	38700	1.2	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
06734	FUR UPPER FRNT SPIRAL PANEL	71300	1.2	
06737	FUR LWR FRNT SPRL PNL WITH I/T TERM TUBE	48500	1.2	
06741	FUR REAR ARCH PANELS	41000	1.2	
06744	FUR UPPER REAR SPIRAL PANEL	73000	1.2	
06747	FUR LWR RR SPRL PNL WITH I/T TERM TUBES	61900	1.2	
06751	FUR VERTICAL WALL PANELS - SIDE	93000	1.2	
06752	FUR LWR VERTICAL WALL PANELS - SIDE	74000	1.2	
06753	FUR UPPER SIDE SPIRAL PANELS	153500	1.2	
06755	FUR LWR SIDE SPIRAL PANELS	35100	1.2	
	Sub Total	1097850	1.2	1097.85
07110	DOWNCOMER TO CONNECTING SPHERE	46300	1.2	
07125	Connecting Sphere	3500	1.2	
07217	SCREEN RELIEF TUBES	950	1.2	
07223	FUR SCREEN AND HANGER ASSEMBLY	63000	1.2	
07231	FUR SPIRAL WALL OUTLET TERM TUBES	2000	1.2	
07232	FUR VERTICAL WALL INLET TERM TUBES	9000	1.2	
07302	Ww Front Header Suspnd Item	10	1.2	
07303	Ww Side Header Suspension DD Items	10	1.2	
07315	FUR SIDE RISERS	40884	1.2	
07316	FUR REAR RISERS	23031	1.2	
07317	FURN STORAGE TANK VENT LINK	800	1.2	
07318	FUR FRNT RISERS	10071	1.2	
07331	Riser Tube Support DD Item	20	1.2	
07360	Furnace Spiral Wall Support DD Item	200	1.2	
07361	Furnace Wall Support Rear DD Item	200	1.2	
07362	Furnace Wall Support Side L&R DD Item	400	1.2	
07402	WW FRT HDR SUSPN	1000	1.2	
07403	WW SIDE HDR SUSPN	2600	1.2	
07404	WW HGR HDR SUSPN	1200	1.2	
07405	WW SCR.HDR SUSPN.	10900	1.2	
07409	Furnace wall Supports front	14700	1.2	
07423	Furnace Screen Tubes Attachment	400	1.2	
07431	RISER TUBE SUPPORT	2700	1.2	
07460	Furnace Spiral Wall supports Misc items	8000	1.2	
07461	Furnace wall Supports rear	14000	1.2	
07462	Furnace wall Supports Sides L & R	22700	1.2	
07502	Ww Front Header Suspnd Shop Item	700	1.2	
07503	Ww Side Header Suspension Shop Item	1200	1.2	
07505	Ww Screen Header Suspnd Shop Item	31600	1.2	
07531	Riser Tube Support Shop Item	1500	1.2	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
07560	Furnace Spiral Wall Support Shop Item	10	1.2	
07991	Welding Electrodes-Part-1	800	1.2	
07992	Welding Electrodes	5	1.2	
07993	EREC MATLS, CONSUMES	600	1.2	
	Sub Total	314991	1.2	314.991
08001	FURN UPR BKSTYS-F&R	86364	1.2	
08003	FURN UPR BKSTYS-SIDE	180000	1.2	
08006	FURN INT BKSTYS	330000	1.2	
08007	FURN LWR BKSTYS	22000	1.2	
08111	FURN REAR ARCH BKSTYS	37270	1.2	
08380	FURN BOT SUPRTS	170000	1.2	
08501	FURN B P BKSTYS-F&R	243568	1.2	
08503	FURN B P BKSTYS-SIDE	240000	1.2	
08901	FURN KEY BKSTYS-UPR	15000	1.2	
08910	EX.MOV'T MEAS COMP	1400	1.2	
08911	Bulk Bps Items-Upper	100	1.2	
08912	Bulk Bps Items-Inter	1300	1.2	
08913	Bulk Bps Items-Lower	1500	1.2	
	Sub Total	1328502	1.2	1328.502
09003	MATL FOR INST TAPPG	650	1.2	
09004	SEAL BOX FURN OPENG	12000	1.2	
09005	SEAL BOX INST OPENG	7000	1.2	
09303	Instrument Insert DD Item	700	1.2	
09304	Seal Boxes For Furnace Openings-DD	100	1.2	
09503	Instrument Insert Shop Item	10	1.2	
	Sub Total	20460	1.2	20.46
10174	FINISH SH INLET HDR	19700	1.2	
10178	SH PLATEN INLET HDR	15800	1.2	
10182	BP LWR REAR HDR	16400	1.2	
10183	BP UPPER SIDE INLET HDR	14200	1.2	
10184	BP EXTENDED SIDE INLET HDR	7600	1.2	
10185	BP LWR FRNT HDR	16300	1.2	
10191	SH FUR ROOF INLET HDR	10400	1.2	
10274	FINISH SH OUTLET HDR	51500	1.2	
10278	SH PLATEN OUTLET HDR	26100	1.2	
10283	BP LWR SIDE HDRS	24800	1.2	
10284	BP EXT FLOOR OUTLET HDR WITH TERM TUBES	6300	1.2	
10285	BP FRNT OUTLET HDR	25700	1.2	
10291	SH FUR ROOF OUTLET HDR	16300	1.2	
	Sub Total	251100	1.2	251.1

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
11074	FINISH SH FRNT ASSY WITH I/T TERM & COT	305700	1.2	
11078	SH PLATEN ASSY WITH TERM TUBES - LEFT	109700	1.2	
11374	FINISH SH REAR ASSY WITH O/T TERM & COT	237500	1.2	
11378	SH PLATEN ASSY WITH TERM TUBES - RIGHT	109700	1.2	
11406	SH Frnt Upper Pnl Attachment	30	1.2	
11416	SH Rear Uppr Pnl Attachment	10	1.2	
11467	SH Sc Side Pnl Upper Left Attachment	10	1.2	
11469	SH Sw Panels Lower Front (L&R)-OS	110	1.2	
11478	SH Rear Wall Panels Lower (Left)-OS	80	1.2	
11484	SH Extended Side Wall Panels-OS	150	1.2	
11487	BP LTRH Hanger Tube Attachment	10	1.2	
11491	SH Radient Roof Tubes (Left)-OS	500	1.2	
11494	SH Extended Bottom Panels-OS	80	1.2	
11606	BP FRNT WALL PANELS	23656	1.2	
11608	BP FRNT WALL PANEL - LWR	34426	1.2	
11684	BP EXTENDED SIDE FIN WELDED PANEL	40000	1.2	
11694	BP EXTENDED SIDE FLOOR FIN WELDED PANEL	16000	1.2	
11716	BP UPPER REAR PANEL	55836	1.2	
11718	BP LWR REAR PANEL	33000	1.2	
11767	BP UPPER SIDE PANEL-LEFT	30000	1.2	
11768	SH SIDE WALL PANELS INTER (FRONT)	20000	1.2	
11769	BP LWR SIDE PANEL - LEFT	22000	1.2	
11787	BP REAR ROOF PANELS	22500	1.2	
11791	SH FUR ROOF FIN WELDED PANEL	36400	1.2	
11967	BP UPPER SIDE PANEL-RIGHT	23000	1.2	
11968	SH SIDE WALL PANELS INTER (REAR)	18000	1.2	
11969	BP LWR SIDE PANEL - RIGHT	18000	1.2	
11987	SHSC RR ROOF PNL RT	22500	1.2	
11991	SH FUR ROOF TUBES	43000	1.2	
	Subtotal	1221898	1.2	1221.898
12178	LINK TO SH DESUPERHEATER	43000	1.2	
12184	BP EXTENDED SIDE CONNECTION LINK	22614	1.2	
12187	SH BYPASS PIPES	20000	1.2	
12306	SH Spprt For Lines And Links DD Item	10	1.2	
12314	Suspn of SH R.Roof Headers DD Item	60	1.2	
12317	Suspn of R.Roof Headers DD Item	50	1.2	
12324	Suspension of SH Rear Wall DD Items	1500	1.2	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
12327	Suspension of SH Rear Wall DD Items	600	1.2	
12328	Suspension of SH Rear Wall DD Items	400	1.2	
12344	Suspn of Vert. Spaced Assy DD Item	20	1.2	
12348	Suspn of Vert. Spaced Assy DD Item	100	1.2	
12354	Suspn of Vert. Spaced Assy DD Item	700	1.2	
12368	RH Vert Platen Frnt Coil Left DD Item	20	1.2	
12393	SH Misc Components DD Item	300	1.2	
12403	SH Sc Spacer Tube Attachment	50	1.2	
12405	SH Hanger Tube Attachment	3900	1.2	
12514	Suspn of SH R.Roof Hdrs Shop Item	2600	1.2	
12515	BP STEAM COOLED HANGER TUBES	24900	1.2	
12524	Suspension of SH Rear Wall Shop Item	100	1.2	
12544	Suspn of Vert. Spaced Assy Shop Item	1000	1.2	
12554	Suspn of Vert. Spaced Assy Shop Item	31600	1.2	
12803	SH STEAM COOLED SPACER TUBES	2700	1.2	
12805	BP FRNT WALL SCREEN TUBES	37000	1.2	
12850	SH CONNECTING PIPE	25000	1.2	
12852	LINKS TO SH PLATEN INLET HDR	23100	1.2	
12900	SH DESUPERHEATER	6000	1.2	
12903	SH MISCL COMPONENTS	6000	1.2	
12906	SH LINK SUPPORTS	44500	1.2	
12907	RAD&RR ROOF SUPPORTS	700	1.2	
12914	EXPN-SH RAD ROOF HDR	4200	1.2	
12916	Sh Desh Supports S-01 -AD	83300	1.2	
12917	SUSPN OF RADINT ROOF	19100	1.2	
12924	SUSPN-SH BAKPASS HDR	81300	1.2	
12927	SUSPN OF REAR ROOF	26500	1.2	
12928	SUSPN - SH REAR WALL	20400	1.2	
12944	SUSPN-SH PLATEN HDRS	2600	1.2	
12948	SUSP-VERT SPACD ASSY	84400	1.2	
12954	SUSP-VERT SPACD HDRS	2000	1.2	
12968	SUSPN OF PLATEN ASSY	28400	1.2	
12991	Welding Electrodes-Part-1	600	1.2	
12992	Welding Electrodes	1000	1.2	
12993	EREC MATLS, CONSUMES	4000	1.2	
	subtotal	656324	1.2	656.324
15136	LTRH INLET HDR	12800	1.2	
15177	RH VER SPC RR IN HDR	28000	1.2	
15236	LTRH OUTLET HDR	28900	1.2	
15279	RH VER PLN FRT OUTHD	48600	1.2	
	Subtotal	118300	1.2	118.3

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
16079	RH VERPLN FR COIL LT	181900	1.2	
16201	LTRH UPPER ASSEMBLY	190000	1.2	
16202	LTRH INTERMEDIATE ASSEMBLY	410000	1.2	
16203	LTRH LWR ASSEMBLY WITH INLET TERM TUBES	320000	1.2	
16379	RH VERPLN FR COIL RT	11700	1.2	
16403	LTRH Coils Lower-OS	300	1.2	
	subtotal	1113900	1.2	1113.9
17174	LINK TO RH DESUPERHEATER	100400	1.2	
17304	RH Spprts For Lines And Links DD Item	30	1.2	
17306	RH Suprt For Lines And Links DD Item	40	1.2	
17319	RH Frnt Suspension DD Item	10	1.2	
17407	RH Sc Spacer Tube Attachment	10	1.2	
17476	RH V.S. Centre Cross Over Tube Attachmt	5500	1.2	
17504	RH Suprts For Lines And Links Shop Item	4500	1.2	
17506	RH Suprt For Lines And Links Shop Item	1200	1.2	
17776	RH VERSPC CEN TUBES	140000	1.2	
17807	RH STM COOL SPACERS	100	1.2	
17900	RH DESUPERHEATER	7900	1.2	
17903	RH MISCL COMPONENTS	67000	1.2	
17904	RH HDR SUPRT AB ROOF	5200	1.2	
17906	RH SUPRT LINES & LIN	6100	1.2	
17919	RH FRONT SUSPENSION	32000	1.2	
17991	Welding Electrodes-Part-1	300	1.2	
17992	Welding Electrodes	300	1.2	
17993	CONSUMABLES & ERECTION MATERIALS	2200	1.2	
	subtotal	372790	1.2	372.79
18001	FUR ROOF SKIN CASING	19800	1.2	
18010	PR PARTS ATTACH-CASG	400	1.2	
18701	Furnace Roof Skin Casing BOI Item	10	1.2	
	subtotal	20210	1.2	20.21
19306	Eco Supports For Line & Links DD Item	300	1.2	
19307	Eco Feed Pipe Suspn DD Item	110	1.2	
19506	Eco Supports For Line & Links Shop Item	27000	1.2	
19507	Eco Feed Pipe Suspn Shop Item	13000	1.2	
19701	ECO INLET HDR	38800	1.2	
19702	ECO OUTLET HDR	31000	1.2	
19753	ECO JUNCTION HDR	13100	1.2	
19763	ECO JUNCTION HDR	13100	1.2	
19783	ECO JUNCTION HDR	13300	1.2	
19793	ECO JUNCTION HDR	13000	1.2	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
19802	ECO LWR HANGER TUBES	141100	1.2	
19814	ECO UPPER ASSY - LEFT	314321	1.2	
19824	ECO LWR ASSY -LEFT	218096	1.2	
19850	ECO INLET LINKS	65400	1.2	
19851	LINKS FROM ECO OUT. HDR TO ECO MIX LINE	169400	1.2	
19852	ECO MIXING LINE	26500	1.2	
19884	ECO INTER ASSY - LEFT	322665	1.2	
19903	ECO.MISCL COMP	57500	1.2	
19904	ECO HDR SUPT AB ROOF	23000	1.2	
19905	ECO HDR SUPT BL ROOF	40000	1.2	
19906	ECO LINE&LINK SUPORT	13000	1.2	
19907	ECO,FEEDPIPE SUPPORT	6200	1.2	
19914	ECO UPPER ASSY - RIGHT	305207	1.2	
19924	ECO LWR ASSY-RIGHT	201324	1.2	
19984	ECO INTER ASSY - RIGHT	313498	1.2	
19991	Welding Electrodes-Part-1	100	1.2	
19992	Welding Electrodes	100	1.2	
	subtotal	2380121	1.2	2380.121
21600	S.B. PPG & FITTINGS	21000	1.2	
21601	S.B PIPING SUPPORTS	1900	1.2	
21602	Sb Piping - DD Items	2000	1.2	
21603	Sb Piping - BOI Items	15	1.2	
21604	SB Piping Supports - OS items	8000	1.2	
21605	SB Piping Supports - DD Items	10	1.2	
21606	SB Piping Supports - BOI Items	2	1.2	
21700	BULKED BPS COMP	500	1.2	
21800	SB VALVES (BHEL)	2000	1.2	
21825	SB VALVES (SUBDELY)	350	1.2	
21850	SB SAFETY VALVE BHEL	60	1.2	
21992	WELDING ELECTRODES	65	1.2	
21987	COMMG SPARES SB SV	2	1.2	
21988	COMMG SPARES-SD	2	1.2	
	subtotal	35906	1.2	35.906
24350	BLR FILLING PIPING	3300	1.2	
24351	H&S BLR FILLING PPG	35	1.2	
24352	Boiler Fill Piping - DD Items	220	1.2	
24353	H&S For Boiler Fill Piping - OS Items	530	1.2	
24354	BOI Items for Blr Trim Piping	2	1.2	
24700	BULKED BPS COMP	350	1.2	
24800	BOILER TRIM PIPING	54000	1.2	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
24803	Boiler Trim Piping - DD Items	500	1.2	
24804	Supports - Blr Trim Piping - OS Items	36500	1.2	
24805	LINK TO BOILER RECIRCU SYSTEM	37510	1.2	
24806	MIXING VESSEL	6500	1.2	
24807	RECIRCU PUMP SUCTION LINE	28169	1.2	
24808	RECIRCU PUMP DISCHARGE LINE	9725	1.2	
24809	BOILR RECIR LINK FROM BF LINE	12689	1.2	
24810	H and S FOR STARTUP SYSTEM	19600	1.2	
24811	Fur Link to Flash tank HWL1&2	74000	1.2	
24814	BOI ITEMS FOR BOILER TRIM PPG	5	1.2	
24815	SPRAY WATER SYSTEM	30000	1.2	
24817	H&S For Start-Up System - OS Items	16000	1.2	
24818	H&S For Start-Up System - DD Items	150	1.2	
24820	EXHAUS PIPE SAFETY VLV	60000	1.2	
24822	De-Superheater Pipes - OS Items	150	1.2	
24823	De-Superheater Pipes - DD Items	3100	1.2	
24824	Exhaust Pipe For Sv - OS Items	15900	1.2	
24825	SILENCER SUPPORTS	150	1.2	
24826	Silencer Supp - OS Items	68000	1.2	
24827	Exhaust Pipe For Sv - DD Items	1200	1.2	
24828	Exhaust Pipe For Sv - BOI Items	20	1.2	
24835	STARTUP VENT DIFFUSER SILEN SUP	501	1.2	
24836	Start-Up Vent, Diffuser, Sil Supp-OS	4400	1.2	
24837	Start-Up Vent, Diffuser, Sil Supp-DD	10	1.2	
24840	SAMPLE COOLER AND SUPPORTS	700	1.2	
24841	Sample Cooler & Supports - OS Items	200	1.2	
24842	Sample Cooler and Suprts-DD items	16	1.2	
24855	RECIRCULATING PUMB COMP	20000	1.2	
24860	VALVES (BHEL)	80000	1.2	
24865	CTL VALVES FOR SPRAY PIPING SD	3300	1.2	
24867	CTL VAL FOR STARTUP RECIRCU SYS	15700	1.2	
24880	SAFETY VALVES	4719	1.2	
24881	SAFETY VALVES AND ERV(BHEL) SD	430	1.2	
24883	Safety Valves (Bhel) - Non HT	6183	1.2	
24885	SILENCERS(BHEL)	140000	1.2	
24950	SPECIAL TOOLS	200	1.2	
24955	LAP TOOL SV&ERV	60	1.2	
24960	LAP TOOL-CON VAL(BHEL)	30	1.2	
24987	BHEL-SV/ERV COMG SPARES	7	1.2	
24988	COMMG SPARES/SD	15	1.2	
24989	BHEL VALVE COMG SPAR	120	1.2	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
24992	WELDING ELECTRODES-TRIM PPG	1200	1.2	
24993	CONSUME & EREC MATLS	100	1.2	
24994	NAME PLATES	300	1.2	
	subtotal	756496	1.2	756.496
	TANKS		1.2	
81-060	FLASH TANK ID 4201X22 THK	42491	1.2	
81-060	FLASH TANK DRAIN TANK OD 2743X16	17000	1.2	
81-036	EMERGENCY COOLING WATER TANK OD 2500X16	7494	1.2	
81-041	CONDENSATE TANK OD 2000X16	4063	1.2	
	subtotal	71048	1.2	71.048
97297	MTM CLAMPS & PADS	150	1.2	
	subtotal	150	1.2	0.15
	PRESSURE PARTS TOTAL	10098326	1.2	10098.326
	INSULATION			
32010	FICOM BLR PP INSUL	4000		129200
32210	FIX COMP-DUCT INSULN	60000		
32700	BULKED DD COMPONENT	50000		
32810	EQUIPMENT OUTER CASING	286000		287800
	subtotal	400000		400
33021	BLR PP MINRL WOOL	585000		1248198.4
33210	MAIN BLR CAST REF GR	180000		270000
33221	DUCT MINERAL WOOL	633000		
33230	MAIN BLR POUR INSUL	90000		
33924	MISC EQPTS PCK MATLS	400		
33970	MISC EQPTS EXP METAL	14800	1.8	
33971	MISC EQPTS WW CLOTH	1300	1.8	
33975	MISC EQPTS SEAL COMP	500		
81xxx	Insulation MINRL WOOL& fixing components	1000		
55919	AXIAL FD FAN INSULATION WOOL	16262.4		1535.1984
55939	AXIAL PA FAN INSULATION WOOL	12936		
	subtotal	1535198.4		1935.1984
	INSULATION TOTAL	1935198.4	1.1	
	STRUCTURES		1.1	
34100	BUNKER BAY COLUMNS	760377	1.1	
34200	BUNKER SUPPORT BEAMS	591041	1.1	
34300	BUNKER BAY HORIZONTAL BRACINGS	19985	1.1	
34390	MISC.STRUCTURES	243350	1.1	
34400	BUNKER BAY HORZ.BEAMS	609391	1.1	
34500	BUNKER BAY VERTICAL BRACINGS	323043	1.1	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
34810	FLOOR GRILLS	3801	1.1	
34820	STAIRS	7457	1.1	
34850	HAND RAILS	3581	1.1	2562.026
	subtotal	2562026	1.1	
35010	FOUNDATION MATERIALS	72680	1.1	
35111	MAIN COLUMNS LEFT 1S	570754	1.1	
35112	MAIN COLUMNS LERT 2N	314760	1.1	
35121	MAINCOLUMNS RIGHT 1S	570754	1.1	
35122	MAIN COLUMNS RIGHT 2	314760	1.1	
35130	MAIN COLUMNS MIDDLE	438361	1.1	
35140	AUXILIARY COLUMNS-LE	621316	1.1	
35150	AUXILIARY COLUMNS-RI	526614	1.1	
35190	GIRDER PIN CONNECTIO	25401	1.1	
35211	CEILING STRUCTUREMAI	551099	1.1	
35212	CEILING STRUCTUREMAI	475037	1.1	
35213	CEIL STRUCT -CROSS W	165110	1.1	
35214	CEIL STRUCT -CROSS W	90271	1.1	
35221	CEILING STRUCTURE RO	66110	1.1	
35222	CEILING STRUCTURE RO	54001	1.1	
35231	CEILING STRUCTURE HO	61862	1.1	
35232	CEILING STRUCTURE HO	39942	1.1	
35311	HORIZONTAL BRACING I	50085	1.1	
35312	HORIZ BRACING II PAS	32824	1.1	
35321	HORIZ BRACING I PASS	59496	1.1	
35322	HORIZ BRACING II PAS	61968	1.1	
35331	HORIZ BRACING I PASS	45744	1.1	
35332	HORIZ BRACING II PAS	49168	1.1	
35341	HORIZ BRACING I PASS	58721	1.1	
35342	HORIZ BRACING II PAS	35628	1.1	
35351	HORIZ BRACING I PASS	43583	1.1	
35352	HORIZ BRACING II PAS	43347	1.1	
35361	HORIZ BRACING I PASS	44304	1.1	
35362	HORIZ BRACING II PAS	44753	1.1	
35381	Landing & Connecting Platforms Tier-1	34980	1.1	
35382	Landing & Connecting Platforms Tier-2	56867	1.1	
35383	Landing & Connecting Platforms Tier-3	61899	1.1	
35384	Landing & Connecting Platforms Tier-4	17324	1.1	
35385	Landing & Connecting Platforms Tier-5	16478	1.1	
35386	Landing & Connecting Platforms Tier-6	70708	1.1	
35387	Landing & Connecting Platforms Tier-7	36240	1.1	
35390	MISC STRUCTURES	24363	1.1	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
35441	Horil Beams First Pass-Tier-1	103769	1.1	
35442	Horil Beams First Pass-Tier-2	180040	1.1	
35443	Horil Beams First Pass-Tier-3	183699	1.1	
35444	Horil Beams First Pass-Tier-4	256975	1.1	
35445	Horil Beams First Pass-Tier-5	97787	1.1	
35446	Horil Beams First Pass-Tier-6	153969	1.1	
35447	Horil Beams First Pass-Tier-7	69479	1.1	
35451	Hor Beam-Second Pass- Tier-1	46896	1.1	
35452	Hor Beam-Second Pass- Tier-2	97478	1.1	
35453	Hor Beam-Second Pass- Tier-3	60211	1.1	
35454	Hor Beam-Second Pass- Tier-4	88272	1.1	
35455	Hor Beam-Second Pass- Tier-5	34354	1.1	
35456	Hor Beam-Second Pass- Tier-6	64069	1.1	
35457	Hor Beam-Second Pass- Tier-7	8461	1.1	
35511	Front Bracing-Tier-1	24087	1.1	
35512	Front Bracing-Tier-2	39361	1.1	
35513	Front Bracing-Tier-3	14015	1.1	
35514	Front Bracing-Tier-4	8586	1.1	
35515	Front Bracing-Tier-5	10463	1.1	
35516	Front Bracing-Tier-6	19841	1.1	
35517	Front Bracing-Tier-7	12017	1.1	
35521	Side Bracing-Tier-1	83388	1.1	
35522	Side Bracing-Tier-2	123282	1.1	
35523	Side Bracing-Tier-3	73935	1.1	
35524	Side Bracing-Tier-4	66886	1.1	
35525	Side Bracing-Tier-5	33099	1.1	
35526	Side Bracing-Tier-6	51751	1.1	
35527	Side Bracing-Tier-7	33006	1.1	
35531	Rear Bracing-Tier-1	76349	1.1	
35532	Rear Bracing-Tier-2	85441	1.1	
35533	Rear Bracing-Tier-3	25022	1.1	
35534	Rear Bracing-Tier-4	48751	1.1	
35535	Rear Bracing-Tier-5	43629	1.1	
35536	Rear Bracing-Tier-6	61167	1.1	
35537	Rear Bracing-Tier-7	45377	1.1	
35700	HSFG FASTENERS	56507	1.1	
35701	HSFG FASTENERS	1227	1.1	
35811	FLOOR GRILLS AND GUARD PLATE	348566	1.1	
35812	Edge Strip And Guard Plate	6437	1.1	
35821	STAIRS - LOWER	12671	1.1	
35822	STAIRS - MIDDLE	12634	1.1	

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
35823	STAIRS - UPPER	10338	1.1	
35851	HAND RAILS AND POSTS	44598	1.1	
35993	CONSUMABLESANDERECTI	37608	1.1	
35995	CHUTE PIPE AND LADDE	35631	1.1	8838.441
	subtotal	8838441	1.1	
36110	COLUMNS NEAR AIR PRE	616713	1.1	
36130	MIDDLE COLUMNS IN BO	202969	1.1	
36150	BEAMSANDBRACINGS NEA	1053680	1.1	
36311	MAIN FLOOR I MBL 1ST	36284	1.1	
36312	MAIN FLOOR I MBL 2ND	8536	1.1	
36313	NON-MBL FLOOR BETWE	80472	1.1	
36314	NON-MBL FLOOR BETWE	31679	1.1	
36315	NON-MBL FLOOR BETWE	28039	1.1	
36316	NON-MBL FLOOR BETWE	9727	1.1	
36321	MAIN FLOOR II MBL 1ST	42691	1.1	
36322	MAIN FLOOR II MBL 2ND	386965	1.1	
36323	NON-MBL FLOOR BETWE	125001	1.1	
36324	NON-MBL FLOOR BETWE	89333	1.1	
36325	NON-MBL FLOOR BETWE	15267	1.1	
36326	NON-MBL FLOOR BETWE	247176	1.1	
36331	MAIN FLOOR III MBL 1	48804	1.1	
36332	MAIN FLOOR III MBL 2	17111	1.1	
36333	NON-MBL FLOOR BETWE	103695	1.1	
36334	NON-MBL FLOOR BETWE	77248	1.1	
36335	NON-MBL FLOOR BETWE	22108	1.1	
36336	NON-MBL FLOOR BETWE	40475	1.1	
36337	NON-MBL FLOOR BETWE	40017	1.1	
36338	NON-MBL FLOOR BETWE	29628	1.1	
36341	MAIN FLOOR IV MBL 1ST	5641	1.1	
36342	MAIN FLOOR IV MBL 2ND	9424	1.1	
36343	NON-MBL FLOOR BETWE	58356	1.1	
36344	NON-MBL FLOOR BETWE	10685	1.1	
36345	NON-MBL FLOOR BETWE	58113	1.1	
36346	NON-MBL FLOOR BETWE	65943	1.1	
36347	NON-MBL FLOOR BETWE	2937	1.1	
36351	MAIN FLOOR V MBL 1ST	10100	1.1	
36352	MAIN FLOOR V MBL II ND	8511	1.1	
36353	NON-MBL FLOOR BETWE	22627	1.1	
36354	NON-MBL FLOOR BETWE	26933	1.1	
36355	NON-MBL FLOOR BETWE	44715	1.1	
36356	NON-MBL FLOOR BETWE	82977	1.1	

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
36361	MAIN FLOOR VI MBL 1ST	22610	1.1	
36362	MAIN FLOOR VI MBL 2ND	13332	1.1	
36363	NON_MBL FLOOR ABOVE	103925	1.1	
36364	NON MBL FLOOR ABOVE MBL VI	16268	1.1	
36365	NON MBL FLOOR ABOVE MBL VI	49297	1.1	
36366	NON MBL FLOOR ABOVE MBL VI	54246	1.1	
36391	MISCELLANEOUS PLATFO	87287	1.1	
36392	MISCELLANEOUS PLATFO	45815	1.1	
36393	APH, SCAPH, HANDLING	15741	1.1	
36394	MISCELLANEOUS PLATFO	1507	1.1	
36395	MISCELLANEOUS PLATFO	4637	1.1	
36396	Slide Bearing Plates	317	1.1	
36610	BOILER ROOF STRUCTUR	215027	1.1	
36611	BOILER ROOF SHEETING	46979	1.1	
36613	RAIN WATER PIPES and	24845	1.1	
36620	BOILER SIDE CLADDING	83644	1.1	
36621	BOILER SIDE CLADDING	25303	1.1	
36700	Hsfg Bolts	18185	1.1	
36701	Fasterners	85	1.1	
36740	POSTS AND HANGERS	35395	1.1	
36811	FLOORGRILLSANDGUARDP	97185	1.1	
36812	FLOORGRILLSANDGUARDP	164474	1.1	
36813	FLOORGRILLSANDGUARDP	164474	1.1	
36814	FLOORGRILLSANDGUARDP	87818	1.1	
36820	STAIRS AND LADDERS	25205	1.1	
36821	STAIRSandLADDERS LOW	7731	1.1	
36851	HANDRAILS AND POSTS	81982	1.1	
36852	HANDRAILS AND POSTS	80195	1.1	
36853	HANDRAILS AND POSTS	32046	1.1	5366.135
	subtotal	5366135	1.1	
38210	INTER CONN PLATFORMS	5727	1.1	
38299	MILL HANDLING MONORA	163672	1.1	
38310	CONN PLATFORMS TO MI	43348	1.1	
38381	ECO HANDLING STRUCTU	56496	1.1	
38410	MILL MAINTANANCE PLA	120330	1.1	
38510	LIFT BEAMS AND BRACI	44176	1.1	
38610	ELEVATOR CLADDING ST	30463	1.1	
38611	ELEVATOR CLADDING SH	22242	1.1	
38710	LIFT MACHINE ROOM DE	37875	1.1	
38810	FLOORGRILLS AND GUAR	18544	1.1	
38820	STAIRS AND LADDERS	1022	1.1	

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
38850	HAND RAILS AND HAND	16026	1.1	559.921
	subtotal	559921	1.1	
39012	FOUNDATION MATERIALS	3000	1.1	
39101	COLUMNS FRAMES BEFORE ESP	170949	1.1	
39102	COLUMNS FRAMES BEFORE ESP	388986	1.1	
39299	Platforms - Before ESP	141671	1.1	
39301	STRUC AND PLATFORM FOR FAN	2000	1.1	
39302	STRUC FOR MOTOR HOOD	20188	1.1	
39304	FAN HANDLING STRUCT FOR FD	12836	1.1	
39305	FAN HANDLING STRUCT FOR PA	19609	1.1	
39700	HSFG FASTENERS FOR P	400	1.1	
39810	FLOOR GRILL	20000	1.1	
39820	STAIRS	10000	1.1	
39850	HAND RAIL AND HAND R	13000	1.1	
39993	CONSUMABLES AND EREC	6000	1.1	808.639
	subtotal	808639	1.1	18135.162
	STRUCTURES TOTAL	18135162	1.3	
	NON PRESSURE PARTS		1.3	
20051	LONG RETRACT SB M11E	77495	1.3	
20054	WALL BOX NPR LRSB MI	1295	1.3	
20201	WALL DESLAGGER RW5E	15958	1.3	
20204	WALL BOX NPR-RW5E	2187	1.3	
20511	DA HEAD VALVE ASSY	114	1.3	
20794	WALL BOX NPR FOR TP	63	1.3	
20962	TR PROBE DUP PT&AC	2025	1.3	
20998	SPL TOOLS FOR SBAND COMMSNG SPARES	13	1.3	99.15
	subtotal	99150		
			1.3	
28220	DOORS	12032	1.3	
28700	BPS FASTENERS	4600	1.3	16.632
	subtotal	16632	1.3	
29200	SCR System	3600000	1.3	3600
	subtotal	3600000	1.3	
30103	SEAL PLATE ASSY -Stainless Steel	4500	1.3	
30215	MAIN BOILER ENCL	32000	1.3	
30219	VERT ROOF ENCL	105000	1.3	
30223	GAS DIST BAFFLES	550	1.3	
30224	ANTIVIBRATION BAFFLE	24000	1.3	
30233	1ST PASS DECK SPRT	40000	1.3	
30234	2ND PASS DECK SPRT	35000	1.3	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
30235	ENCL SUPPORT STEEL	57000	1.3	298.05
	subtotal	298050	1.3	
31010	COMPS WELDED TO PR	1100	1.3	
31104	FUR REAR ARCH SKIN	2700	1.3	
31993	ERCTION MATERIALS	2000	1.3	5.8
	subtotal	5800	1.3	
37010	BLR OUTER CSG COMPS	45000	1.3	
37810	BLR OUTER CASING	54000	1.3	99
	subtotal	99000	1.3	
			1.3	
41350	ACOIL GUN ASSY	600	1.3	
41390	OIL GUN VICE&RACK	1000	1.3	
41500	HEA IGNITOR	800	1.3	
41710	Oil Gun Assebly - DD items	5	1.3	
41988	O&G BURN COMMG SPARE	5	1.3	2.41
	subtotal	2410	1.3	
42001	PNEUMATIC FITTINGS	150	1.3	
42002	STEAM BLOW MATERIALS	2300	1.3	
42005	INSTRUMENT FITTINGS	350	1.3	
42010	LFO PUMP SET	8500	1.3	
42020	HFO PUMP SET	15500	1.3	
42030	HFO HEATER SET	38000	1.3	
42046	DO PUMP-MOTOR ASSY	500	1.3	
42065	DRAIN OIL TANK	6000	1.3	
42070	BURNER STN SKID ASLY	6200	1.3	
42120	PIPING,PH FUEL OIL	8000	1.3	
42128	PIPING,P.HOUSE STM	1600	1.3	
42150	PIPING, OFLR HFO/TRC	5000	1.3	
42152	PIPING,OP.FLR LFO	1200	1.3	
42154	PIPING,OP.FLR DO	1200	1.3	
42157	PIPING,OP.FLR AIR	1500	1.3	
42158	PIPING,OP.FLR STM	5500	1.3	
42200	SUB.DEL FO SYSTEM	3200	1.3	
42300	BHEL VALVE F.O. SYS	2200	1.3	
42358	B.VALVE,OP.FLR STM	600	1.3	
42700	BULKED BPS COMPONENT	1000	1.3	
42710	Fuel Oil System - DD Items	2500	1.3	
42858	Fuel Oil System - Shop items	17500	1.3	
42988	O&G SYS COMMG SPARE	50	1.3	
42992	IMPORTED ELECTRODES	50	1.3	128.6
	subtotal	128600	1.3	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
43004	ASSY SCNR&GUN AIR SY	4500	1.3	
43005	ASSY MILL AIR SYSTEM	18500	1.3	
43104	M/C SCNR&GUN AIR SYS	12000	1.3	
43105	M/C MILL AIR SYSTEM	60000	1.3	
43200	SUBDEL,IGNR,SCNR AIR	5500	1.3	0.5
43710	Seal Air & Scanner Air System - DD items	500	1.3	
	subtotal	101000	1.3	
45200	Windbox - Sub Delivery	3500	1.3	
45710	Wind Box & SOFA Assembly - DD items	50	1.3	
45801	WINDBOX AND SOFA TUBE ATTACH	29000	1.3	
45802	WINDBOX ASSEMBLY - 32" WIDTH	165000	1.3	
45804	WINDBOX - SOFA ASSEMBLY	30500	1.3	
45805	WINDBOX SUPPT AIR CYL MOUNTG	19500	1.3	
45858	Wind Box & SOFA Assy - Shop items	29000	1.3	276.55
	subtotal	276550	1.3	
47200	Fuel Piping - Sub-delivery	7500	1.3	
47261	FUEL PIPE SUPPORTS	22500	1.3	
47263	FUEL PIPE MISC ITEMS	27000	1.3	
47269	ST PIPE SHOP BEND REST OF MILL	385000	1.3	
47710	Pulverised Fuel Piping - DD items	3000	1.3	
47858	Fuel Piping - Shop items	26000	1.3	471
	subtotal	471000	1.3	
48012	DUCT - -FDFAN TO A.H	141093	1.3	
48014	EXP.JT - -FDFAN TO A.H	4481	1.3	
48015	SUPPORT-FDFAN TO A.H	27853	1.3	
48018	MISC. DUCT&SPRT MATL	13000	1.3	
48019	AIRDUCT SUP FDN MATL	3622	1.3	
48022	DUCT - FDFAN INTRCON	10000	1.3	
48112	DUCT - -PAFAN-PRI-AH	145623	1.3	
48114	EXP.JT - -PAFAN-PRI-AH	10575	1.3	
48115	SUPPORT-PAFAN-PRI-AH	19013	1.3	
48141	SEAL AIR HAG&ID GATE	5000	1.3	
48142	DUCT - -COLDAIRBUS	134815	1.3	
48144	EXP.JT - -COLDAIRBUS	3836	1.3	
48145	SUPPORT-COLDAIRBUS	19560	1.3	
48200	INS TAPPINGS ON DUCT	2700	1.3	
48202	DUCT - AH-WIND BOX	186353	1.3	
48204	EXPJT - AH-WIND BOX	43618	1.3	
48205	SUPORT AH-WIND BOX	47861	1.3	
48206	CLH/VLH -Hot Air	12275	1.3	
48207	FLOWMTR-SEC AIRFLOW	25118	1.3	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
48208	DUCT-SEC.AIR TO WB	149019	1.3	
48212	DUCT - WIND BOX CONN	113377	1.3	
48214	EXPJT - WIND BOX CONN	11316	1.3	
48222	SQ DUCT AH-HOT AIR BUS	200835	1.3	
48224	EXPN PCS AH-HOT AIR BUS	14375	1.3	
48225	SUPPORT AH-HOT AIR BUS	36708	1.3	
48262	Rect Duct Aiht Toprinozzle And Seca	103827	1.3	
48264	Expn Piece Aiht Toprinozzle and Seca	34546	1.3	
48265	Supports Aiht Toprinozzle And Seca	12672	1.3	
48342	SCR Inlet Ducting	250000	1.3	
48344	EXPJNT-SCR inlet ducting	15000	1.3	
48345	Supports-SCR Inlet ducting	20000	1.3	
48352	SCR outlet ducting	175000	1.3	
48354	EXPJNT-SCR outlet ducting	15000	1.3	
48355	Supports-SCR outlet ducting	20000	1.3	
48362	Eco bypass ducting	100000	1.3	
48364	EXPJNT-Eco bypass ducting	15000	1.3	
48365	Support-Eco bypass ducting	20000	1.3	
48372	DUCT - ECO HOPPER TO AH	28690	1.3	
48382	DUCT - ECO-HOPPER	122256	1.3	
48384	EXPNJ - ECO-HOPPER	39258	1.3	
48385	SUPPORT - ECO-HOPPER	15000	1.3	
48386	DUCT - ECO TO ECO HOPPER	250000	1.3	
48395	CLH/VLH-FLUE GAS	6000	1.3	
48432	DUCT - AH-BLROUTFL	102789	1.3	
48434	EXPJT - AH-BLROUTFL	6650	1.3	
48435	SUPORT AH-BLROUTFL	32034	1.3	
48462	DUCT - BLROUTFL-EP	415143	1.3	
48464	EXPJT - BLROUTFL-EP	35738	1.3	
48465	SUPORT BLR OUTFL-EP	51508	1.3	
48662	CIRCULAR DUCT HOT BUS MILLS	118921	1.3	
48664	EXPN PCS HOT BUS MILLS	11208	1.3	
48665	SUPPORTS HOT BUS MILLS	16925	1.3	
48667	FLOW METER	17038	1.3	
48700	BULKED BPS COMPONENT	4000	1.3	
48911	Slide Brg Pl & Pac Bellow-Blr	1264	1.3	
48915	Man Hole Doors (450X450)	10000	1.3	
48993	ERECTON-MATERIALS	30224	1.3	3477.717
	subtotal	3477717	1.3	
50510	STEAM COIL A P H	16000	1.3	16
	subtotal	16000	1.3	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
57010	GATE-FD FAN OUTLET	31031.228	1.3	
57033	DAMPER-SA SCAPH INLET	14797.174	1.3	
57063	DAMPER-SA SCAPH OUTLET	18756.996	1.3	
57083	DAMPER-SA SCAPH BYPASS	18772.364	1.3	
57110	GATE-PA FAN OUTLET	16970.25	1.3	
57141	SEAL AIR HAG AND ID FAN OUTGAT	9006.082	1.3	
57141	SEAL AIR HAG AND ID FAN OUTGAT	9264.548	1.3	
57143	DAMPER-COLD AIR TO MILL	5672.856	1.3	
57160	GATE-COLD AIR TO MILLS	14170.816	1.3	
57173	DAMPER-PA APH INLET	9440.9	1.3	
57203	DAMPER-SA APH OUTLET	27432.548	1.3	
57209	MTG BKT FOR CL DAMPER AIR CYL	4346.72	1.3	
57223	DAMPER-PA APH OUTLET	10663.522	1.3	
57270	GATE-HOT AIR TO MILLS	22046.896	1.3	
57273	DAMPER-HOT AIR TO MILL	9874.829	1.3	
57363	DAMPER-ECONOMIZER BYPASS ISOLN	8385.664	1.3	
57413	DAMPER-ECONOMISER BYPASS CNTRL	6565.133	1.3	
57430	FLUE GAS AH OUT GATE	63601.768	1.3	
57466	PLATFORMS AND LADDERS	1731.344	1.3	
57466	PLATFORMS AND LADDERS	780.064	1.3	
57577	ELECT ACTUATOR FOR GATE,DAMPER	5000	1.3	
57577	ELECT ACTUATOR FOR GATE,DAMPER	10000	1.3	
57578	ELECTRICAL ITEMS FOR GATE,DAMP	8	1.3	
57578	ELECTRICAL ITEMS FOR GATE,DAMP	50	1.3	
57603	DAMPER-SCR INLET	58619.544	1.3	
57613	DAMPER-SCR OUTLET	58447.424	1.3	
57623	DAMPER-SCR BYPASS	55490.668	1.3	
57988	DUCTS COMMISSIONING SPARES	7.36	1.3	490.934698
	subtotal	490934.698	1.3	9082.843698
	NON PRESSURE PARTS TOTAL	9082843.7	1.4	
	ROTATITING MACHINES		1.4	
	AIR HEATER ASSY		1.4	
52010	LARG AH-ROTOR ASSY	1487500	1.4	
52011	LARG AH-ROTOR POST	49209.856	1.4	
52012	LARG AH-ROTORPINRACK	7491.496	1.4	
52013	LARG AH-ROTORSEALS	17330.256	1.4	
52030	LARG AH-ROTORHOUSING	71962.022	1.4	
52041	HOT END CONN PLATE	128713.338	1.4	
52042	COLD END CONN PLATE	246761.122	1.4	
52054	LARG AH-AXIAL SEAL	1300	1.4	
52055	LARG AH-BY PASS SEAL	1728.3	1.4	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
52100	LARGE AH ROTOR DRIVE	14472.86	1.4	
52101	LARG AH-AUX ROTDRIVE	10460	1.4	
52211	LARG AH-AIRSEAL PIPE	792.274	1.4	
52220	LARG AH-GENS DETAILS	5200	1.4	
52261	LARG AH-GUIDE BEARNG	7978.999	1.4	
52262	LARG AH-SUPRT BEARNG	21910.252	1.4	
52271	OIL PIPING GUIDE BRG	538.29	1.4	
52272	OIL PIPING SUPRT BRG	520.002	1.4	
52274	LUB OIL CIRCULATION UNIT	1114.768	1.4	
52275	LARGE AIR HEATER-LUBRICANTS	1509.89	1.4	
52301	WASH MANIFLD GAS INL	2425.748	1.4	
52302	WASH MANIFLD GAS OUT	2669.624	1.4	
52338	LARGE AH-MULTIMEDI CLNG DEV-CE	2050	1.4	
52339	LARGE AH-RETRACT CLNG DEV (HE)	1486.456	1.4	
52988	LARG AH COMMISSIONING SPARE	497.28	1.4	2085.622833
	subtotal	2085622.833	1.4	
	FD, ID, PA, Seal Air Fans		1.4	
55011	FD FAN FOUNDATION MATL	1498.144	1.4	
55021	AXL IDFAN FDN MATL	3200	1.4	
55024	ID SEALING/COOLING FANS	3000	1.4	
55031	PA FAN FOUNDATION MATL	1650	1.4	
55091	FISRT FILL LUBRICANTS	4620	1.4	
55216	AXIAL FD FAN ROTOR	4460.042	1.4	
55227	AXIAL ID FAN ROTOR	36919.734	1.4	
55335	AXIAL 2 REACTION PA FAN ROTOR	6010.204	1.4	
55516	AXIAL FD FAN STATOR	25785.932	1.4	
55527	AXIAL ID FAN STATOR	89725.365	1.4	
55635	AXIAL PA FAN STATOR	17982.034	1.4	
55810	AXIAL FDFAN COUPLING	850	1.4	
55820	AXIAL IDFAN COUPLING	2900	1.4	
55830	AXL PAFAN COUPLING	1200	1.4	
55910	AXIAL FD FAN LUBE OIL SYSTEM	3000	1.4	
55911	AXIAL FDFAN SILENCER	67070.556		
55919	AXIAL FD FAN INSULATION WOOL	16262.4	1.4	
55920	AXIAL ID FAN LUBE OIL SYSTEM	4100	1.4	
55930	AXIAL PA FAN LUBE OIL SYSTEM	4200	1.4	
55931	PA FAN SILENCER	55383.81	1.4	
55939	AXIAL PA FAN INSULATION WOOL	12936		
56161	RADIAL PENT HOUSE VENTILN FAN	1360	1.4	
56173	RADIAL SEAL AIR FAN ROTOR	1628.246	1.4	
56373	RADIAL SEAL AIR FAN BEARINGS	205.3	1.4	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
56473	RADIAL SEAL AIR FAN STATOR	6828.686	1.4	
56670	RADIAL SEAL AIR FAN MOTOR	2000	1.4	
56870	SEAL AIR FAN COUPLING(RADIAL)	45	1.4	374.821453
	subtotal	374821.453	1.4	
61010	JOURNAL ASSEMBLY(3nos),JOURNAL HEAD ASSY	73600	1.4	
61110	PLANETARY GEAR BOX ,BOWL & BOWL HUB ASSY	276800	1.4	
61210	MILL SIDE ASSEMBLY	158640	1.4	
61310	SEPARATOR BODY ASSEMBLY WITH TRUNNION SHAFTS & JOURNAL OPENING COVER,SEPARATOR TOP ASSEMBLY,DYNAMIC CLASSIFIER COMPLETE	369520	1.4	
61410	MDV ASSEMBLY -4nos (KNIFE GATVE VALVES)	3960	1.4	
61400	SEAL AIR ASSY	3200	1.4	
61710	MILL MOTOR COUPLG ASSY	2560	1.4	
61810	LUB OIL CIRCULATION UNIT	15120	1.4	
61910	FOUNDATION MATERIALS	83440	1.4	
61xxx	MISC COMPONENTS	213000	1.4	1199.84
	subtotal	1199840	1.4	
65200	Coal Feeder- Sub-Delivey	1000	1.4	
65710	Coal Feeder - DD items	200	1.4	
65736	36GRAVIMETRIC FEEDER	56500	1.4	57.7
	subtotal	57700	1.4	
67200	Coal Feeding System- Sub dely.	1500	1.4	
67204	RAW COAL GATES	3700	1.4	
67272	BUNKER OUTLET GATE -36" MOTOR	7500	1.4	
67277	FEEDER INLET GATE-36" MOTOR	8500	1.4	
67283	FEEDER OUTLET ISOLATION GATE	11000	1.4	
67710	Coal Feeding System - DD items	600	1.4	
67801	DOWN SPOUT	18500	1.4	
67802	BUNKER EMPTYINGCHUTE	24500	1.4	
67803	FEED PIPE TO MILL	18500	1.4	94.3
	subtotal	94300	1.4	
xxxxx	Mill Motors	60400	1.4	
xxxxx	FD Fan Motors	29200	1.4	
xxxxx	PA Fan Mototrs	32200	1.4	
xxxxx	ID Fan Motors	46000	1.4	167.8
	subtotal	167800	1.4	3980.084286
	ROTATITING MACHINES TOTAL	3980084.286	1.5	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA	Description	Weight in Kgs(per unit)	Rate Schedule ID	Weight in MT
	Rotating Machines Handling Equipments		1.5	
61502	Mill handling system	33000	1.5	
99099	MISC CHAIN PULLY BLO	100	1.5	
99100	FAN HANDLING EQUIPT	14500	1.5	
99300	PUMP HANDLING EQUIPT	4000	1.5	
99400	SCAPH,RAPH HANDLG EQ	3500	1.5	
99502	PRE.PARTS HANDLING E	14500	1.5	
99512	FURN CRADL-2WALC	3000	1.5	
99600	FO SYSTEM HANDLG EQU	1000	1.5	73.6
	subtotal	73600		
	Insulation in Boiler Breakup		1.6	270
	Castable,Pourable Refractory	270000	1.8	129.2
	Fixing Components (Steel ,etc)	129200	1.7	1248.1984
	Mineral Wool	1248198.4	1.9	287.8
	Aluminium Components	287800		1935.1984
	subtotal	1935198.4		43305.21438

B) Detail weight schedule for Unit -5 ESP, GATES, DUCTS & DAMPERS , EXTERNAL STRUCTURES, Insulation of 5X800 MW Yadadri TPP

PGMA+C2:I90	Description	Wt in KG	Rate SCH Id	Qty
	Gates and Dampers			
57460	GATE-ESP INLET	56795.656	2.2	
57466	PLATFORMS AND LADDERS(partial)	2000	2.2	
57466	PLATFORMS AND LADDERS(partial)	40000	2.2	
57470	GATE-ESP OUTLET	60561.632	2.2	
57480	GATE-ID FAN INLET	51393.59	2.2	
57490	GATE-ID FAN OUTLET	52483.828	2.2	
57491	BLOWER WITH MOTOR	8600	2.2	
57497	KNIFE GATE VALVE	3520	2.2	
57577	ELECT ACTUATOR FOR GATE,DAMPER(partial)	5380	2.2	
57577	ELECT ACTUATOR FOR GATE,DAMPER(partial)	40000	2.2	
57988	DUCTS COMMISSIONING SPARES	7	2.2	
	Sub Total	320741.706	2.2	320.741706

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA+C2:I90	Description	Wt in KG	Rate SCH Id	Qty
	ESP		2.1	
79301	ROLL/SLIDE SUPPORTS	35128	2.1	
79305	ESP-SUB-DELIVERY COMPONENTS	589.7	2.1	
79306	INSULATOR HOUSING AS	50154.84	2.1	
79308	GAS DIST. ASSY	93503.824	2.1	
79309	GD-RAPPING MECHANISM	16505.13	2.1	
79310	GD_DRIVE ARRANGEMENT	921.32	2.1	
79311	GAS SCREEN-EP	75562	2.1	
79313	EMIT SYST SUSPENSION	19844.02	2.1	
79314	SUPPORT INSULATORS	12960	2.1	
79315	EMITTING ELECTRODES	37301.22	2.1	
79316	EMIT ELECT RAPP MECH	48472.704	2.1	
79317	DRIVE ARGT. FOR EMIT. SYS	36280.908	2.1	
79319	COL ELEC SUSPENSION	171092.633	2.1	
79320	COLLECTING ELECTRODE	1631082.266	2.1	
79321	EMIT SYS FRAME-TOP	176840.662	2.1	
79322	EMIT SYS FRAME BOTOM	211589.665	2.1	
79323	INSPECTION DOORS	14910.282	2.1	
79324	SHOCK BARS	133860.241	2.1	
79325	COLL ELECT RAPP MECH	110160.868	2.1	
79326	COLL ELEC RAPP DRIVE	8182.368	2.1	
79328	ESP ROOF BEAM	250676.308	2.1	
79331	GEARED MOTORS FOR RAPPING MECH	27000	2.1	
79332	EMIT SYS FRAME-MIDLE	273861.366	2.1	
79342	OUTER ROOF-EP	343006.568	2.1	
79343	HOPPER RIDGES	84249.887	2.1	
79344	HOPPER UPPER PART	435604.32	2.1	
79345	HOP MLD&LOWER PART	667320.576	2.1	
79346	INSULATOR SUPP PANEL	159629.368	2.1	
79347	ROOF PANEL ASSY	232176.74	2.1	
79348	CASING STRUCTURE	597760.944	2.1	
79349	CASING SHELL/PANEL	732173.462	2.1	
79350	INLET-OUTLET FUNNEL	220238.528	2.1	
79355	PENT HOUSE FOR E P	173679.459	2.1	
79357	SPLITTER&GUIDE VANES	38895.336	2.1	
79361	EP PERF TEST EQUIPT	17120.302	2.1	
79363	ASH LEVEL INDICATOR	600	2.1	
79365	APP PLATFORM-HOPPER	161601.1	2.1	

TENDER SPECIFICATION BHEL PSSR SCT 1867

TECHNICAL CONDITIONS OF CONTRACT (TCC)

PGMA+C2:I90	Description	Wt in KG	Rate SCH Id	Qty
79366	WATER WASHING SYSTEM	5935.185	2.1	
79372	INTERLOCKS-EP	2000	2.1	
79373	ELECTRICALLY OPERTD HOIST&ACCE	6500	2.1	
79380	FOUNDATION MATLS FOR ESP	19604.532	2.1	
79381	SUPPOTING STRUCTURES FOR ESP	764675.321	2.1	
79390	HEATING ELEMENTS	4984	2.1	
79401	ROLL/SLIDE SUPPORTS	3808	2.1	
79405	ESP-SUB-DELIVERY COMPONENTS	70.19	2.1	
79406	INSULATOR HOUSING AS	5849.125	2.1	
79411	GAS SCREEN-EP	8736.604	2.1	
79413	EMIT SYST SUSPENSION	2237.2	2.1	
79415	EMITTING ELECTRODES	4144.8	2.1	
79416	EMIT ELECT RAPP MECH	5317.12	2.1	
79417	DRIVE ARGT. FOR EMIT. SYS	4039.448	2.1	
79419	COL ELEC SUSPENSION	18923.063	2.1	
79420	COLLECTING ELECTRODE	192034.392	2.1	
79421	EMIT SYS FRAME-TOP	20014.014	2.1	
79422	EMIT SYS FRAME BOTOM	23877.521	2.1	
79423	INSPECTION DOORS	1487.944	2.1	
79424	SHOCK BARS	15658.848	2.1	
79425	COLL ELECT RAPP MECH	12012.856	2.1	
79426	COLL ELEC RAPP DRIVE	909.152	2.1	
79432	EMIT SYS FRAME-MIDLE	30447.332	2.1	
79442	OUTER ROOF-EP	37452.09	2.1	
79443	HOPPER RIDGES	9937.384	2.1	
79444	HOPPER UPPER PART	45553.472	2.1	
79445	HOP MLD&LOWER PART	74133.952	2.1	
79455	PENT HOUSE FOR E P	12714.501	2.1	
79465	APP PLATFORM-HOPPER	15126.941	2.1	
79466	WATER WASHING SYSTEM	384.55	2.1	
79480	FOUNDATION MATLS FOR ESP	1801.596	2.1	
79481	SUPPOTING STRUCTURES FOR ESP	69621.472	2.1	
79489	GUIDE PLATE/VANE EP INLET DUCT	19222	2.1	
79988	COMMISSIONING SPARES	903.222	2.1	
79xxx	TRANSFORMER RECTIFIER	156000	2.1	
89610	EP GALLERIES&STAIRS	4491.328	2.1	
89610	EP GALLERIES&STAIRS	75559.171	2.1	
89611	ESP ROOF HANDRAILS	1089.94	2.1	

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PGMA+C2:I90	Description	Wt in KG	Rate SCH Id	Qty
89611	ESP ROOF HANDRAILS	11156.02	2.1	
89612	FLOOR GRILL AND STEP TREAD	3202.065	2.1	
89612	FLOOR GRILL AND STEP TREAD	56952.885	2.1	
89613	FLOOR GRILL AND MOBILE LADDER	5336.775	2.1	
89613	FLOOR GRILL AND MOBILE LADDER	56040.06	2.1	
89614	PENT HOUSE ROOFING SHEETS	4278	2.1	
89614	PENT HOUSE ROOFING SHEETS	38270.2	2.1	
AI101	AIR AND AMMONIA PIPING	6700	2.1	
AI102	VALVES AND PIPE FITTINGS	1041.058	2.1	
AI103	INJECTION PROBE ASSEMBLY	10100	2.1	
AI104	GAS HEADER ASSEMBLY	820.7	2.1	
AI105	AIR BLOWER WITH ACCESSORIES	10043	2.1	
AI201	SKID ASSEMBLY	12000	2.1	
AI202	WATER SPRINKLER ASSEMBLY	465.212	2.1	
AI203	SUPPORTS AND PLATFORM	20000	2.1	
	sub total	9214201.156	2.1	9214.20116
	Structures			
39012	FOUNDATION MATERIALS (partial)	3540	2.2	
39141	COLS FRAMES NEAR ID	147440	2.2	
39142	COLS FRAMES NEAR ID	286466	2.2	
39150	COL FRAMES BETN I.D.	149869	2.2	
39300	PLATFORMS - AFTER ESP	134110	2.2	
39301	STRUC AND PLATFORM FOR FAN(partial)	1721	2.2	
39306	FAN HANDLING STRUCT FOR ID	71440	2.2	
39700	HSFG FASTENERS FOR PG 39(partial)	379	2.2	
39810	FLOOR GRILL(partial)	26898	2.2	
39820	STAIRS(partial)	11407	2.2	
39850	HAND RAIL AND HAND RAIL POST(partial)	15292	2.2	
39993	CONSUMABLES AND ERECTION MATERIAL(partial)	6408	2.2	
	sub total	854970	2.2	854.97
	DUCT			
48018	MISC. DUCT&SPRT MATL(PARTIAL)	13883	2.2	
48141	SEAL AIR HAG&ID GATE(PARTIAL)	2500	2.2	
48200	INS TAPPINGS ON DUCT(Partial)	2000	2.2	
48395	CLH/VLH-FLUE GAS(partial)	6500	2.2	
48482	DUCT - ESP TO ID FAN	388474	2.2	
48484	EXP NJT - ESP TO ID FAN	23116	2.2	
48485	SUPPORT - ESP TO ID FAN	42581	2.2	

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PGMA+C2:I90	Description	Wt in KG	Rate SCH Id	Qty
48492	DUCT - IDFAN-CHIMNY	375000	2.2	
48494	EXPNT - IDFAN-CHIMNY	13681	2.2	
48495	SUPPORT IDFAN-CHIMNEY	45000	2.2	
48496	DUCT - ,ID FAN-CHIMNEY	150000	2.2	
48498	DUCT - ,ID FAN-CHIMNEY	20000	2.2	
48700	BULKED BPS COMPONENT	2155	2.2	
48912	Slide Brg Pl-Id Sys	726	2.2	
48915	Man Hole Doors (450X450)(partial)	5466	2.2	
48993	ERECTON-MATERIALS(partial)	10000	2.2	
	sub total	1101082		1101.082
	Insulation		1C,1D,1E	
32210	FIX COMP-DUCT INSULN(partial)	30000		
32700	BULKED DD COMPONENT(partial)	25000		
33221	DUCT MINERAL WOOL(partial)	300000		
79367	MIN WOOL FOR ESP INSULATION	208544		
79368	FIXING COMP. FOR ESP INSULATIN	84314.575		
79467	MIN WOOL FOR ESP INSULATION	23184		
79468	FIXING COMP. FOR ESP INSULATIN	9378.806		
89615	INSULATION CLADDING SH FOR ESP	7680		
89615	INSULATION CLADDING SH FOR ESP	69120		
	sub total	757221.381		
	Total per unit	12248216.24		
	Total per package	24496432.49		
	Insulation details			
	Fixing Components (Steel ,etc)	148693.381	1D	148.693381
	Mineral Wool	531728	1C	531.728
	Aluminium Components	76800	1E	76.8
	sub total	757221.381		757.221381
	TOTAL			12248.2162

Note to clause 1.9.1 above:

1. The weights mentioned above are approximate and liable to vary as per design consideration. There will be change in PG, weight, description etc. However, payments will be made for the tonnage actually erected at the quoted rate. Quantity Variation will be dealt as per clause 2.14 of General Conditions of Contract (Volume I Book II).
2. Besides PG / PGMA indicated in the weight schedule, there is likelihood of addition of product groups integral to Boiler, Aux Boiler, ESP and its auxiliaries. The quoted rates shall be applicable for such product groups also.

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3. The erection & dismantling of temporary piping, pumps, tanks, dummy plates & other miscellaneous equipment etc. for pre-commissioning and commissioning activities like hydraulic test, chemical cleaning, steam blowing, gas tightness test etc. are covered in this contract and shall be carried out as a part of work. There will not be any separate payment for these works.
4. The Erection of HT MOTORS are covered in this scope of contract.
5. The Erection and alignment of HV rectifier transformers are covered in this scope of contract. However, dry out, testing and commissioning is not in the scope of this contract.
6. Fixing Components for Insulation: The scope of work covers welding of all attachment on the pressure parts for fixing insulation & refractory.
7. The erection and dismantling of air blowers and connecting pipes and ducts, providing blanks / dummies at the required locations and conducting gas tightness test is in the scope of the contract and shall be carried out within the quoted rate.
8. Imported electrodes / TIG welding wires released by manufacturing Units will be supplied by BHEL. All other electrodes / TIG welding wires are to be supplied by contractor under his scope.
9. Also, refer welding schedule in chapter 4 of part II of Technical Conditions of Contract (Volume-I Book-I).
10. The welding joints indicated in the welding schedule in Volume I Part II Chapter 2 is typical for an 800MW supercritical boiler.

For aux. boiler, tube expansion as per the drawing is in the scope of contract. Modification / rectification of tubes before tube expansion shall be carried out by the contractor with in the quoted rate.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART-I CHAPTER -X

GENERAL

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.10.1 **In addition to the clause 2.8 of General Conditions of Contract (Volume-1C of Book-II) the contractor shall comply with the following.**

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.10.2 Contractors are requested to furnish the following documents at PSSR-HQ, Chennai immediately after release of Letter of Intent (L.O.I)

- i) Security Deposit and Additional Security Deposit
- ii) Un Qualified Acceptance for Detailed L.O.I. / work order
- iii) Rs 100/- Stamp Paper for Preparation of Contract agreement.

1.10.3 Contractors are requested to furnish the Proof of Documents for the following at PSSR-Site

- i) Provident Fund (PF) Registration Number.
- ii) Labour License Number.
- iii) Workmen Insurance Policy Number.

1.10.4 **In addition to the clause 2.8 of General Conditions of Contract (Volume-1C of Book-II) the contractor shall comply with the following:**

1.10.4.1 **BOCW Act & BOCW Welfare Cess Act**

1.10.1.1.1 The Contractor should register their Establishment under BOCW Act 1996 read with rules 1998 by submitting Form I (Application for Registration of Establishment) and Form IV (Notice of Commencement / Completion of Building Other Construction Work) to the respective Labour Authorities i.e.,

- a) Assistant Labour Commissioner (Central) in respect of the project premises which is under the purview of Central Govt.–NTPC, NTPL etc.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- b) Appropriate state authorities in respect of the project premises which is under the purview of State Govt.
- 1.10.1.1.2 The Contractor should comply with the provisions of BOCW Welfare Cess Act 1996 in respect of the work awarded to them by BHEL.
- 1.10.1.1.3 The contractor should ensure compliance regarding Registration of Building Workers as Beneficiaries, Hours of work, welfare measures and other conditions of service with particular reference to Safety and Health measures like Safety Officers, safety committee, issue of Personal protective equipments, canteen, restroom, drinking water, Toilets, ambulance, first aid center etc.
- 1.10.1.1.4 The contractor irrespective of their nature of work and manpower (Civil, Mechanical, Electrical works etc) should register their establishment under BOCW Act 1996 and comply with BOCW Welfare Cess Act 1996.
- 1.10.1.1.5 Contractor shall make remittance of the BOCW CESS as per the Act **in consultation with BHEL** as per the rates in force (presently 1%) BHEL shall reimburse the same upon production of documentary evidence. However, BHEL shall not reimburse the Fee paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
- 1.10.1.1.6 Non- compliance to provisions of the BOCW Act and BOCW welfare Cess Act is not acceptable. BHEL reserves the right to withhold any sum it deems fit. Only upon total compliance to the BOCW Act and also discharge of total payment of Cess under the BOCW Cess act by the contractor, BHEL shall consider refund of the amounts.

1.10.1.2 Provident Fund

- 1.10.1.2.1 The contractor is required to extent the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of this letter of intent. In case, you are exempted from such remittance an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.

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1.10.1.2.2 The contractor shall ensure the payments of minimum labour wages to the workmen under him as per the rules applicable from time to time in the state.

1.10.1.2.3 The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable.

1.10.1.3 OTHER STATUTORY REQUIREMENTS

- 1.10.1.3.1 The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no. along with the first running bill.
- 1.10.1.3.2 The contractor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.
- 1.10.1.3.3 The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. In case of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contractor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.
- 1.10.1.3.4 The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workman under ID Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act 1948 (if applicable) to BHEL along with the Final Bill.
- 1.10.1.3.5 In case of any dispute pending before the appropriate authority under ID act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.
- 1.10.1.3.6 In case of any dispute prolonged / pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying

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BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL.

1.10.1.3.7 RECOVERY OF COMPENSATION PAID TO VICTIMS BY BHEL IN CASES OF DEATH/ PERMANENT INCAPACITATION OF PERSON DUE TO AN ACCIDENT DURING THE WORKS.

BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

a) **Victim:** Any person who suffers permanent disablement or dies in an accident as defined below.

b) **Accident:** Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing / operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works /during working at BHEL Units/ Offices/ townships and premises/

Project Sites.

c) Compensation in respect of each of the victims:

In the event of death or permanent disability resulting from Loss of both limbs:
Rs. 10,00,000/- (Rs. Ten Lakh)

In the event of other permanent disability: Rs. 7,00,000/- (Rs. Seven Lakh)

d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to Section 2 (l) of the Employee's Compensation Act, 1923."

1.10.1.3.8 DEPLOYMENT OF SKILLED / SEMI-SKILLED TRADESMEN

1.10.1.3.8.1 The following clause is applicable incase the contract value / contract price is Rs. Five crores and above.

1.10.1.3.9 The contractor shall, at all stages of work deploy skilled / semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute / Industrial Training Institute / National Institute of Construction

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Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed / certified by State / Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled / semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

1.10.5 GENERAL

- 1.10.5.1 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The applicable erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any rework on this failure to comply with will be to account of contractor only. BHEL engineer, depending upon the availability of materials, fronts etc., will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs in other projects or for any reason whatsoever.
- 1.10.5.2 Contractor has to work in close co-ordination with other erection agencies at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule / plans. Contractor shall arrange & augment the resources accordingly.
- 1.10.5.3 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc. for any temporary supporting or scaffolding works or as bed for pre-assembly works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a

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sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

- 1.10.5.4 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.
- 1.10.5.5 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely operation of equipment installed. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.
- 1.10.5.6 The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.
- 1.10.5.7 No member of the already erected structure, platform, pipes, grills, other component and auxiliaries should be cut without specific approval of BHEL engineer.
- 1.10.5.8 No temporary supports shall be welded on the pressure parts of piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alteration of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer.
- 1.10.5.9 Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies / personnel on ISO 9001 – 2015 Standards.
- 1.10.5.10 Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer for other agencies, like piping, Turbine, Generator erection, Cabling,

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instrumentation, insulation etc., to commence their work from / on the equipments coming under this scope. Sometimes, more than one agencies may have to work in same location. Sometimes it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the overall project schedule.

- 1.10.5.11 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.
- 1.10.5.12 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.
- 1.10.5.13 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.
- 1.10.5.14 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.
- 1.10.5.15 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.
- 1.10.5.16 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.
- 1.10.5.17 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.
- 1.10.5.18 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
- 1.10.5.19 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

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- 1.10.5.20 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.
- 1.10.5.21 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.
- 1.10.5.22 On completion of work, 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 expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.5.23 UTILITY POINTS

- 1.10.5.23.1 Number of utility points (Service / plant air, service / plant water, service / washing steam, inert gas (N_2) etc., shall be indicated in the P & I diagram. Contractor to locate the utility points as advised by site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout with 'BILL OF MATERIAL' to BHEL for approval.
- 1.10.5.23.2 The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe.

1.10.5.24 DOCUMENTATION

- 1.10.5.24.1 Contractor shall be supplied with two extra copies of the layout & isometrics drawings. Contractor to incorporate in one of the copy with Red ink all the changes / deviations / alterations etc. carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.
- 1.10.5.24.2 After successful completion, testing and commissioning of installation work, as built drawings / documents if any, in line with the actual work carried out as per site routing drawing shall be submitted by the contractor as agreed for the project.
- 1.10.5.24.3 The contractor shall maintain a record in the form as prescribed by BHEL for all operations carried out on each weld and maintain a record indicating the number

TECHNICAL CONDITIONS OF CONTRACT (TCC)

of welds, the name of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejections if any, percentage of rejection, etc. and submit copies of the same to the BHEL Engineer as required.

1.10.5.24.4 Other documents as specified in of Chapter – XI of Technical Conditions of Contract (VOLUME-IA PART- II)

1.10.5.25 SITE INSPECTION

1.10.5.25.1 The contractor shall maintain at site a joint protocol for recording actual measurement of work carried out at site, inspection and witnessing of various tests conducted by the contractor.

1.10.5.25.2 The owner / employer or his authorized agents may inspect various stages of work during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever for such duplication of inspection of work be entertained.

1.10.5.26 PLATFORMS, CROSSOVERS & CANOPIES (Applicable for part I of BOQ)

Platforms, ladders, crossovers and canopies shall also be provided at places where it has not been shown in drawings but if felt necessary by site engineer. Canopies shall be provided for all outdoor pumps and motors. Platforms, ladders, crossovers and canopies shall have to be fabricated from raw materials supplied by BHEL and erected by contractor as per instruction of BHEL and shall be paid as per accepted tonnage rate for “structures” i.e, Rate schedule Id. 1.1

1.10.5.27 Steam Generator & Auxiliaries-Over view

Steam Generator of 800 MW capacity each including all related auxiliary equipments are broadly specified as below. The steam generator will be of once through, two pass, single reheat, radiant furnace, dry bottom, balanced draft, outdoor type, pulverised coal fired having super critical parameters with all necessary auxiliaries, integral piping, elevators, etc.

Scope includes Erection, alignment and welding, bolting, fastening, grouting, assisting commissioning, arranging statutory clearances as applicable of:

- (1). Boiler structure.

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- (2). Water cooled furnace complete with separators, water wall, headers, steam generating tubes, furnace bottom hoppers, drains, observation ports, etc.
- (3). Super heaters including safety valves with silencers, motorized main steam stop valves with integral bypass valve, startup vents, air vents, nitrogen connections, etc.
- (4). Re heaters including safety valves with silencers, drains, air vents, etc.
- (5). In line, bare tube economizer, including vents, drains etc.
- (6). De superheating spray system for Super heaters and Re heaters
- (7). Steam soot blowing system including long fully retractable rotary blowers for super heater, re heater and economizer; Sweep action soot blowers for regenerative air preheater along with necessary accessories. Soot blower System will be complete with drains, entire piping, fittings, control valves, safety valves etc
- (8). Complete draft plant for the balanced draft system
 - a) 2 nos. Forced draft fans with drives, associated auxiliaries and accessories.
 - b) 2 nos. Induced draft fans with drives, associated auxiliaries and accessories.
 - c) 2 nos of Primary air fan with drives, associated auxiliaries and accessories.
 - d) Regenerative air pre-heater 2 nos.
 - e) 2 nos. steam coil air pre-heater (SCAPH) with drain collection system.
 - f) Air and Gas duct work with necessary metallic expansion joints, dampers and support steel work up to chimney.
 - g) Duct stiffening devices, mating flanges, access doors and brackets, supporting structure as applicable.
- (9). Raw coal feeders system.
- (10). (2 X 100%) Seal Air Fans
- (11). Coal pulverisers (bowl mills), complete with all necessary accessories (including classifiers, seal air fans, etc).
- (12). 2 X 100% scanner air fans.
- (13). Fuel oil system will cater to Heavy Furnace Oil (HFO) and Light Diesel oil (LDO) firing requirements of each Steam Generator. Fuel oil burners will be complete

TECHNICAL CONDITIONS OF CONTRACT (TCC)

with diffusers, tips extension pipes, atomizers, burner shut off valves, flexible hoses and all other ancillaries.

(14). All valves, dampers etc with actuators.

(15). Hoists and cranes.

(16). Thermal insulation & refractory.

(17). Painting.

(18). SCR.

(19). Ducts and dampers:

FD fan to Furnace System, PA Fan to Mills, Furnace Outlet to Boiler Outlet Flange(BOF), BOF to ESP inlet, ESP outlet to ID Fan & ID Fan to Chimney flue inlet including chimney inlet transition duct. (The transition duct connecting flue gas duct to vertical chimney flue liners).

VOLUME-IA PART-I CHAPTER - XI
PROGRESS OF WORK

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.11.1 Refer forms F -14 to F-18 of volume I D (Forms & Procedure) of volume -I Book-II. Plan and review will be done as per the formats.
- 1.11.2 Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
- 1.11.3 Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.
- 1.11.4 Tenderers have to furnish a list of Tools and Plants including cranes, Tractor / Trailers etc., which they propose to deploy for this work.
- 1.11.5 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer. The periodicity of the reports will be decided by BHEL Engineer at site.
- 1.11.6 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.
- 1.11.7 The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard.
- 1.11.8 The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.
- 1.11.9 The monthly report as a booklet shall be submitted at the end of every month and shall contain the following details: -

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- a. Progress photographs in colour.
- b. Erection progress in terms of tonnage, welding joints, radiography, stress relieving, etc., completed as relevant to the respective work areas against planned.
- c. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan.
- d. Category- wise man hours engaged during the previous month under the categories of fitters, welders, riggers, khalasis, grinder-men, gas-cutters, electricians, crane operators and helpers. Data shall be split up under the work areas like Boiler (pressure parts, structures), Rotating machines, SCR, Insulation etc.
- e. Consumables report giving consumption of all types of gases and electrodes during the previous month.
- f. Availability report of cranes.
- g. Safety implementation report in the format.
- h. Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

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VOLUME-IA PART-I CHAPTER -XII

FOUNDATIONS AND GROUTING

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.12.1 Foundation for the equipments to be erected shall be provided by BHEL / clients of BHEL. The dimensions of the foundations and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipments / plants shall be carried out by the contractor.
- 1.12.2 Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., dewatering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form / shuttering work are within the scope this work.
- 1.12.3 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 30 mm for obtaining proper face for packer plates / shims, as may be required for the erection of the equipment / plants will have to be carried out by the contractor without extra cost
- 1.12.4 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments / equipments based on the foundations including shear lug provisions/openings.
- 1.12.5 Foundation pockets are to be cleaned thoroughly before placing the supports / columns / equipments. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement. If required cleaning of the threads to be done with proper dies.
- 1.12.6 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. Packer plates should not

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only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineer's instructions.

- 1.12.7 Total grouting of the columns / equipments including pocket grouting, grouting at the gap between foundation and base plates top surface of column / equipments is in the scope of the contractor. All the grouting should be carried out by non-shrink cement like combextra GPI / Combextra GP II / Shrinkkomp or its equivalent etc. This special non-shrink cement shall be arranged by the contractor at his cost. The quoted rate shall be inclusive of the same.
- 1.12.8 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost including any miscellaneous expenditure for this activity. BHEL will not pay any service and incidental charges for arranging the supplier representative. The contractor to take note of this aspect and quote accordingly.
- 1.12.9 All equipment bases and structural steel bases and foundations pockets shall be grouted and finished as per these specifications after surface preparation unless otherwise recommended by the equipment manufacturers. The surface preparation includes soda washing of the foundations to remove oil, grease etc. to ensure proper grouting.
- 1.12.10 The certificates of the grout are to be submitted BHEL. If necessary, test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards. In case grouting with Portland cement is approved, necessary cement, sand etc. to be arranged by the contractor including the fine aggregates.
- 1.12.11 All the materials required for grouting including special cements as approved by BHEL and other materials like Portland cement, sand, chips, gravel, etc., are to be arranged by the contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.
- 1.12.12 Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates / sheets at site by the contractor to meet site requirement. However, machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.

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1.12.13 PROCEDURE FOR GROUTING:

Contractor has to carry out the grouting as per the work instructions for grouting available at site or the grouting is to be carried out as per the supplier's recommendation / IS standard. Copy of those recommendations is to be submitted to BHEL for records.

VOLUME-IA PART-I CHAPTER -XIII

MATERIAL HANDLING, TRANSPORTATION AND SITE STORAGE

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.13.1 Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment, placement on respective foundation / location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks/ slings/ tools and tackles / labour including operators, fuel, lubricants etc. for loading & unloading of materials will be in the scope of contractor.
- 1.13.2 Loading at storage yard and transporting to site, unloading at site / pre assembly area or at working area, is in the scope of work. Required cranes for loading & unloading of materials, trailer shall be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, sandbags which are required for temporary supporting of the components at site. Store / storage yards are located approx. 5 kms from site of erection which are within and outside the plant premises adjacent to the plant boundary.
- 1.13.3 The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.
- 1.13.4 Contractor shall plan and transport equipments, components from storage yard to erection site in such a manner and sequence that material accumulation at site does not lead to congestion at site of work.
- 1.13.5 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.
- 1.13.6 Materials shall be stacked neatly, preserved and stored in the contractor's shed / work area in an orderly manner. In case it is necessary to shift and re-stack the materials

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kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

- 1.13.7 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.
- 1.13.8 The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting of the components at site.
- 1.13.9 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.

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VOLUME-IA PART-I CHAPTER- XIV

ERECTION

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.14.1 Erection

- 1.14.1.1 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision/clarification of BHEL engineer will have to be followed.
- 1.14.1.2 In case of any class of work for which there is no such specifications as laid down in the contract such as blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.
- 1.14.1.3 The contractor is strictly prohibited in using any of the Boiler components like angles, channels, hand-rails, etc for any temporary supporting or scaffolding work. In case of such misuse, a sum as determined by BHEL shall be recovered from contractor's bills. Also the contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.
- 1.14.1.4 The temporary structures/ items welded to permanent members/pipes are to be cut and removed without any damage. Any damage so to permanent members/ pipes to be made good by the contractor at his cost.
- 1.14.1.5 All welded joints shall be subjected to acceptance by BHEL Engineer.
- 1.14.1.6 The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection /location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage/loss of such equipment at site.
- 1.14.1.7 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

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- 1.14.1.8 Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.
- 1.14.1.9 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.
- 1.14.1.10 Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.
- 1.14.1.11 Any fixtures, scaffolding materials, approach ladders, concrete block supports, steel structures required for temporary supporting, pre assembly, checking, welding, lifting & handling during pre-assembly and erection shall be arranged by the contractor at his cost.
- 1.14.1.12 In the case of structural members / ducts in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connects the joints at no extra cost.
- 1.14.1.13 Fine fittings and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the 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 when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.
- 1.14.1.14 All welded joints should be painted with anti-corrosive primer, once NDE works are over.
- 1.14.1.15 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.
- 1.14.1.16 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.
- 1.14.1.17 Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.

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- 1.14.1.18 In case of piping connected to equipment, matching of flanges for achieving the parallelism and alignment at equipment end by suitably resorting to heat correction or other method as instructed by BHEL Engineer is within scope of work.
- 1.14.1.19 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.
- 1.14.1.20 Wherever elbows of 45 deg or any other angle are required, the same shall be cut from 90 deg. elbow supplied and used. No extra cost shall be paid.
- 1.14.1.21 Erection of flow switches, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL/Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.
- 1.14.1.22 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles/orifices/ metering elements fixed on piping as per the instructions of BHEL Engineer.
- 1.14.1.23 Welding of all thermowells, draft, pressure and temperature instrumentation points and all other instrumentation points on piping and auxiliaries and welding of thermocouple pads for permanent system as well as for performance guarantee test is in the scope of work.
- 1.14.1.24 Plate / Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc., shall be supplied by BHEL duly bent and threaded. Assembly and necessary cutting work etc., shall be carried out at site by contractor within the quoted rate.
- 1.14.1.25 Wherever hanger and support materials are not received from manufacturing unit in time to suit the erection schedule, contractor shall erect the system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap/spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports. The erection of temporary support is in the scope of contractor at no extra cost.
- 1.14.1.26 No separate payment will be made for the edge preparation of pipes, Standard fittings such as bends, Tees etc.,
- 1.14.1.27 Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

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- 1.14.1.28 All the equipments /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joints assemblies and other components as per instruction of BHEL Engineer during erection at the quoted rate.
- 1.14.1.29 Contractor shall cut / open works if needed, as per BHEL Engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning opening of valves, changing of gaskets, attending to leakages, minor modification, rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower with T & Ps in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning, the same has to be rectified by the contractor at his cost.
- 1.14.1.30 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity.
- 1.14.1.31 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.
- 1.14.1.32 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be removed / attended as per BHEL engineer.
- 1.14.1.33 Field Quality Assurance Formats: -

It is the responsibility of the contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and customer as token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets.

1.14.2 ERECTION OF BOILER & ITS AUXILIARIES, AUX BOILER AND ROTATING MACHINES

- 1.14.2.1 Brief list of System / sub-system to be erected by the contractor & approximate weight of individual PGMA's and number of welding joints are given in this tender elsewhere and are meant for giving general idea to the tender only about magnitude

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of the work involved. This should not be taken for billing or any other claims. All weights for such purposes will have to be taken from design documents only (shipping list). This section also gives general idea about various components to be erected with expected accuracy level. However, the contractor is requested to get the correct details from the engineer to avoid mistakes and rework.

1.14.2.2 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

- a) Scaffolding and rigging operations
- b) Machine / flame / electric cutting, grinding, welding, radiography and stress relieving.
- c) Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, cleaning, checking, leveling, blue matching, aligning and assembly.
- d) Machining, surface grinding, drilling, doweling, shaping
- e) Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication
- f) The contractor should get the formal approval from the Boiler inspectorate to take up the boiler erection work (mainly pressure parts, piping etc.). Necessary assistance will be extended by BHEL for the same

1.14.2.3 Preparation of preassembly bed is very much essential for preassembly of MBLs, columns, ceiling girders, panels, coils etc. on consolidated ground and to avoid sagging and shrinking the temporary supports are to be provided. The preassembled component should have minimum three supports to avoid sagging. No separate payment will be made. The column and girder pieces are to be measured individually to check for camber, sweep etc. The level markings on the columns to be checked before erection. The verticality stickers are to be fixed over individual column pieces on both the flanges (90° apart in two places). These stickers are to be arranged by the contractor within the quoted rates.

1.14.2.4 Tier by tier erection method is to be followed. Columns are to be tied up with horizontal and diagonal bracing in each tier before proceeding to next level. Log sheets are to be maintained in line with log sheets which are available with BHEL. After grouting the first tier columns, second tier erection is to be taken up. Adequate curing of the grout is to be ensured. Verticality of the columns is to be ensured either by plum bob or theodolite. The tolerance for verticality is 1mm per meter subject to

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a maximum of 25 mm. Care should be taken while erecting the vertical and diagonal bracings to maintain the work points as per drawing. The top level of the column level should be achieved within 3 mm variance. Before erection of top column piece the girder pin connection matching and welding of support plates with column top shall be completed. Necessary lubricant for the girder pin assembly should be applied as per drawing within the quoted rates.

- 1.14.2.5 The following measuring and test equipments with proper calibration certificates are to be made available by the contractor before taking up the structural and other pressure parts erection. Steel tapes minimum 5M,30M in sufficient numbers, torque wrench minimum 650-1000 ft pounds, bolt tension calibrator, torque wrench with calibration, temperature recorder, two theodolites with one second accuracy etc. Periodic calibration of the measuring instruments is to be done once in six months and certificate for the same to be submitted to BHEL for records.
- 1.14.2.6 Detailed procedure available with BHEL site office should be collected before taking up the job by the contractor for preassembly of ceiling girders. EACH CEILING GIRDER WILL BE SUPPLIED IN MAXIMUM 3 PIECES AND CEILING GIRDERS ARE TO BE PRE-ASSEMBLED AT SITE AND WELDING, NDT TESTS AND STRESS RELIEVING AS APPLICABLE ARE TO BE CARRIED OUT, INCLUDING 100% RADIOGRAPHY FOR THE WELDED JOINTS IN CEILING GIRDERS.
(Please check for the correct dimensions / measurements including weight before taking up the work and plan for the resources)

Camber, sweep and twist are to be checked. Major deviation if any observed should be intimated to BHEL for getting the resolution before proceeding further. The tolerances for individual piece camber and sweep, individual length, level of girder assembly, flatness of the web, out of squareness of assembly, overall length of the assembly etc. to be ensured before taking up the job. The preheating and post heating operations to be done in line with the guidelines issued by BHEL. Any additional clarifications if required are to be obtained. The sequence of welding of girder joints for the flange and web is to be followed strictly as per the procedure issued by BHEL. Suitable crane to be used for handling /lifting the ceiling girder. Positioning of the crane inside the boiler cavity is to be decided in consultation with BHEL.

- 1.14.2.7 The erection of the welded beams, rolled beams, boiler roof frame assembly etc. to be taken up along with ceiling girders immediately as the crane moves from first girder to the last. The silencers of various safety valves also to be erected in the respective bays. The completion of the roof sheeting should follow to create a comfortable working space in the boiler cavity giving protection to all work men from

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rains and sun. It is expected that the contractor will complete the same before separator lifting/pressure parts erection. The materials for boiler roofing and side cladding etc. will be supplied by BHEL and contractor has to erect the same at the quoted /accepted tonnage rate.

- 1.14.2.8 The tightening procedures for HSFG bolts are to be obtained from BHEL at site before taking up the work. Normally it is done by turn of nut method. Torque wrenches also can be used. The bolted joints will be checked jointly by BHEL/Customer engineers for required tightness and retightening is to be done as per requirement. The tightened bolts will be marked with colour paints. Facility for random checking by torque wrench will have to be done. The required calibrated torque wrench will be provided by the contractor.
- 1.14.2.9 Some platform materials in PG 36 and PG 38, approach ladders, suspension materials etc. will be supplied in running meters. The contractor has to modify these materials wherever they are supplied in running meters to the required size / shape, to be welded and erect them within the quoted rates.
- 1.14.2.10 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should not be welded on the column and should be fabricated clamping type ladders. No temporary welding on any structural members is permitted except under special circumstances with the approval of BHEL. The necessary materials for the ladders are to be arranged by bidder within quoted rate. Any ladder supplied by the manufacturing unit for this purpose will be issued to contractor free of cost and the same is to be returned once the platforms are completed.
- 1.14.2.11 Scrap disposing chutes are to be provided by the contractor within the quoted rate at different areas like along the boiler column, bunker structure and duct supporting structures. Material for the scarp chute will be provided by BHEL.
- 1.14.2.12 Certain adjustments in length of steel /pipe/tube members may be necessary while erecting high pressure pipelines of boiler and piping (pre-fabricated lines) and the contractor should remove the extra lengths to suit the final layout after preparing edges afresh and adopting specified heat treatment procedures at no extra cost, wherever indicated. Depending upon the type of deviation BHEL will consider the reimbursement at man hour rates. If the drawing provides for erection allowance, then it becomes part of the work and no compensation is payable. The prepared edges in pressure parts shall be preserved by applying with weldable primer as preservation and supply of the primer is in contractor scope.

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- 1.14.2.13 Ducts / expansion pieces are dispatched to site in loose walls / plates and these are to be assembled at site before erection. (Walls with stiffeners in welded condition will be provided)
- 1.14.2.14 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over. Daily welding reports in the proforma suggested by BHEL should be submitted by next morning without fail.
- 1.14.2.15 Suspension for piping, pressure parts, ducting etc., will be supplied in running lengths which shall be cut to suitable sizes and adjusted as required within the quoted cost.
- 1.14.2.16 All the dampers, valves, lifting equipments, power cylinders, etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre-commissioning. The bearings of dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning the equipments, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract.
- 1.14.2.17 In case of any class of work for which there is no such specifications as laid down in the contract such us blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.
- 1.14.2.18 Spring suspensions / constant load hangers have to be preassembled and adjusted for the required loading and erected as per instructions, of BHEL Engineer. Any adjustments, removal of temporary arrestors / lockers, etc., have to be carried out as and when required at no extra cost to BHEL.
- 1.14.2.19 The contractor shall carry out necessary preservative painting, periodic application of preservations on pressure parts and other equipments during erection / after erection until completion of work. Necessary preservatives / paints, other consumables are to be arranged by the contractor at his cost
- 1.14.2.20 Contractor shall provide necessary crew with all items like wire brushes, paint brushes, emery paper, cotton waste, scaffolding materials etc., at his cost.
- 1.14.2.21 No temporary supports shall be welded on the pressure parts of piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alteration of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer
- 1.14.2.22 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing to obtain a reliable and complete pipe installation as per

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instructions of BHEL Engineer. Normally supports are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost. (Any machining or threading is involved will only be done by BHEL).

- 1.14.2.23 Normally the high pressure valves will have prepared edges for welding. But if it becomes necessary the contractor shall 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 for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection, after chemical cleaning and during commissioning. Edge preparation becomes the part of erection work. However, payment for new edge preparation reconditioning beyond reasonable limits will be considered as per man day rates. All the valves, after chemical cleaning, have to be checked, cleaned or overhauled in full or part before erection if called for as part of scope.
- 1.14.2.24 Adjustments like removal of ovalities in pipes and opening or closing the fabricated bends of all piping including high pressure piping to suit the layout shall be considered part of work and the contractor is required to carry out such work free of cost, as per instructions of BHEL, which shall include specific heat treatment procedures etc.,
- 1.14.2.25 Suspension for piping, pressure parts, ducting etc., will be supplied in running lengths which shall be cut to suitable sizes and adjusted as required within the quoted cost.
- 1.14.2.26 Fabricated pipes are sent in standard length and will 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 up to NB 65 mm will have to be fabricated at site adopting specified heat treatment procedures, wherever required at no extra cost.
- 1.14.2.27 **The enclosed welding schedule in VOLUME- IA PART II Chapter 4 is for information and the applicable welding schedules will be issued during erection of work at site.**
- 1.14.2.28 In the case of structural members / ducts in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connect the joints at no extra cost. Normally, the machine profile will be cut out for the structural members but the contractor will have to carry out suitable

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alteration / adjustments at site, without any extra payment in case it becomes necessary.

- 1.14.2.29 Attachment, welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and control valves etc., both for regular measurements and performance testing to be provided on boiler / its auxiliaries or pipelines covered with in scope of this tender, will also be the responsibility of the contractor and the same will be done as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor's responsibility even if, (a) Product group under which these items are released are not covered in the scope of this tender, (b) Items are supplied by an agency other than BHEL if they are integral to the scope envisaged under this package. Payment will be regulated as per the settled terms and conditions.
- 1.14.2.30 The contractor shall fabricate piping, install lub oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lub oil system, carry out the pressure test of oil coolers. etc.,
- 1.14.2.31 All the tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Sponge ball test shall be carried out for all tubes before erecting the same. Bigger size pipes should be cleaned with flexible wire brush, wherever necessary. After cleaning is over, the end caps shall be put back in tube openings till such time they are welded to other tubes. Required compressors shall be arranged by the contractor at his cost.
- 1.14.2.32 All attachment welding including those for insulation and refractory work coming on the pressure parts shall have to be done by the contractor. Contractor's quoted rate shall include all these contingencies. Attachment welding on pressure parts shall be done by qualified and certified welders only.
- 1.14.2.33 It is the responsibility of the contractor to do the alignment, checking, etc., if necessary, repeatedly to satisfy BHEL Engineer / customer Engineers with all the necessary tools and tackles manpower, etc., without any extra cost. The alignment will be complete only when jointly certified so, by the BHEL Engineer & customer. Also the contractor should ensure that the alignment is not disturbed afterwards.
- 1.14.2.34 Burner tilt mechanism will be checked for freeness, serviced and adjusted, if necessary to obtain optimum tilt before and after installation.
- 1.14.2.35 Fine fittings, boiler trim piping, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position. As such, layout of small bore piping in boiler and oil system shall be done as per the

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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 when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.

- 1.14.2.36 Additional platforms for approaching different equipments as per the site requirement, which may not be indicated in drawings, shall be fabricated, assembled and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate for erection of structure. The steel materials required for these works shall be supplied by BHEL free of cost and the contractor will have to install them to suit the requirement. Works of major nature not covered under this clause.
- 1.14.2.37 Complete penetration of water wall (Panel to panel) tube to tube and fins welding shall be achieved either by single side or preferably double side welding. The decision of BHEL Engineer is final.

NOTE: The water wall/spiral wall panels will be supplied with fin cut to a length of 300 mm on ends for alignment and welding of tube to tube of panels at site. The contractor may require to cut fins further to a maximum length of 300 mm (total 600 mm) for alignment and welding of tube to tube in water wall/spiral wall panels and welding of fins on both sides after completion of panel to panel welding within the quoted rate. The required material for fin will be supplied in rods. No extra payment will be made for the above works.

- 1.14.2.38 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.
- 1.14.2.39 The column erection has to be done tier by tier with all bracings, beams to be erected, welded / bolted. Second tier of erection can be carried out only after grouting of column base.
- 1.14.2.40 Certain extra lengths of various tubes/pipes and fabricated ducts are provided as erection allowance and the same have to be cut/adjusted to suit the site conditions and layouts or certain small lengths may have to be added for adjustments to suit the site conditions. For any mismatch while matching the joints in tubes, the cutting, adjusting, re welding, addition spool pieces should be done by the contractor to match site conditions without any extra payment.
- 1.14.2.41 Assistance for calibrating / testing the power cylinders / valves, gauges, instruments, etc. and setting to actuators coming under various groups shall be provided by contractor within the quoted rates.

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1.14.2.42 Hanger rods are shown in the pressure parts arrangement drawing for boiler. Any cutting / welding and required heat treatment and necessary NDT of such hanger rods will be done by the contractor as part of the work within the quoted rate. The hangers for pressure parts will be tested for even distribution of load with the help of torque wrench.

1.14.2.43 Skin casing sheet for covering the boiler roof panels, and other areas will be supplied as fabricated items. Any cutting and re-fabrication to suit the site conditions shall be carried out within the quoted rates.

1.14.2.44 For all the site routed piping under PG-21, 24 & 42 as built drawings are to be submitted by the contractor immediately after erection. It is to be noted that piping for fine fittings, trim piping, oil system (PG 42) soot blower system shall be supplied mostly in running meters which will be erected and all joints are to be welded as per the drawings/site routing within the quoted rates by the bidder.

1.14.2.45 Regarding steam coil-Air Pre-heater the contractor is expected to erect as per the drawings. Hydraulic test of SCAPH has to be carried out on the ground before lifting it to the position.

1.14.2.46 Seal box to be painted with bituminous paint of IS158 by the bidder. The required paint shall be supplied by the bidder within the quoted rate.

1.14.2.47 Before lifting the heavy components like header, panels, burner assemblies, down comer pipes etc. soft materials like gunny bags to be used while lashing the rope to avoid dents, rubbing marks etc. The capacity, number of sheave pulleys, size of the rope, guide pulley locations are to be decided at site with respect to the capacity and positioning of the winch. The end caps provided at shop for various stubs are to be removed during final fit up only.

1. While Lifting the headers lifting lugs or shell portion of the headers only to be used. The temporary supports to be removed prior to hydraulic test. While erecting the temporary supports, care should be taken so that they do not affect the erection of permanent supports. Tack welding of suspension rods with bearing plates to be done after final adjustment. Details for welding of bearing plates can be referred in the drawings/check list.
2. Precautions to be used while erecting the collector channel supports. Equal loading of the hangers is to be ensured. Ring headers are erected before erection of water wall bottom hopper panels. Headers are to be arrested before welding to panels/headers/tubes/coils as the case may be. Sequence of welding to be followed while welding higher size joints.

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3. Each water wall tube is provided with an orifice assembly in the bottom ring header. Orifice adopter is welded inside the header and welded at shop. After chemical cleaning operations, the orifice assemblies are to be erected at site as per directive of engineer and drawings.
4. Erection of various components is taken up from top to bottom. Planning has to be done every month in consultation with the engineer. Pre assembly of seal boxes for the peep hole openings, pressure tapping, soot blowers etc. can be done on the ground before erection, if feasible. The burner blocks are to be erected in convenient position before closing the furnace with panels. For panel to panel erection and welding panels erection attachments are supplied by units. Furnace alignment with respect to boiler /furnace axis is very vital and important. The alignment is to be achieved. Details to be checked with engineer.
5. The gaps between coils and steam cooled /WW panels /between coils etc. to be maintained in line with drawing. Please check up the permissible tolerance before taking up the work.
6. Preassembly of end bars with crown plates including stress relieving for coil assemblies.
7. Pump case / volute is welded with suction manifold in line with procedures available with site office.
8. The required accuracy level to be ensured before welding as per drawing. Necessary radiography/NDT along with heat treatment to be done.
9. CC pump motor installation is taken up only after completion of system pipe work supports. When mounted the pump should accommodate movement in the pipe without imposing excessive loads on the casing and branches. Sufficient clearance should be available beneath the motor to facilitate removal during maintenance. It is to be assembled as per the directions available with engineer.
10. Ensure completion of the maintenance hoists meant for CC pumps immediately else the area may be used by other agencies for laying the cables for various equipments coming in that area, inadvertently and they have to be removed later. Heat exchanger installation is also to be completed and necessary cooling water lines, thermocouples, pressure gauges etc. to be completed. The power cable connection made to the pumps should ensure free down ward expansion of the boiler at the level.

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11. Down comer pipes erection can be done by carrying out preassembling the pipes whatever feasible as per availability. The suction manifold received in loose pieces and to be pre-assembled in the floor nearby. After welding the suction manifold, it is to be positioned, aligned and then only the down comers from the steam separator/ drum are to be connected. Erection of suction spool pieces, and hand operated valves for the system to be erected. The CC pump volute without impeller is fitted to the bottom of the suction spool. Bottom flange of the volute is carefully leveled and aligned before welding the suction spool. After completion of welding in all respects cutting and trimming of erection attachment to be done. CC pumps volute is to be blanked for carrying out hydro test. After hydro test, the blanks are removed and pump erection taken up. The tightening of the bolts to be done with torque wrench as per the instructions of the supplier.
12. Before taking up the erection of coils, pre erection checks to be carried out like width and length of the coil, availability of flexible connectors, damages on the coils, permanent bows if any, sponge test for the coil and completion of ground inspection by inspector of boilers as deemed.
13. Erection of LTRH/ Economizer coils as applicable can be done by preassembling the upper and lower coils. Pre erection checks like width, length etc., and sponge test of coils for thoroughness to be done before erection. Required hanger tubes erection to be completed before LTRH / Economizer coils erection. The preassembly of cassette baffles of LTRH and Eco coils can be carried out before their erection.
14. Check for the gaps between SH steam cooled front wall and Eco/SH horizontal assemblies, gap between SH steam cooled rear wall and SH horizontal assemblies/ eco assemblies, spacing between rear WW arch and pendant assemblies and finish SH coils. Detailed drawings are to be referred during execution. The items indicated are suggestive only.
15. Check for the inner space between eco coils, LTRH, RH and SH coils as per drawing
16. Ensure proper completion of steam cooled spacers. Check for clearances for soot blower lance tubes. Radiant roof skin casing sheets are to be welded after application of castable refractory.
17. Before erecting the valves and other mountings, check for the tag for correct rating with valve schedule. Ensure correct flow direction. Ensure easy accessibility for operation and maintenance of valves.

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18. While erecting the safety valves, check for the set pressure and type. The lever arrangement, blow down ring approach for floating should be ensured. Drip pan drains with proper slope to be given to safe location. Check the exhaust pipe arrangement for expansion and proper guides to be given. Ensure anchor points for the above pipes.
19. Ensure removal of drains plugs provided in the silencers, the gap between exhaust pipe and roof is sealed properly.
20. DWLGs to be erected as per drawing. Joint protocol to be made for its correct erection with supports
21. Other tapping points meant for monitoring the level should be erected and protocol is to be made. Maximum use of the pads and lugs welded on the steam separator/drum to be used for giving supports.
22. Sample coolers are to be erected preferably in clean area. All the lines should be air blown before termination on both ends. Sockets are to be used for sampling lines.
23. All the drain lines should have sufficient slope towards drain. Provide expansion loops in all the vents and drains as per the drawings. All the motor operated valve stems should be vertical preferably. All the valve packing with asbestos base to be lubricated once in 6 months till handing over. Necessary gland packing will be supplied by BHEL.
24. Prior to erection of any pressure part like headers, pipes, tubes, panels etc. inspection to be done for any foreign materials and damages and they are to be removed/ attended as per BHEL engineer.
25. Transport binders on all coils are to be removed.
26. Gas distribution baffles and vibration snubbers, mechanical spacer bars etc. are to be erected as per drawings.
27. Buck stays are preassembled and raised to their respective elevations and hung prior to erection of furnace walls. Before fixing them to furnace walls, ensure completion of panel to panel welding and voids in the buck stay region. The necessary scalloped bars /plates/pads are to be welded after leveling. Ensure completion of vertical buck stays including support hangers, links. The erection of leveler channels with guides to be completed.
28. All the furnace guides to be erected as per drawing keeping gap of about 3 mm for free boiler expansion.

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29. The necessary connection to the wind box is to be completed in all respects as per drawing. If any drain holes are envisaged, the same to be provided. No pipe line supports should be taken from the buck stays without getting the approval from engineer.
30. Sagging of roof tubes results in condensate stagnation during shut down. Hence ensure that radiant roof and back pass roof tubes are erected without sag.
31. Total boiler is to be examined in all levels for free expansion. All the arrestors are to be removed. Expansion indicators are to be erected in various levels as per drawing / instruction of engineer.
32. Some of the few important locations for voids filling: -
 - Around penetration for pendent surfaces and radiant roof/SH screen tubes/second pass roof tubes.
 - Between loose front ww tubes above front upper panels and below radiant roof.
 - Gap between radiant roof tubes at the junction of front wall.
 - Extreme rear arch tubes and side ww/extended ww panels.
 - Extreme SH screen tubes and SH extended steam cooled walls.
 - Gaps between tubes / nipples in the steam cooled rear, side and front wall and respective headers.
 - Extreme tubes of front and side ww lower panels.
 - Side ww/extended side ww and extreme tubes of radiant roof.
 - Extended side steam cooled wall and extreme tubes of SH screen tubes.
 - Steam cooled side wall and extreme tubes of second pass roof.
 - Between tubes in upper corner tubes.
 - Between tubes in lower transition tubes.
 - Gap between tubes/nipples of side ww lower header at the ash hopper throat region.
 - Voids due to lifting slots in fusion/fin welded panels.
 - Voids due to erection slots in fusion/fin welded panels.
 - Fusion/fin welded panel fin slits at the panel tube-tube butt joint locations.

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- The above list is suggestive only. Voids are to be closed suitably to retain refractory in position and to achieve the gas tightness.

1.14.2.48 Erection of Boiler structures and points to be taken care of for achieving verticality of Boiler columns.

- The column pieces are pre-assembled and site match marks to be provided.
- Pre assembly checks to detect and deviations in the columns like length, camber sweep, twist etc.
- Checking of foundations for its levels distance, diagonal, distance etc.
- Proper tightening of the foundation bolts.
- Erection of columns tier by tier and box by box. Grouting to be done immediately after 1st tier erection.
- Ensuring the availability of guy ropes, etc. during column erection and removal of guy ropes after ensuring the verticality of columns.
- Using calibrated theodolite for verticality measurement of columns.
- Tightening of HSFG bolts to be done by turnoff nut method only after ensuring the verticality of the columns.
- Measuring adjacent diagonals of the ceiling girders after its erection.
- Ensuring the verticality of the columns before and after the Drum/steam separator erection.

1.14.2.49 All Rotating machineries and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary dismantling and refitting before erection. If in the opinion of BHEL Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.

1.14.2.50 The fans shall be checked for blade clearance and other vital tolerances. The Flow control devices in fans like IGV/Damper units shall be serviced. Necessary assistance for balancing of equipment during trial run shall be provided by the contractor.

1.14.2.51 Vital clearance of mill should be checked at site and adjusted if required.

1.14.2.52 The HT motor bearings shall be blue matched at site and checked for bearing clearance. Scrapping of bearing housing, if required to any extent shall be carried

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out by the contractor. No extra claim for blue matching of any two surfaces will be entertained. The HT motors will also be checked for air gap and adjustment of stator / rotor to magnetic center shall be carried out as part of erection.

- 1.14.2.53 The contractor shall fabricate piping, install lub oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lub oil system, carry out the hydraulic test of oil coolers. etc.,
- 1.14.2.54 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.
- 1.14.2.55 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from, all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity. If the contractor does not do this job satisfactorily, BHEL will arrange for the same at the cost of the contractor. Periodical payments to the contractor for the work done will be considered only if the housekeeping is certified as satisfactory by the customer.
- 1.14.2.56 Scrap disposing chutes are to be provided by the contractor within quoted rate at different areas like along the boiler main column, bunker structure, and duct supporting structures. Materials for the scrap chute will be provided by BHEL.
- 1.14.2.57 Aux boiler erection shall be commenced as soon as the foundations are handed over to the contractor and the erection and commissioning works to be completed to meet the main boiler requirement.

1.14.3 ERECTION OF ESP AND ITS AUXILIARIES

- 1.14.3.1 Loading at storage yard after identification, transporting to site or pre-assembly yard / erection site, unloading at pre-assembly yard / erection site, pre-assembling of equipment's wherever required for inspection or checking, erecting the material, aligning, welding, fastening, supporting, grouting, carrying out the necessary non-destructive testing as may be required, application of Insulation, providing services for trial operation, pre-commissioning activities upto the time of completion of commissioning activities and supply and application of final painting. The contractor should erect and assemble the components as per the drawings

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issued and the number of components supplied to him will be on the basis of shipping list / completion schedules. Complete pre assembling of components are in the scope of the contractor.

- 1.14.3.2 All the dampers, valves, lifting equipment's, power cylinders etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre-commissioning. The bearings of dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning the equipment's, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract.
- 1.14.3.3 Any other systems / Components which are integral to ESP & auxiliaries, supplied by BHEL manufacturing units are also to be erected and commissioned by the contractor within the quoted / accepted tonnage rate / lump sum value.
- 1.14.3.4 The Erection & Alignment of HV rectifier transformer is in the scope of contractor. However, dry out, testing and commissioning is not in the scope of this contract. HVR Transformer to be erected and handed over for commissioning in good condition. Refilling of oil, if required for HVR transformer, is included in the scope of the bidder till completion of HVR Transformer commissioning
- 1.14.3.5 Erection & dismantling of air blowers and connecting pipes & ducts, providing blanks/ dummies at the required locations and conducting gas-tightness test is in the scope of contract and shall be carried out within the quoted rate.
- 1.14.3.6 Certain extra lengths of various tubes/pipes are provided as erection allowance and the same have to be cut/ adjusted to suit the site conditions and layouts or certain small lengths may have to be added for adjustments to suit the site conditions. For any mismatch while matching the joints in tubes, the cutting, adjusting, re welding, addition spool pieces should be done by the contractor to match site conditions without any extra payment.
- 1.14.3.7 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be removed / attended as per BHEL engineer

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1.14.3.8 Wherever equipment's are supplied in pre-fabricated assembled packages, there may be necessity to make minor changes, including strengthening by additional welds. This shall be treated as part of the contractor 's scope.

1.14.3.9 All the bearings, Gearboxes etc., of the equipment and electrical motors to be erected are provided with protective greases only. Contractor shall arrange as and when required by the engineer for cleaning the bearing/gear boxes etc., with kerosene or some other agent if necessary by dismantling some of the parts of the equipment during erection and shall arrange for re-greasing/lubricating them with recommended lubricants and assembling back.

1.14.3.10 All the motors/pumps shall be stripped opened, thoroughly serviced with proper care and re-assembled properly before erection by the contractor. During servicing, pre-commissioning & commissioning, if any deficiency is observed the same should be taken up with BHEL Engineer at site and rectified at site without any delay.

1.14.3.11 All site-fabricated pipes will be issued in running metres as straight. These are to be cut and edge prepared at site to required length to suit layout as given in the erection drawing. All the attachments like lugs, stoppers, cleats etc., will be supplied as loose items and to be cut and welded to the pipes at site as per erection drawing. Necessary drilling of holes on main pipe for welding stubs shall also be done at site by the contractor. Fittings like bends, tees, elbow, MITRE bends, reducers, flanges etc., will be supplied as loose items.

1.14.3.12 ESP Collecting Electrodes may require straightening and repair for minor transport damages before erection as per erection manual by the contractor within the quoted price.

1.14.3.13 Additional platforms of permanent nature for approaching different equipment's, as per site requirement which may not be indicated in drawings shall be fabricated and installed by the contractor. However, the contractor will be paid for this work on accepted tonnage rate for ESP erection as per rate schedule 1A. The material required for platform will be supplied by BHEL at free of cost.

1.14.3.14 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should

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not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.

1.14.3.15 Any fixtures, concrete block supports, steel structures required for temporary supporting for pre-assembly or checking and welding for lifting and handling during pre-assembly and erection shall be arranged by the contractor.

1.14.3.16 The scope of equipment's to be erected under this contract is detailed in Tender Specification. The schedule of weights given wherein is approximate and is meant only to give a general idea to the tenderer about the magnitude of the work involved.

1.14.3.17 All the works such as cleaning, checking, leveling, blue matching, aligning, assembling, temporary erection for alignment, opening, dismantling of certain equipment's for checking and cleaning, surface preparation, edge preparation, fabrication of tubes and pipes as per general engineering practices at site, cutting, grinding, straightening, chamfering, filing, chipping, and rectification of foundation up to 30 mm, drilling, reaming, scrapping, shaping, fitting up etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily shall be carried out by the contractor as part of the work and at his quoted rates.

1.14.3.18 Fixing, welding of necessary instrumentation tapping points for regular measurements as well as performance testing, to be provided on auxiliaries covered within the scope of this specification will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The fixing / welding of all the above items will be contractor 's responsibility even if the

- I). Product groups under which these items are supplied are not specifically indicated in the Tender Specification.
- ii). Items are supplied by an agency other than BHEL.

1.14.3.19 Suspension for pipes will be supplied in running lengths which shall be cut to size and adjusted as required. All joints connecting ducts, expansion pieces shall be seal welded on inside and as well outside. Also it may sometime

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become necessary to remove any of the erected members to facilitate erection of bigger / pre-assembled equipment. In such case the removal and re-erection of such members, which are essential will have to be carried out by the contractor without any extra payment.

1.14.3.20 In the case of structural members / ducts, in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length/prepared the edges to suit the matching profile weld/bolt connect the joints at no extra cost.

1.14.3.21 Normally, the matching profile will be cut out for the structural members but the contractor will have to carry out suitable alterations / adjustments at site, without any extra payment, in case it becomes necessary.

1.14.3.22 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.

1.14.3.23 Contractor shall carryout necessary touch up painting periodic application of preservation on all components and other equipment during erection / after erection until completion of work. Contractor shall provide necessary crew with all items like wire brushes, paint brushes, emery paper, cotton waste, scaffolding materials etc.

1.14.3.24 Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.

1.14.3.25 It is the responsibility of the contractor to do the alignment, checking, etc. if necessary, repeatedly to satisfy BHEL Engineer / Customer Engineers with all the necessary tools and tackles, manpower etc. without any extra cost. The alignment will be completed only when jointly certified so, by the BHEL Engineer & Customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

1.14.3.26 Works such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin etc. are covered in the scope of work.

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1.14.3.27 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from various locations as indicated by BHEL Engineer. The housekeeping must be a routine and continuous activity in the various work fronts. If the contractor does not do this job satisfactorily, BHEL will arrange for the same at the cost of the contractor. Periodical payments to the contractor for the work done will be considered only if the housekeeping is certified as satisfactory by the customer.

1.14.3.28 It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the desired progress and target set by BHEL. The contractor 's quoted rate shall include all these contingencies.

1.14.3.29 All the valves, lifting equipment's, etc. shall be serviced and lubricated to the satisfaction of BHEL Engineer before erecting the same and also during pre-commissioning. The bearings shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning the equipment's, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract. Welding or joining of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rate.

1.14.3.30 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing to obtain are reliable and complete installation as per instructions of BHEL Engineer. Normally supports are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost. (Any machining or threading is involved will only be done by BHEL).

1.14.3.31 Before lifting the heavy components, soft materials like gunny bags to be used while lashing the rope to avoid dents, rubbing marks etc. The capacity, number of sheave pulleys, size of the rope, guide pulley locations are to be decided at site with respect to the capacity and positioning of the winch. The end caps provided at shop for various stubs are to be removed during final fit up only.

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1.14.3.32 Certain instruments like pressure switches, gauges, air sets, regulators, filters, junction boxes, power cylinders, dial gauges, thermometers, flow meters, valve actuators, flow indicators etc., are received in assembled conditions as integral part of equipment's. Contractor shall dismantle such instruments and re-erect whenever required prior to commissioning. Sometime this may have to be handed over to store or instrumentation contractor.

1.14.3.33 Ducts / expansion pieces are dispatched to site in loose walls / plates and these are to be assembled at site before erection.

1.14.3.34 No members of the structure / platform should be cut without specific approval of BHEL.

1.14.3.35 In case any class of work for which there is no such specification as laid down in the contract such as welding of stainless steel parts, etc. works shall be carried out in accordance with the instructions and requirements of the Engineer at the quoted rates only.

1.14.3.36 Contractor is strictly prohibited in using the erection components like angles, channels and hand rails for any temporary supporting or scaffolding works. In case of such misuse, a sum as determined by BHEL Engineer will be recovered from contractor's bills. Also the contractor will be responsible for the safe custody and proper accounting of all materials issued in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawals at the rate prescribed by manufacturing units.

1.14.3.37 Contractor shall carryout chipping and blue-matching of foundation concrete with the packer plates. The packer plates shall be supplied by BHEL. Necessary machining wherever required and blue-matching of packer plates shall be carried out by the contractor within the quoted rates

1.14.3.38 Attachment welding of necessary instrumentation tapping points, both for regular measurements and performance testing to be provided on E.S.P / its auxiliaries or pipelines covered within the scope of this tender will also be the responsibility of the contractor and the same will be done as per the instruction of BHEL Engineer.

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1.14.3.39 Spring suspensions / constant load hangers have to be pre-assembled and adjusted for the required loading and erected as per the instructions of BHEL Engineer. Any adjustments, removal of temporary arrestors / lockers etc. have to be carried out as and when required.

1.14.3.40 Roof Insulation
One layer of insulation mattress on roof top of E.S.P roof (inner) shall be applied before outer roof is placed.

1.14.4 APPLICATION OF INSULATION AND REFRactory

1.14.4.1 Handling at site stores / storage yard, Transportation to site of work, Application of refractory & Insulation materials and connected works for Boiler and auxiliaries, ESP, ducts etc., and binding and cladding with sheets etc., using their own tools plants, tackles, all consumables, supervisor and men as enumerated in the scope of contract. Refractory & insulation works include application of refractory, wool insulation, sheet metal cladding, welding of hooks / supports to hold insulation and refractory under this contract but are not limited to the following.

1.14.4.2 Insulation of main and Aux. boiler portion, boiler Drum / steam separator, ceiling heat recovery area, air and flue gas ducts, and connected ducts, HP & LP piping, temporary acid cleaning and steam blowing piping connected tubes, oil and coal burners, oil and steam tracing lines complete and fuel and draft plants, all drain lines, traps, flanges, fine fittings, sampling lines, Fans and other equipment like Vessels, Flash tanks, Heaters, etc.

1.14.4.3 The work shall conform to dimensions and tolerances given in various drawings and quality manuals provided by BHEL. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost, failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be effected from contractor's bill towards expenditure incurred including BHEL's overhead charges.

1.14.4.4 All insulations and refractory materials including iron components and other sheets, casing materials, etc., required as per drawing will be supplied by BHEL and the same have to be erected / applied as per the drawings and specifications of BHEL by the contractor.

1.14.4.5 Clean the Surface to be insulated from Rust, Dust, Grease, Loose scale, Oil, Moisture, etc. Care shall be taken that flexible insulation is not unduly compressed.

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After insulating the equipment, the gaps / joints shall be filled with loose wool/ moulded insulation as applicable

- 1.14.4.6 Painting of inner side of sheet metal covering over the insulation walls with two coats of anti-corrosive paint (IS-158) to be applied to the entire satisfaction of BHEL Engineer and application of bituminous sealing compound on cladding/ sheet metal joints shall also be carried out by the contractor. Retainer type 'A' must be coated with Aluminium paint. For which the required amount of paint, and other accessories for painting, cleaning the surfaces etc., shall be supplied by the contractor within the quoted rate.
- 1.14.4.7 Bituminous sealing compound will be provided by BHEL free of cost which is supplied by the respective Mfg. Units.
- 1.14.4.8 It is the responsibility of the contractor to ensure that the insulation and refractory materials and sheet metal covering issued to him for application are well protected against loss or damage or weather conditions tending to affect its quality by the provision of close / semi closed sheds at his cost.
- 1.14.4.9 All the insulation and refractory materials and sheet metal covering etc., issued to the contractor shall be properly stored and handled before application of the same. If any damage occurs to the materials due to improper storage or due to any causes attributable to the contractor except for normal breakage or damaged material shall be to the cost of the contractor.
- 1.14.4.10 Contractor is liable for the exact accounting of the materials issued to him and any unaccountable losses shall be made good by him. The necessary accounting of the material issued will have to be furnished by the contractor periodically
- 1.14.4.11 The contractor shall provide the required quantity of wire, nails and other materials for centering works at their cost.
- 1.14.4.12 Wherever iron components are to be welded on non-pressure parts, the contractor shall employ only approved structural welders. It shall also be the responsibility of the contractor to arrange for welding hooks, flats, plates, supports and other fixtures also. All consumables tools and plants etc., required for the work shall be arranged by the contractor at their cost.
- 1.14.4.13 Contractor shall observe all precautions for laying and curing of Castable refractory. Any defective works found shall be re-laid by contractor at his own cost including materials.
- 1.14.4.14 Wool insulations are received at site as bonded and un bonded mattresses in standard sizes. These has to be dressed / cut to suit equipment / site work by the contractor.

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- 1.14.4.15 For the insulation of hot air duct, gas duct, ID duct etc., un faced bonded wool, mattresses are to be used with wire netting (wire netting is supplied separately) on the outside for rigidity.
- 1.14.4.16 Dressing of insulation bricks to suit site conditions curing the refractory concrete applied, sheet cladding over insulations, form the part of this work.
- 1.14.4.17 Removal type of insulation to be provided for valves, fittings, expansion joints etc., as per the drawings or as directed by BHEL Engineer.
- 1.14.4.18 All piping insulations shall be carried out in such a manner as to facilitate removal of bolts nuts and washers from the flanges.
- 1.14.4.19 Refractory works at complete combustion chambers, ceiling heat recovery area, oil and coal burner areas and application of castable refractory wherever specified in drawing or as directed by BHEL Engineer have to be carried out.
- 1.14.4.20 Fabrication of covering sheets may be necessary like preparing the sheets to the sizes and shapes specified in drawings, beading, swaging, beveling of sheets crowning of the sheets if necessary the same to supports over wool insulation with screws as specified in BHEL drawings or as instructed by BHEL engineer.
- 1.14.4.21 Fabrication, fixing or welding of hooks / supports to equipment of boiler parts, piping and other connected equipments to support wool insulation applying of primer paint to welded portion parts welding certain supports on parts other than pressure parts to hold refractory's (by engaging approved welders) as per the drawings or as instructed by BHEL Engineer will have to be carried out by the contractor.
- 1.14.4.22 The contractor shall leave certain gap and opening while doing the work as per the instructions of BHEL Engineer to facilitate inspection by Boiler Inspector or doing commissioning to fix gauges, fittings, instruments. Those gaps will have to be finished as per drawings at a later date by the contractor at his cost, as required by BHEL .
- 1.14.4.23 Cladding sheets shall be suitably pressed along with diagonals to form diamond shape so as to improve the strength of the sheets, to avoid humpiness and to give aesthetic look.
- 1.14.4.24 Plates, bars, rods and other materials that are to be cut, and re-welded from the fabricated places to suit erection requirements for which no extra payment will be made to the contractor.

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1.14.4.25 A log book shall be maintained by the contractor for the clearance of the area for application of refractory and insulation. If the contractor does the work on his own accord without prior permission the area should be redone at his cost.

1.14.4.26 The contractor shall draw only one week's requirement of material for their work from BHEL stores and keep them in their semi-closed shed near to the work area. The materials required for a particular space of work only shall be taken to the work spot. At the end of the day's work the leftover or unused materials shall be taken back to their semi-closed shed for keeping the materials safe. Necessary records shall have to be maintained by the contractor in respect of the above drawls / deposits, on daily basis as instructed by BHEL.

1.14.4.27 Wastages allowance for the materials issued are envisaged as follows:

a) Castable refractory	2%
b) Insulation bricks & mortar	2%
c) Wool mattresses	2%
d) Cladding sheets	5%

1.14.4.28 Making structural supporting works for pourable insulation, laying pourable insulation, adhering to all specifications and instructions shall be the responsibility of the contractor

1.14.4.29 Upon completion of daily work , the contractor shall remove from the vicinity of work all scrap packing materials rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer. Also, the contractor will demolish all the hutments, sheds, offices, constructed by him and shall clean the debris after the contract is over. In the event of his failure to do so, the same will be arranged / removed by BHEL Engineer and the expenses incurred with overhead will be recovered from the contractors.

1.14.4.30 Welding of hooks as per pitch, non-pressure parts, applying red oxide paint to the welded portion as directed as per drawings before application of mineral wool mattresses will have to be done by the contractor.

1.14.4.31 Applying different layers of mineral wool as directed and as per drawings and specifications for boiler and its auxiliaries, pipelines valves and other vessels and after fixing require holdings materials, suitably if necessary, fabrication of rings etc., and fixing as directed and as per drawings and specifications shall also form part of this work.

1.14.4.32 If necessary the hooks may have to be made from the rods, raw materials supplied in running lengths. The contractor may have to carry out this work also and use the same hooks.

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- 1.14.4.33 In case the contractor is required to dismantle and re-erect certain area as and when required for pre-commissioning / commissioning activities the rate as indicated in the rate schedule shall be paid by BHEL for erection. However, for dismantling no extra charge will be paid under any circumstances.
- 1.14.4.34 Wherever additional / clamps, frame works, etc., are required to be fabricated and installed even though not indicated in the drawings shall be fabricated and installed at their cost. Only steel materials shall be given by BHEL free of cost, consumables like electrodes, gases etc., are to be arranged by the contractor at his cost.
- 1.14.4.35 Contractor has to arrange required fire retardant covering material at their cost to protect the insulation materials drawn from BHEL before and after erection.
- 1.14.4.36 The contractor shall provide any fixtures, concrete blocks / wooden sleepers, etc., which are required for temporary supporting of the insulation materials at site.
- 1.14.4.37 Delay in clearance of mechanical equipment and piping for insulations is unlikely to happen. However, if any delay occurs, the contractor shall not claim anything extra, like idle charges.
- 1.14.4.38 Welding of all seal boxes covers after completion of refractory work shall be done by the contractor. No extra charges will be payable for the same.
- 1.14.4.39 Application of Castable refractory between tubes around burners on ceiling and as directed by Engineers and as per detailed drawings and specifications will have to be done by the contractor
- 1.14.4.40 Welding of iron components directly on pressure parts and HP piping are to be carried out by certified IBR high pressure welders.
- 1.14.4.41 Application of insulation and removal of the same for temporary piping under scope of erection of this contract is also included in the scope of the work. However, BHEL will supply the insulation materials free of cost.
- 1.14.4.42 Dressing of insulation to suit site conditions, sheet cladding over insulations, form the part of this work.
- 1.14.4.43 The temporary structures / items welded to permanent members / pipes are to be cut and removed without any damage. Any damage so to permanent members / pipes to be made good by the contractor at his cost.
- 1.14.4.44 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision / clarification of BHEL Engineer will have to be followed.

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- 1.14.4.45 All rectification including painting of Employer's structure which are damaged by contractor during his work.
- 1.14.4.46 Special type of insulation wool used in penthouse shall not be cut indiscriminately. All chicken mesh, cut bits shall be accounted for.

**WELDING, HEAT TREATMENT & RADIOGRAPHY AND
NON-DESTRUCTIVE TESTING**

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless unless otherwise specified.)

FOR BUNKER, THE CLAUSES MAY BE APPLICABLE AS PER REQUIREMENT.

- 1.15.1 The bidder shall use the Customer approved quality welding electrodes only.
- 1.15.2 The pressure parts, equipments and piping shall be erected in conformity with the provisions of Indian Boiler Regulations and as may be directed, as per other standard / specification in practice in BHEL. The method of welding (viz) ARC, TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions.
- 1.15.3 Welding of pressure parts, high tensile structural steel, Piping shall be done by certified high pressure welders who possess valid certificate and who are approved by BHEL Engineer. *Links & Pipes for interlinking SH headers & RH headers are supplied with P91 materials.*
- 1.15.4 ***Welding & NDE test are to be carried out, including 100% radiography and the required UT for the welded joints in ceiling girders and 100% RT, 100% Hardness for all T91, T92 joints within the quoted rates. Irrespective of the EWS, the areas of T91, T92 joints shall be tested for 100% RT and 100% Hardness. UCI-M1C10 equipment shall be used by the contractor for Hardness measurement. The contractor shall make arrangement for testing through portable UCI method only.***
- 1.15.5 All welders including tack welders, structural and high pressure welder shall be tested and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid 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 and performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The

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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.

- 1.15.6 Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection in the joints welded by him. The welders having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
- 1.15.7 All charges towards testing of Welders for destructive and non-destructive test, testing and approval of welders for engaging in the erection work shall be borne by the contractor.
- 1.15.8 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 quality engineer.
- 1.15.9 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.
- 1.15.10 All expenses for testing of contractor's welders including destructive and Non-destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of tube and pipe material required for making test pieces will be supplied by BHEL free of cost.
- 1.15.11 Only BHEL approved electrodes and filler wire will be used. 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. Separate ovens shall be used for baking and holding.

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1.15.12 All butt / fillet welds shall be subject to Non -Destructive testing as per the Drawing/Procedures/Welding Schedules/tender Documents etc at no additional cost.

1.15.13 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, 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 otherwise of the welds shall be final.

1.15.14 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. Prepared edges to be preserved / applied with weldable primer.

1.15.15 All welds shall be painted with anticorrosive primer once radiography and stress relieving works are over. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost. RG plugs are to be plugged completely before proceeding with stress relieving.

1.15.16 Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, Non Pressure Parts like Crown Plate support assembly, including attachment welding wherever necessary, are parts 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.

1.15.17 Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor shall arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, ceramic pads, 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,

- 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.

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- 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 cost. 6 point, 12-point recorder shall be mobilized.

- The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting and during soaking period of SR operations.

1.15.18 The contractor shall also be equipped for carrying out other NDT like LPI /MPI /Hardness test etc. as required as per welding schedules/ drawings/tender conditions within the finally accepted price/ rates. Ultrasonic testing, wherever required, will be arranged by contractor within the quoted rate.

1.15.19 The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.

1.15.20 The contractor for radiography work shall use iridium-192 / Cobalt 60; 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). Contractor shall construct radiography pit for the same. Location for the pit shall be finalized and provided by BHEL.

1.15.21 Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only are used for weld joint radiography. Film density shall be between 1.5 and 2.0.

1.15.22 All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrometer as per ASME or ISO must be used for each exposure.

1.15.23 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.

1.15.24 Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification. 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 the down streamside of the weld. For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.

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1.15.25 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.

1.15.26 All arrangements for carrying out radiography work including dark room 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.

1.15.27 The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories. All radiography films shall be developed in the dark room at site. Contractor shall ensure that Radiography personnel be equipped with film badge dosimeter for monitoring cumulative radiation dose absorbed due to ionizing radiation.

1.15.28 In case of radiography of less than 100%, the joints identified by BHEL at random shall be radiographed.

1.15.29 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 on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out.

1.15.30 All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radio graphed and submitted to BHEL / customer.

1.15.31 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.

1.15.32 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.

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- 1.15.33 Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re- submitted for evaluation.
- 1.15.34 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-radio graphed at contractor's cost.
- 1.15.35 Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ Engineer required for the work as per directions of BHEL.
- 1.15.36 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.
- 1.15.37 The contractor shall deploy required number of H.P. welders to carry out the H.P. weld joints. The welding works should not be held up due to shortage / want of I.B.R/ H.P. welders.
- 1.15.38 All welded joints shall be subjected to acceptance by BHEL Engineer.
- 1.15.39 The technical particulars, specifications and other general details of work shall be in accordance with BHEL welding, Heat treatment and NDE manuals or equivalent as decided by BHEL Engineer.
- 1.15.40 Contractor shall carryout Radiography as per welding Manual booklet applicable as per IBR, enclosed. However, percentage radiography shown in the respective drawings shall be final and binding on the contractors.
- 1.15.41 The field joints are to be radiographed and preheating and post weld heat treatment to be done as per BHEL procedure and manuals.
- 1.15.42 The percentage of Radiography are tentative, which may be increased depending upon the quality of joints at the discretion of BHEL.
- 1.15.43 Penetrometer as per ASME/ISO shall be used for all exposures.
- 1.15.44 Lead numbers and letters (generally of 6mm size) are to be used for identification of radiographic contract No., joints identification, sources used welder's identification, SFD used are to be noted down in the paper cover of radiography. Lead intensifying screens for front and back of the film shall be used as per the instructions of BHEL Engineer

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1.15.45 The weld joint is to be marked with permanent mark A, B, C, etc. to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the downstream side of the weld. For multiple exposures on pipes, an overlap of about 25 mm of film shall be provided.

1.15.46 The contractor shall be fully equipped with radiography equipments, films, chemicals and other dark room facilities. There must be a number of radiographic personnel with sufficient experience and certified by BARC for field radiographic inspection. Further, the contractor must follow strictly the safety rules laid down by BARC, from time to time, contractor's radiographers shall also be registered with BARC for film badge service. **Minimum of 2 radiography sources shall be made available by the contractor.**

1.15.47 Contractor shall provide all skilled, unskilled work men required for the job, which will include Engineers, supervisors, operators, as required for timely and satisfactory execution of radiography work.

1.15.48 All the radiographs shall be properly preserved in air-conditioned rooms and shall become the property of BHEL.

1.15.49 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 high pressure welders. If the performance of the welder is unsatisfactory, he shall be replaced immediately.

1.15.50 The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of Engineer and Re-radio graphed. The decision of Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor.

1.15.51 Wherever radiographs are not accepted on account of poor exposure, joints shall be re-radiographed and new film submitted for evaluation. Radiographs shall be taken again on joints after carrying out repairs. However, if the defect persists after first repair as per radiograph, carrying out 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-radio graphed at contractor's cost.

1.15.52 The contractor shall also be equipped for carrying out other NDT like liquid penetrant inspection, magnetic particle inspection, etc. as and when required in the interest of work within the quoted rates.

1.15.53 For carrying out ultrasonic testing of welded joints of large size tubes and pipes, it will be necessary to prepare the surface by grinding to a smooth finish and contour as desired by BHEL Engineer. The contractor's scope of work includes such preparation and no extra charges are payable for this.

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1.15.54 It may also become necessary to adopt inter layer radiography / MPT / UT depending upon the site/technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this into account and quote the price inclusive of all such work and radiography.

1.15.55 The welded surface irrespective of place of welding shall be cleaned of slag and painted at the center with primer paint to prevent corrosion at no extra cost towards this.

1.15.56 All welders shall be tested and approved by BHEL Engineer before they are actually engaged on work though they may possess the required certificate. BHEL reserves the right to reject any welders without assigning any reason. The welder Identification code as approved by the BHEL Engineer shall be stamped by the welder on each joint done by them. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL.

1.15.57 BHEL Engineer is entitled to stop any Welder from the work if his work is unsatisfactory for any technical reasons or there is a high percentage of rejection of joints welded by him, which in opinion of the BHEL Engineer will adversely affect the quality of the welding though the Welders, has earlier passed the tests prescribed by BHEL Engineers. The welders having passed qualification tests do not relieve the contractor of a contractual obligation to check the welder's performance.

1.15.58 The welding process, weld joint details, joint configuration and material specification may change to suit the design requirements. The contractors quoted rates shall be inclusive of each contingency. All welds involved in the erection of temporary pipe lines for hydraulic test, chemical cleaning, steam blowing etc. to be carried out within the quoted rates. The number of joints to be welded as mentioned in the welding schedule consists of butt welds. All other welds viz attachment welds on pressure parts/non-pressure parts, fillet welds in non-pressure parts welding in the boiler and Rotating Machines has to be carried out by the bidder within quoted rates.

1.15.59 *For uniform heating and better closed loop control, pre heating, post heating, controlled rate of heating & cooling and post weld heat treatment cycles for tube specifications **SA213T91 & SA213T92** should be carried out using flexible ceramic pads with suitable heating machine.*

1.15.60 MPI must be followed on joints which had undergone ultrasonic testing.

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- 1.15.61 Also refer relevant notes to weight schedule in chapter IX of this booklet.
- 1.15.62 The enclosed welding schedule in VOLUME- IA PART II Chapter 4 is for information and the applicable welding schedules will be issued during erection of work at site.
- 1.15.63 After completion of Hydro Test(interval), all relevant joints, catalogue, RT, SR and NDT reports shall be submitted to BHEL.

VOLUME-IA PART-I CHAPTER – XVI

HYDRAULIC TEST

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.16.1 The pressure testing for boiler / piping system shall be carried out as per IBR / Customer / customers' consultant specification / BHEL. Customers' consultant specification forms the part of this tender specification.
- 1.16.2 All pressure parts and some of the Low Pressure parts shall be subjected to hydraulic test as per the Standard / statutory requirements. The contractor shall supply necessary labour and other services and make necessary arrangements to carry out the required tests as per the instructions and directions of the BHEL Engineers.
- 1.16.3 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 extra cost.
- 1.16.4 Soundness of the welds shall be tested hydraulically under the supervision of the BHEL Engineer and Customer, to the pressure indicated in the drawing. Prior to the test, the boiler / piping system shall be inspected by the BHEL Engineer to the extent necessary to ensure compliance with clearance for the test, which will be obtained by the contractor from the Engineer.
- 1.16.5 Hydraulic testing, as required shall be carried out by the contractor. The servicing, installation, electrical connection, erection, testing and dismantling of Hydraulic Test pump, temporary pipelines, fittings, etc. shall be carried out by the contractor as part of this work.
- 1.16.6 All the hydraulic tests shall be repeated till all the pipelines / boiler to satisfy the requirements / obligation of BHEL to their customer. As far as the hydraulic pressure test is concerned, the same shall be conducted at various stages to the satisfaction of IBR inspectorate / BHEL / Customer Engineers. Any rectifications required shall have to be done / redone by the contractor at his cost. The contractor shall carry out all the required tests and pre-commissioning and commissioning activities required for successful and reliable operation. These would include hydraulic test of piping, pre-boiler system detergent flushing/chemical cleaning, steam blowing, water washing etc. as instructed by BHEL.

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1.16.7 Test records shall be made for pressure testing of above piping system. These records shall contain the following information:

- Date of test
- Identification of piping tested
- Test fluid
- Test pressure
- Approval of the Engineer.

1.16.8 Contractor has to arrange required pumps with sufficient capacity for filling water in the tubes and pipes for conducting Hydraulic testing of LP lines. Contractor has to arrange Hydraulic Test pump / Hand Pump at his cost for Hydraulic testing of LP lines.

1.16.9 Hydraulic testing pumps for HP lines shall be provided by BHEL free of hire charges. The testing pumps will be issued to the contractor in working condition. Installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc., shall be carried out by the contractor as part of this work without any extra charges. In case any servicing of the test pump is to be done during the course of the test, the contractor shall provide the necessary labour for the same and spares will be arranged by BHEL.

1.16.10 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic tests and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.

1.16.11 Raw materials for all temporary piping necessary for conducting Hydraulic test, Chemical cleaning, Steam blowing, Flushing, effluent disposal, etc. will be provided by BHEL free of cost. However, fabrication, servicing, erection and dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

1.16.12 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. Temporary piping, pumps, valves, flanges, blanks etc. shall be removed by him and returned to BHEL. All thermo well points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.

1.16.13 Welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable de-aeration / venting / draining points with valves as per BHEL Engineer's instructions, for performing hydro-test of piping and other equipments is within the scope of work.

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Gaskets, valves, fasteners will be provided free of cost by BHEL. Contractor shall cut steel blanks from steel provided without charging extra. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities/scars of cutting weld filled and ground as per BHEL Engineer's instructions.

- 1.16.14 The contractor shall make all necessary arrangements including making of temporary closures / dummy on piping / equipment for carrying out the hydro-static testing on all piping, equipment covered in the specification at no extra cost. Necessary blanks will be provided by BHEL.
- 1.16.15 Hanger adjustment / re-adjustment during erection, before and after Hydraulic Test, before and after steam blowing, during and after full load operation, are to be carried out by the contractor within quoted rate.
- 1.16.16 In general, Hydraulic testing of piping shall be performed after all eventual pipe branches have been completed and valves installed. Should it be required to hasten erection work, pressure tests may be performed by sections. For this scope of work, the erected pipe lines shall be hydraulically tested as per site requirement in segments. For conducting hydraulic test, both ends of pipe lines shall be blanked by welding of plates. Only one or two set of plates and structural materials for blanking required for one segment will be provided by BHEL free of charge. After completion of hydraulic test in one segment, the same plates are to be cut and removed and utilized / welded on the other segment of the pipe lines, to carry out the hydraulic test for the respective segments. No separate plates for blanking for each segment will be provided. After completion of Hydraulic test, the required edge preparations shall be carried out on the end of pipe lines and to be welded with the respective pipe lines. In such cases joint connection shall be checked during a final and additional test, if required. The contractor shall note this aspect and quote accordingly.
- 1.16.17 During hydraulic test, the pipes being tested shall be isolated from the equipments to which they are connected.
- 1.16.18 Openings on piping for pressure / temperature impulse connections shall be fully closed during the test to prevent dust or foreign matter entering into the instrument piping inadvertently.
- 1.16.19 The following specifications shall also be complied with during hydrostatic test.
 - a. Vent nozzles with valves shall be provided at the highest point of the runs, to eliminate air pockets. At the lowest point drain nozzles, with valves shall be

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provided to drain water from pipes. The nozzles and valves shall be of the same materials as the pipe.

- b. The lowest part of the pipe shall always be filled first with water.
- c. Pressure shall be slowly increased (without shocks) to the stipulated value and maintained as long as required to visually check all joints.
- d. Following the control specified above the pressure shall be slowly decreased to the design pressure after which the pipe shall be subjected to the peening test, applying knocks every 150 mm approx. especially in the welded joint areas, with a 0.5 – 1.5 kg. Hammer (depending on the pipe wall thickness). The hammer used shall be a round headed one.
- e. Following the peening test, the pressure shall be increased to the stipulated value and all welded joints shall be visually inspected.
- f. Following these test, the pipe shall be drained or pumped out to the other section to be hydro test using the drain out pump to be provided by Contractor and wherever necessary shall be flushed with air for all pipes.
- g. The pressure test is considered satisfactory if no cracks, unjustified pressure reductions, leakages, seepages etc., appear.
- h. Should defects be found, these shall be repaired in the same manner as these during radiographic examination. Hydraulic test shall be repeated after defects have been repaired.

VOLUME-IA PART-I CHAPTER- XVII

TESTING AND COMMISSIONING

The scope of the work will comprise of but not limited to the following:

The scope of the work will comprise of but not limited to the following:

1.17 TESTING, PRE – COMMISSIONING & COMMISSIONING AND POST COMMISSIONING

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

- 1.17.1 The Contactor shall carry out all the required tests and pre-commissioning and commissioning activities in the equipments under the scope of this contract which required for their successful and reliable operation of the system. These broadly would include Air leak test of Boiler, Aux Boiler, ESP, Ducts, SCR, hydraulic test of boiler, land flow test, clean air flow test, chemical cleaning of piping and boiler, water washing, oil flushing of oil system, Gas Distribution Test etc. as per the Drgs/FQPs/manuals, etc and as instructed by BHEL using contractors own consumables, labour and scaffoldings etc. Air leak test on pressure parts preliminary to hydraulic test by compressed air shall also be carried out to check and rectify the various leakage and defects etc. All the chemicals required for carrying out these activities will be supplied by BHEL free of cost.
- 1.17.2 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications though some of the tests / activities are not listed in these specifications.
- 1.17.3 After completion of erection of furnace, ducts and air heaters, a test shall be performed on the steam generator by the contractor to establish the tightness of the erected equipment from the outlet of Forced Draught (FD) fan through the steam generator upto stack.
- 1.17.4 All the tests may have to be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. The contractor shall do all the repairs for site-welded joints arising out of the failure during testing.
- 1.17.5 Raw materials for all temporary piping necessary for conducting Hydraulic test, Chemical cleaning, Steam blowing, Flushing, effluent disposal, etc. will be provided by BHEL free of cost. However, fabrication, servicing, erection and

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dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

- 1.17.6 The scope of pre-commissioning activities covers installation of all necessary equipments including temporary piping, supports, valves, blanking, pumps, tanks, with access platforms valves, along with accessories required for hydro test, chemical cleaning, steam blowing or for any other tests. The scope also covers the offsite disposal of effluents.
- 1.17.7 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. On completion, Temporary piping, pumps, valves, flanges, blanks, tanks, etc. shall be removed by him and returned to BHEL. All thermo well points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.
- 1.17.8 All items / material required for Boiler, ESP & Aux boiler for conducting Air leak test, gas Distribution test, hydraulic test, alkali boil out, acid cleaning/EDTA cleaning steam blowing, Ammonia leak testing any testing required for SCR, etc., will be supplied by BHEL / its customer. However, servicing, dismantling and returning of the same to stores is the responsibility of the contractor who is erecting the equipment / piping. The contractor may note that **no separate payment shall be released** for any temporary works that are to be carried out for conducting pre-commissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be as under:
 - Erection of all temporary piping including valves, tanks, effluent pumps, electrical control panel, etc. and cabling along with insulation and supports for Air leak test, steam blowing, chemical cleaning, Ammonia leak testing & any testing required for SCR, etc and effluent disposal are to be carried out as part of work. Contractor will be responsible for their operation and any servicing required during the pre-commissioning activities. He will also service the equipment and handover the equipment to the other agency for further erection / commissioning activities. All the pumps, motors and electrical control panels/ switch gear, valves and actuators will be furnished to the contractor after due servicing.
 - Blowers, blanks, etc. and putty, temporary fixtures & ducts required for conducting air tightness test, etc are to be installed. (Putty to be procured by the contractor).

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- Dismantling of the temporary equipment, piping and return the same to the BHEL stores is also included in the scope of work.

The above is only a broad breakup of the temporary works. The engineer at site will make final break up. His decision will be final and binding by all the parties.

- 1.17.9 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic test and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.
- 1.17.10 Commissioning of the Boiler & ESP will involve trial run of all the equipment erected. The boiler has to be lighted up for refractory drying, alkali boil out, acid cleaning / EDTA cleaning, passivation, preservation, steam blowing and floating of safety valves. Chemical cleaning and oil flushing the lub oil lines, Flushing of all the lines by air, oil or steam as the case may be, trial run of the boiler and its auxiliaries, trial run of the fans, Lub. Oil pumps, Mills, servicing of valves dampers, actuators etc., and any other works incidental to commissioning are to be carried out. Contractor shall provide required workers along with supervisors with all the requisite tools round the clock and material for all these works, which shall form part of the work to be done.
- 1.17.11 It shall be the responsibility of the contractor to preserve the boiler as per BHEL's requirement. The required N₂ will be provided by BHEL for boiler preservation if required.
- 1.17.12 It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.
- 1.17.13 It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including engineers/supervisors.
- 1.17.14 It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.

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- 1.17.15 In case, any rework is required because of contractor's faulty erection, which 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.
- 1.17.16 During commissioning, opening / closing of valves, changing of gaskets, Re-alignment of Rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price /rates shall also include all such work.
- 1.17.17 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 re-alignment are necessary, the contractor at his cost shall do the same as per Engineer's instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.
- 1.17.18 All temporary supports shall be removed in such ways that pipe supports are not subjected to any sudden load. 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.
- 1.17.19 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. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.
- 1.17.20 Cleaning and servicing of all the filters / strainers, in the system shall be done by the contractor within the accepted price. All oils and greases to be filled in the main equipments as first fill and subsequent topping up's will be furnished by BHEL.
- 1.17.21 At the time of each inspection, the contractor shall take note of the decisions/ changes proposed by the Engineer and incorporate the same at no additional cost.
- 1.17.22 Hydraulic testing pump for Boiler shall be provided by BHEL free of hire charges. The testing pump will be issued to the contractor in working condition. Installation, electrical connection, erection, testing and dismantling and returning to BHEL stores, etc., shall be carried out by the contractor as part of this work without any extra charges. In case any servicing of the test pump is to be done during the course of

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the test, the contractor shall provide the necessary labour for the same and spares will be arranged by BHEL.

- 1.17.23 All pressure parts and some of the Low Pressure parts shall be subjected to hydraulic test as per the Standard / statutory requirements. The contractor shall make necessary arrangements including supplying the Low Pressure Hydraulic test pump and other services to carry out the required tests as per the instructions and directions of the BHEL Engineers within the quote rates.
- 1.17.24 The valves, dampers, actuators etc. will have to be checked cleaned and overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as may be necessary.
- 1.17.25 Welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable deaeration / venting / draining points with valves as per BHEL Engineer's instructions, for performing hydro-test of piping and other equipments is within the scope of work. Gaskets, valves, fasteners will be provided free of cost by BHEL Contractor shall cut steel blanks from steel provided within quoted rate. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities / scars of cutting weld filled and ground as per BHEL Engineer's instructions. Seal welding of thermo-wells and blanks of Temperature Element are to be removed by grinding only after steam blowing.
- 1.17.26 The hydraulic testing of the equipment and piping, covered under this scope of work has to be carried out by the contractor as per instructions of BHEL Engineer. The contractor shall provide all facilities required for hydraulic testing. Before hydraulic test, all the hangers are to be locked by locking pin / plate or temporary support. After completion of Hydraulic test, these are to be removed and all hangers are to be readjusted if required, to the desired value within quoted value.
- 1.17.27 All the tests shall be repeated till boiler / pipelines / equipments satisfy the requirements / obligation of BHEL to their customer. As far as the hydraulic pressure test is concerned, the same shall be conducted at various stages to the satisfaction of BHEL / Boiler Inspector / Customer Engineers. Any rectifications required shall have to be done / redone by the contractor at his cost.
- 1.17.28 Transportation of oil drums from customer/ BHEL's stores, filling of lubricants and filling of oil for flushing and first filling and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, transport of chemicals, gas cylinders etc,for various pre-commissioning activities / processes mentioned in the above clauses and returning of remaining and

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/ or the empty containers of the chemicals to customer / BHEL stores is the responsibility of the contractor.

1.17.29 Replacing / cleaning of filters of the erected equipments, piping system etc. during pre-commissioning / commissioning stage are within the scope of work.

1.17.30 Contractor shall lay the temporary pipelines with fittings, accessories and erection / commission pumps, tanks, valves, fittings, hangers and supports and other installations as instructed by BHEL, Engineer for the purpose of chemical cleaning / alkali flushing / steam blowing / steam washing / steam flushing / water flushing / water washing / oil flushing etc. of piping and other equipments are in the scope of work. Necessary, materials for this will be provided by BHEL. Overhauling / cleaning / servicing of valves, pumps, fittings in temporary system and acid cleaning tanks etc. prior to the above operations / activities will also be carried out by the contractor at his cost. All the chemicals will be supplied by BHEL free of cost.

1.17.31 Chemical cleaning (Acid cleaning of piping / EDTA cleaning / alkali flushing) will involve the installation of temporary piping, valves, cutting of some of the existing valves, placing the rubber, wedges in the valves, gagging of valves, and installation of temporary tanks for chemical and for mixing. Necessary temporary access platforms to mixing tank are to be made by the contractor. The dissolving tank, neutralizing tank etc. required for acid pickling will have to be fabricated by the contractor within the quoted rate. Required materials will be provided by BHEL free of cost. Chemicals for chemical cleaning will be provided by BHEL and handling of chemicals & other consumables and other connected activities has to be carried out by the contractor at their cost. All other consumable would have to be provided by the contractor.

1.17.32 Laying of insulation of this temporary piping, tanks are to be carried out by the contractor within quoted rate, and required insulation materials will be provided by BHEL. The welding joints in the temporary pipe lines for acid cleaning and steam blowing are to be welded by HP welders only. Required NDT tests are to be carried out for the above joints as part of work as per customer / BHEL requirement.

1.17.33 Steam blowing lines for Oil piping shall be erected as per the instructions of BHEL Engineer. Necessary pipes and other items will be supplied by BHEL free of cost. All arrangements for erection including welding have to be arranged by the contractor as a part of the work. After completion of steam blowing, all the temporary lines to be dismantled and restoration of piping to be carried out, within quoted rate.

1.17.34 During steam blowing operations the required manpower shall be arranged by the contractor as per the instructions of BHEL Engineer within the quoted rates. The manpower for the above operation may be required round the clock if necessary. The

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contractor shall carry out the above operation as per the instructions of BHEL Engineer within the quoted rates.

- 1.17.35 During the initial stages of work, trenches for draining water may not be available for alkali flushing or mass flushing for discharging and draining the system and piping. Necessary low point drains and temporary piping for this will have to be erected by contractor from materials provided by BHEL.
- 1.17.36 After the chemical cleaning has been successfully completed, removing all temporary piping, fittings of tanks etc. checking all the valves for any accumulation of foreign materials, welding the valves, pipes which were cut and cleaning, re-fixing as per BHEL Engineer's instructions is within the scope of work/specification.
- 1.17.37 The contractor as per BHEL requirements will suitably make preservation of cleaned surfaces.
- 1.17.38 Contractor may have to replace old/damaged gaskets / packing etc. for equipments and the same shall be carried out by contractor as per requirement. Materials will be given by BHEL.
- 1.17.39 In case any erection defect is detected during various tests / operations, trial runs as detailed above such as loose components, undue noises or vibration, strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. The parts to be replaced shall be provided by BHEL free of cost. If the insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.
- 1.17.40 Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract.
- 1.17.41 The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.
- 1.17.42 During this period though the BHEL's / Client's staff will also be associated in the work, the contractor's responsibility will be to arrange required tools, man and plants till such time the commissioned units are taken over by BHEL's client.
- 1.17.43 Contractor shall cut / open works if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning, opening of valves, changing of gaskets, attending to leakages, minor modification / rectification works may arise. The contractor has to carry out these

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works at his cost by providing required manpower in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.

- 1.17.44 For conducting gas tightness test, it may be required to erect the blowers and connecting ducts and commission the same for tightness test. It is the responsibility of the contractor to erect the blowers & dismantle once the test is over. Contractor shall carry out the work within the quoted rate and BHEL will provide blowers and dummies free of cost for conducting the test.
- 1.17.45 Contractor to provide necessary commissioning assistance from pre-commissioning state onwards and up to continuous operation of the unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programmes made to achieve the schedule agreed with customer.
- 1.17.46 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools, supervision as part of commissioning assistance after synchronization till handing over of sets to customer.
- 1.17.47 After floating of safety valves, the commissioning activities and trial operations will continue up to handing over of the unit. Contractor shall provide the manpower for three months from trial operation completion or submission of final bill with material reconciliation whichever is later. It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers as per the work requirement along with supervisors including necessary consumables, tools etc., during this period. The rate quoted shall indicate all these contingencies also. The various categories of workers required for pre-commissioning, commissioning and post-commissioning activities are as follows:
 - a) Pipe fitters
 - b) Millwright Fitters
 - c) HP& structural welders
 - d) Riggers
 - e) Unskilled workers
 - f) Supervisors
 - g) Electricians
 - h) Liggers
 - i) Sheet metal fabricator/fitter
 - j) Any other category of workers as may be required.

Further in addition to the above, contractor has to arrange the following minimum

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manpower exclusively for assisting BHEL commissioning engineers during stabilization and trial operation period. This manpower will be directly controlled by BHEL commissioning engineers.

1. One Engineer in charge for three shifts.
2. Three supervisors per shift for three shifts
3. Three fitters per shift for three shifts
4. Ten helpers per shift for three shifts
5. One electrician per shift for three shifts

It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL commissioning Engineers and hence, overtime, may be involved. The contractor's quoted rate shall be inclusive of all these factors also.

- 1.17.48 During commissioning any improvement or rectification due to design requirement is involved and if the contractor is asked to carry out the job, they shall be paid at man-day rates. For this purpose, daily labour report indicating therein nature of work carried out, consumables used, etc. shall be maintained by contractor, and got signed by BHEL Engineer every day. It is not obligatory on the part of BHEL to get the works done by the contractor. They can employ any other agency if they so desire at that time.
- 1.17.49 During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.
- 1.17.50 Hanger adjustment / re-adjustment during erection, before and after Hydraulic Test, before and after steam blowing, during and after full load operation, are to be carried out by the contractor within Quoted Rate.
- 1.17.51 The contractor has to provide required man power assistance during pre-commissioning and commissioning checks of motor operated valves, actuators, control valves etc. without any extra charges.
- 1.17.52 D.S.L / equivalent system for hoisting equipment's are also to be erected and commissioned including load testing by the contractor within the quoted rates. Required manpower including electricians is to be arranged by the contractor for carrying out commissioning of electrical hoist and load testing of electrical hoist. Statutory inspection if any required to be arranged by the contractor. Required loads will be provided by BHEL free of cost.

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- 1.17.53 Air tightness shall be performed on each pass of precipitator on completion of erection of ESP casing, hopper, inlet and outlet funnels with all internals fitted as per the approved drawings.
- 1.17.54 The activity shall be completed prior to installation of insulation of ESP and the work front for insulation shall be made available to the insulation agency without any delay.

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VOLUME-IA PART- I CHAPTER-XVIII

PAINTING

The scope of the work will comprise of but not limited to the following:

1.18.1 FINAL PAINTING

- 1.18.1.1 The scope of work shall also include supply and application of final painting of all the erected equipments as required and specified in painting schedules for the components of boiler and its auxiliaries, mill bunker structures, Rotating machines etc.
- 1.18.1.2 Required paints other consumable such as wire brush, brush etc. shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc. shall be provided by the contractor within the quoted rate. The arrangement of primer/paint will be in contractor's scope.
- 1.18.1.3 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.
- 1.18.1.4 In the case of steel fabricated items, raw steel after fabrication has to be cleaned and subsequent painting to be carried out.
- 1.18.1.5 All the exposed metal parts of the equipments including piping, structures, hangers etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer and required number of finish coats as indicated in the Painting Specification which matches the shop primer paint used, after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and chemical cleaning and the same being inspected and approved by BHEL engineers for painting. Afterwards the above parts shall be finished with as per the instructions of BHEL/Customer official.
- 1.18.1.6 Normally Paint shall be applied by brushing as per the instruction of BHEL Engineer. It shall be ensured that brush marks are minimum. If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates. Spray painting gun and compressed air arrangement has to be made by the contractor himself within the Quoted rates.
- 1.18.1.7 Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL / Customer.
- 1.18.1.8 Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of the ready mix type in original sealed containers as packed by the paint

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manufacturer. No thinners shall be permitted. Paint manufacturer's instructions shall be followed in method of application, handling, drying time etc.,

- 1.18.1.9 The scope of painting includes application of colour bands, lettering the names of the systems, equipments; tag nos. of valves, marking the directions of flow and other data required by BHEL within the quoted rate.
- 1.18.1.10 All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots.
- 1.18.1.11 Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and the DFT of finish paint shall not be less than the specified. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.
- 1.18.1.12 Finish coat paint, no. of coat and DFT shall be as indicated in the painting specification enclosed in this tender / relevant BHEL document/ customer's specifications. The painting specification which is forming part of this tender as in TCC shall be used as guidelines to be followed.
- 1.18.1.13 The actual colour to be applied shall be approved by the customer before starting of actual painting work.
- 1.18.1.14 Primer & finish paint shall be of reputed paint supplier approved by BHEL / Customer. Contractor has to procure paints from the BHEL / Customer approved agencies only, and the paints should be as per the customer painting specification. The quality of the finish paint shall be as per the standards of IS or equivalent as approved by BHEL / Customer. Before procurement of paint the contractor has to obtain the clearance from BHEL authorities. The batch certificates of paints to be submitted to BHEL Engineer before using the same.
- 1.18.1.15 No paint shall be applied when the surface temp is above 55 deg. Centigrade or below 10 deg. Centigrade, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather.
- 1.18.1.16 Before commencement of final painting, contractor has to obtain written clearance from BHEL / Customer for effective completion of surface preparation.
- 1.18.1.17 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL / Customer.
- 1.18.1.18 Wherever applicable, supply and application of primer / final painting of all the insulation items erected under the scope of this tender. The painting shall be as

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required and specified in the painting schedule, which forms the part of this tender book.

- 1.18.1.19 Painting of inner side of sheet metal covering over the insulation walls with two coats of anti-corrosive paint (IS-158) to be applied to the entire satisfaction of BHEL Engineer and application of bituminous sealing compound on cladding/ sheet metal joints shall also be carried out by the contractor. Retainer type 'A' must be coated with Aluminium paint. For which the required amount of paint, other consumables&accessories for painting, cleaning the surfaces etc., shall be arranged by the contractor within the quoted rate.
- 1.18.1.20 The contractor shall effectively protect the finished work from action of weather and from damage of defacement and shall cover the finished parts, then and there, for their protection.

1.18.2 PRESERVATION / TOUCH UP PAINTING

- 1.18.2.1 Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification right from pre- assembly stage to till the equipment is cleared for final painting. The primer paint shall be matching shop primer.
- 1.18.2.2 Any rust on the materials shall be cleaned and painted before erection of the material. Cleaning of rust and painting shall be done by the contractor within the rates awarded in the contract and no additional cost will be provided for the same.
- 1.18.2.3 Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of same primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.
- 1.18.2.4 Mostly the equipment / items / components will be supplied with one coat of primer paint and one coat of finish paint. However, during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour.
- 1.18.2.5 Required paints, other consumable such as wire brush, brush etc shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc shall be provided by the contractor within the quoted rate. The arrangement of primer/paint will be in contractor's scope
- 1.18.2.6 Painting of portions of Employer's structures wherever connection/welding is carried out by contractor for supporting structures.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.18.2.7 All rectification including painting of Employer's structure which are damaged by contractor during his work.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART - I CHAPTER – XIX

ACCOUNTING OF MATERIALS ISSUE

(FOR BUNKER FABRICATION & ERECTION)

1.19.1 ISSUE OF STEEL

1.19.1.1 The steel shall be issued to the contractor on the following basis:

Sl. No.	Description	Basis
(a)	Structural Steel	Weighment basis (Unit – MT)

1.19.1.2 All the structural steels issued by BHEL shall be properly accounted for. The total quantity of steel required for the work will be calculated from the approved Bar Bending schedule, fabrication drawings, approved laps, chairs and lugs. The measurement for payment as well as for accounting (issue, reconciliation and return of materials) shall be based on the sectional weights as indicated in the following IS standards. No rolling tolerance shall be accepted in any case for issue, reconciliation, return of materials and payment purposes

IS: 808-1964 Beams, Channels and Angles

IS: 1730-1961 Plates, Sheets and Strips / Flats

1.19.1.3 The steel issued to the contractor shall be mainly in standard length and sections as received from the supplier. However, the contractor shall be bound to accept the steel in length as available in the project stores no claims for extra payment because of issue of non-standard length will be entertained.

1.19.1.4 The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.

1.19.1.5 The contractor shall submit to the engineer, a statement indicating estimated quantity of steel required during a quarter, at least two months in advance of the quarter. In addition, the contractor shall also furnish the estimated requirement of steel during a month by the third week of the previous month indicating his requirement.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.19.1.6 Following shall be limit for the maximum quantity of BHEL issue materials that would be with the contractor at any point of time when work is in progress (excluding what has already been incorporated in the works).

SL. No.	Issue of Materials	Maximum Quantity in contractor's store.
1	Structural Steel	Requirement of one month

Bidders to ensure that no lamination materials are taken over by them from BHEL.

Fabrication wastage, if any due to above, shall not be compensated by BHEL.

Bidder to note that steel materials required for embedments, inserts, MS Grating, Galvanised Grating, GI Handrail, Stainless Steel Handrail, SS Sheets for Bunker liner, Stop Lock Gate, Stationery Screen, fasteners like MS / HT / HSFG bolts / nuts, lock nuts, washers and foundation bolts other than those supplied by BHEL, shall be supplied by the bidder. However, Bidder shall use the scrap materials available with BHEL or with the respective bidders, for their use in the permanent works as embedment / inserts etc. after necessary store issue formalities, if taken from BHEL and shall be accounted for monthly reconciliation, if it belongs to the bidder's scrap materials.

1.19.2 RETURN OF MATERIALS

1.19.2.1 All surplus steel and all wastage materials will be taken back on weightment basis.

1.19.2.2 Surplus, unused and untampered steel shall be sorted section-wise and returned separately for a place directed by BHEL/Engineer within the project area. Return of such materials will not be entitled to any handling and incidental charges.

1.19.2.3 All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be promptly returned to the stores and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any transportation and incidental charge. Bidder shall use the scrap materials for their use in the permanent works as embedment / inserts etc. after necessary store issue formalities and site clearance

1.19.3 SCRAP & SERVICEABLE MATERAILS:

1.19.3.1 All Structural steel of length above 2 M except M.S. Plate shall be considered as serviceable materials provided the materials is in good and acceptable condition. Structural steel in length less than 2 M shall be treated as scrap.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.19.3.2 Plates having both sides greater than 1 M or if any side is less than 1 M but greater than 0.5 M and the total area is equal or greater than 2 Sq. M shall be considered as serviceable.

1.19.3.3 All pipes measuring 2 M and above in length shall be treated as serviceable materials provided they are in good and acceptable condition. Pipe in less than 2 M length shall be treated as scrap.

1.19.3.4 All TMT measuring 3 M and above in length shall be treated as serviceable materials provided they are in good and acceptable condition. TMT in less than 3 M length shall be treated as scrap.

1.19.4 STEEL CONSUMPTION AND WASTAGE

1.19.4.1 STRUCTURAL STEEL, (ROLLED SECTION, PLATES ETC.) CONSUMPTION & WASTAGE.

a) CONSUMPTION.

The theoretical consumption of various sections shall be based on approved drawings. Weights shall be calculated considering the sectional weights as per Indian standard. No extra shall payable to the contractor for any deviation in weights for the two different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.

- i). Actual consumption = Issue – Surplus.
- ii). Surplus = Untampered, unused, uncut quantity of steel and Serviceable materials as stipulated under clause “Scrap and Serviceable Materials (Refer Clause 1.19.3 above)” returned by the contractor to BHEL store along with relevant documents.
- iii). Wastage = Actual consumption – Theoretical consumption.

b) WASTAGE

Allowable wastage: - 4% (FOUR percent) of the theoretical consumption shall be considered. Wastage shall be considered as cut pieces and scrap material, measured as per actual weighment basis. Invisible wastage (max limit to 0.5%), if any, shall be considered to be included in the specified 4% allowable wastage.

SI. No.	CONSUMPTION OF STRUCTURAL STEEL (ROLLED SECTION, PLATES & SS liner)	BASIS OF ISSUE
S-1	Theoretical consumption (without Considering any wastage, scrap or loss) as per spec. &	Free

TECHNICAL CONDITIONS OF CONTRACT (TCC)

SI. No.	CONSUMPTION OF STRUCTURAL STEEL (ROLLED SECTION, PLATES & SS liner)	BASIS OF ISSUE
	drawing.	
S-2	Wastage limited to plus Four percent (+4%) of the aforesaid theoretical consumption (S-1) towards allowable wastage.	Free
S-3	Wastage beyond Four percent (4%) of the aforesaid theoretical consumption (S-1).	Penal Rate

1.19.5 RECONCILIATION OF MATERIALS

- 1.19.5.1 The contractor shall submit a reconciliation statement of steel issued to him and steel procured by him with each RA Bill.
- 1.19.5.2 At the time of submission of bills, the contractor shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance materials are available with contractor's custody at site.
- 1.19.5.3 At the time of submission of bills by the contractor, if it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then, BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.
- 1.19.5.4 The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings prepared by the BHEL and drawings approved by BHEL for fabrication works and such other drawings approved by BHEL. This shall also include the bar bending schedule prepared by the contractor and approve by BHEL.

1.19.6 RECOVERY OF MATERIAL

If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly Running Account Bill at the Penal Rate.

PENAL RATE OF MATERIALS

A	STRUCTURAL STEEL MS plates, MS flats, rolled steel joists, channels, and angles, MS pipes, Chequered Plates, etc in sizes and lengths as available	Rs. 59,693 /- per MT plus GST
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VOLUME-IA PART – II

CHAPTER 1

CORRECTIONS / REVISIONS IN SPECIAL CONDITIONS OF CONTRACT, GENERAL CONDITIONS OF CONTRACT AND FORMS & PROCEDURES

SI No: 1

Clause 4.1.11 under 'Obligations of Contractor of SCC is deleted.

SI No: 2:

OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT MANAGEMENT/ QUALITY ASSURANCE PROGRAMME

The following clauses in Occupational Health, Safety & Environment Management / Quality Assurance Programme published in Chapter-IX of Special Conditions of Contract (Volume I Book-II) is revised as under.

Chapter IX Clause 9.1 is modified as below:

Contractor will comply with HSE (Health, Safety & Environment) requirements of BHEL as per the "HSE Plan for Site Operations by Subcontractor" (Document No. HSEP: 14 Rev00) enclosed.

Chapter IX Clause 9.1.1 to 9.1.25 stands deleted. Chapter IX Clause 9.2 to 9.62 stands deleted.

SI No: 3:

Clause No. 10.5 on RA Bill Payments, in Special Conditions of Contract (SCC), Volume-IB, Book-II, is revised as under:

The payment for running bills will normally be released within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc., and other dues in the meanwhile.

SI No: 4

The EARNEST MONEY DEPOSIT (EMD) clause 1.9 published in General Conditions of Contract (Volume I Book-II) is revised as under.

1.9 EARNEST MONEY DEPOSIT

1.9.1 Every tenderer must furnish the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- i. Electronic Fund Transfer credited in BHEL account (before tender opening).
- ii. Earnest Money Deposit (EMD) shall also be paid directly to BHEL-PSSR through Online EMD payment portal, before tender opening, by following these steps.
 1. Visit www.onlinesbi.com -> Go to State Bank Collect (In the tab section)
 2. Click Check box to proceed for payment -> Click on Proceed
 3. Under State of Corporate/Institution ->Select Tamilnadu
 4. Under Type of Corporate/Institution -> Select PSU – Public Sector Undertaking ->Go
 5. Under PSU – Public Sector Undertaking Name -> Select BHEL PSSR CHENNAI and Submit
 6. Under Select Payment Category ->-> SCT Tender EMD & Tender Fees
- iii. Banker's cheque or Pay order or Demand Draft in favour of 'Bharat Heavy Electricals Limited' (along with offer) and payable at 'BHEL-PSSR, EVR Periyar Building, 690, Anna Salai, Nandanam, Chennai – 600035'
- iv. Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
- v. In case EMD amount is more than Rs. Two Lakhs, Tenderer has the option to submit Rs. Two lakhs in any one of form described above in clause no. 1.9.1. (i) to (iv) and remaining amount over and above Rs. Two Lakhs in the form of Bank Guarantee from Scheduled bank. (Explanatory statement: EMD upto Rs. 2 Lakhs can be submitted in any of the form as in (i) to (iv) above, and where EMD in a tender is more than Rs. 2 Lakhs, then first part of EMD of Rs. 2 Lakhs can be submitted in (i) to (iv) above and remaining amount over and above Rs. 2 Lakhs by way of BG).

Note:

- a) The Bank Guarantee in such cases shall be valid for at least six months from the scheduled due date of tender submission mentioned in the Notice Inviting Tender.
- b) Date of Expiry of Claim shall be minimum of 3 months after the validity of Bank Guarantee.
- c) Proforma for Bank Guarantee for EMD is enclosed with this Tender.

Bank Details for the purpose of Taking EMD BG

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Name and Address of Beneficiary:	Bharat Heavy Electricals Ltd. #690, EVR Periyar Building, Nandanam, Anna Salai, Chennai - 35
Name of Bank of Client :	State Bank Of India
Bank Branch Address:	SBI Saidapet Branch, EVR Periyar Building, Nandanam, Anna Salai, Chennai - 35
IFSC Code :	SBIN0000912
Account No. :	10610819499

Details for SFMS (Structured Financial Messaging System) transmission of BG

Bank Branch	SBI TFCPC Branch
Branch Code	5056
IFSC Code	SBIN0005056

1.9.2 EMD shall not carry any interest.

1.9.3 EMD by the Tenderer will be forfeited as per NIT Conditions, if:

- After opening the tender and within the offer validity period, the Tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
- The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/Contract

1.9.4 EMD given by all unsuccessful tenderers will be refunded normally within 15 days of award of work.

1.9.5 EMD of successful tenderer will be retained as part of Security Deposit.

1.9.6 EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant " Guidelines on Suspension of Business dealings with suppliers/contactors" and forfeited / released based on the action determined under these guidelines.

SI No: 5

SECURITY DEPOSIT The SECURITY DEPOSIT (SD) clause 1.10 published in General Conditions of Contract (Volume I Book-II) is revised as under.

1.10 Security Deposit:

1.10.1 Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit for satisfactory completion of work,

TECHNICAL CONDITIONS OF CONTRACT (TCC)

as given below:

1.10.2 The total amount of Security Deposit will be 5% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

1.10.3 The security Deposit should be furnished before start of the work by the contractor.

1.10.4 Modes of deposit:

1.10.4.1 The balance amount to make up the required Security Deposit of 5% of the contract value may be furnished in any one of the following forms

- i. Cash (as permissible under the extant Income Tax Act)
- ii. Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL
- iii. Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.
- iv. Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.
- v. Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL and discharged on the back)

(Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

1.10.5 At least 50% of the Security Deposit including the EMD should be deposited in any form as prescribed before start of the work and the balance 50% of the Security Deposit will be recovered by deducting 10% of the gross amount progressively from each running bills of the contractor till the total amount of the required Security Deposit is collected.

1.10.6 The recoveries made from running bills (cash deduction towards balance SD amount) will be released against submission of equivalent Bank Guarantee in the prescribed formats, but only once, before completion of work.

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- 1.10.7 The Security Deposit shall not carry any interest.
- 1.10.8 If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the excess Security Deposit due the enhancement shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor.
- 1.10.9 The validity of Bank Guarantees towards Security Deposit shall be initially upto the completion period as stipulated in the Letter of Intent/Award + 3 months, and the same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL
- 1.10.10 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.
- 1.10.11 Penalty for Delayed Remittance of Security Deposit
If the contractor fails to furnish SD before start of work, in line with 1.10.3 above, Simple Interest against delayed remittance of the Security Deposit shall be deducted from the sub-contractor at the rate of SBI PLR + 2% on the value of 50% SD of the contract, for the delayed period (i.e., period between start of work and date of remittance of Initial SD, i.e., atleast 50% of SD). In case, the delayed period has different SBI PLR rates, Simple Interest shall be calculated based on different rates by considering the corresponding time period. On similar lines Penalty shall be levied for delayed remittance of Additional Security Deposit (if applicable).

Note: - Bank details & SFMS details provided above in Sl. No. 04 Earnest Money Deposit) may be used for the purpose of arranging Bank Guarantees towards Security Deposit / Additional Security Deposit also.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

SI no 6

Clause 2.7.2 and 2.7.3 in GCC regarding Rights of BHEL is revised as under:

2.7.2.

2.7.2.1 To terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' by BHEL in any of the following cases:

- i. Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.
- ii. Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.
- iii. Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.
- iv. Termination of Contract on account of any other reason (s) attributable to Contractor.
- v. Assignment, transfer, subletting of Contract without BHEL's written permission.
- vi. Non-compliance to any contractual condition or any other default attributable to Contractor.

Risk & Cost Amount against Balance Work:

Risk & Cost amount against balance work shall be calculated

as follows: Risk & Cost Amount= $[(A-B) + (A \times H/100)]$

Where,

A= Value of Balance scope of Work (*) as per rates of new contract

B= Value of Balance scope of Work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

* Balance scope of work (in case of termination of contract):

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for

TECHNICAL CONDITIONS OF CONTRACT (TCC)

'Termination of Contract', shall be taken as balance scope of Work for calculating risk & cost amount. Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items

total Quantities as per issued drawings would be deemed to be contract quantities. Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions. However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: Incase portion of work is being withdrawn at risk & cost of contractor instead of termination of contract, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work' for calculating Risk & Cost amount.

LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with LD clause no. 2.7.9 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

- i). Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- ii). Let the value of executed work till the time of termination of contract= X
- iii). Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- iv). Delay in executed work attributable to contractor i.e. $T2=[1-(X/Y)] \times T1$
- v). LD shall be calculated in line with LD clause (clause 2.7.9) of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.

2.7.2.2 In case Contractor fails to deploy the resources as per requirement, BHEL can deploy own/hired/otherwise arranged resources at the risk and cost of the contractor and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.

2.7.3 **Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor**
Following sequence shall be applicable for recoveries from contractor:

- a) Dues available in the form of Bills payable to contractor, SD, BGs against the same contract.
- b) Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.
- c) If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:
 - i) Dues payable to contractor against other contracts in the same Region shall be considered for recovery.
 - ii) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.
 - iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.

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SL No: 7

In addition to clause 2.7.9 of General Conditions of Contract (GCC), a New clause 2.7.9.1 is added as below.

2.7.9.1 Penalty for Intermediate Milestones

- 2.7.9.1.1 M1 and M2 shall be intermediate Milestones for each unit of this work.
- 2.7.9.1.2 In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.
- 2.7.9.1.3 Incase delay in achieving M1 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to Maximum 2% of executable contract value will be withheld.
- 2.7.9.1.4 Incase delay in achieving M2 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to maximum 3% of executable contract value will be withheld.
- 2.7.9.1.5 Amount already withheld, if any, against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 milestone.
- 2.7.9.1.6 Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
- 2.7.9.1.7 Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of intermediate milestones shall be adjusted against LD or released as the case may be.
- 2.7.9.1.8 In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted in to recovery.

Note: *Executable contract value-value of work for which inputs/fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

SL No: 8

OVERRUN COMPENSATION (ORC)

The **OVERRUN COMPENSATION (ORC)** clause 2.12 published in General Conditions of Contract (Volume I Book-II) is revised as under.

2.12 OVERRUN COMPENSATION (ORC)

2.12.1 ORC during original contract period: No ORC shall be applicable during the original contract period.

2.12.2 ORC during extended period for the reasons solely attributable to contractor: No ORC shall be applicable during the extended period granted for the reasons solely attributable to contractor and work executed during this period shall be paid as per original contract rates.

2.12.3 ORC during extended period for the reasons not attributable to contractor: ORC shall be payable as per following procedure:

2.12.3.1 For initial period of twelve months of extended period, ORC rate applicable over executed value shall be 5%. For every subsequent period of twelve months, ORC rate shall be further increased by 5% over the previous rate. For example, ORC rates applicable for initial period of 12 months and subsequent period of 12 months are given below.

Sl. No.	Extended Period for the reasons attributable to BHEL	ORC rate applicable over executed value
1	First 12 months	5%
2	13 th -24 th month and so on	10.25% $\{[(1.05 \times 1.05)-1] \times 100\}$

This process of increasing ORC rate for each subsequent period of 12 months shall continue till applicability of ORC.

2.12.3.2 On completion of original contract period as well as on completion of each subsequent period of twelve months i.e. at the time of change in applicable ORC rate, Delay Analysis shall be carried out and percentage shortfall attributable to both BHEL & Contractor shall be calculated.

2.12.3.3 For the purpose of calculation of ORC, executed value of work in the month shall be divided in Part-1 and Part-2 in proportion of percentage shortfall attributable to BHEL and contractor respectively, based on the last delay analysis as worked out in 2.12.3.2.

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ORC shall be payable only on Part-1 and no ORC shall be payable on Part-2. Value of Part-1 shall be further limited to the value of actual inputs provided by BHEL i.e. "Plan - Shortfall attributable to BHEL" for the month, as per Form-14 for calculation of ORC.

2.12.3.4 Payment of ORC amount shall be further regulated as follows:

- (i) 50% of the ORC is allocated for deployment of matching resources (with weightages) agreed as per the joint programme drawn vide 2.11.4. ORC Payment against resources shall be calculated in proportion to percentage of resources actually deployed w.r.t. planned resources, as per Form-14.
- (ii) 50% of ORC is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. ORC Payment shall be reduced in proportion to percentage shortfall attributable to contractor w.r.t.-"Plan - Shortfall attributable to BHEL" for the month, as per Form-14.

2.12.3.5 The maximum amount of ORC payable for the month shall be limited to Rs. 5,00,000/-.

2.12.3.6 In case, there is no shortfall attributable to contractor for the month and also contractor has deployed the resources as agreed in Form-14 but ORC amount payable for the month worked out as per procedure mentioned in clause 2.12.3.3, 2.12.3.4 and 2.12.3.5, is less than Rs.1,00,000/-, then ORC amount payable for the month shall be Rs.1,00,000/- otherwise ORC amount payable for the month shall remain same.

2.12.3.7 In case execution is on **HOLD** (Other than Force Majeure), ORC shall be payable as per following:

- i). Contractor has not been permitted by BHEL to de-mobilize
 - a) ORC amount of Rs. 1,00,000/- per month shall be applicable during the period of HOLD provided resources as planned are deployed (not demobilized) during the period of hold.
 - b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.
- ii). Contractor has been permitted to demobilize and to remobilize after lifting of HOLD
 - a) No ORC shall be payable to contractor for the period of HOLD.
 - b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in

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calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

2.12.3.8 In case **Force Majeure** is invoked:

- i). No ORC shall be applicable during the period of Force Majeure.
- ii). Subsequent to revocation of Force Majeure, period of Force Majeure shall be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

2.12.4 Applicability of ORC: ORC shall not be applicable for following activities.

- (i) Area cleaning, removal of temporary structures and return of scrap.
- (ii) Punch list points / pending points liquidation pending due to reasons attributable to contractor
- (iii) Submission of "As built Drawing"
- (iv) Material Reconciliation
- (v) Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./ Statutory Authorities etc.

2.12.5 Total Over Run Compensation shall be limited to 10% of the cumulatively executed contract value till the month (excluding Taxes and Duties if payable extra). For this purpose, executed contract value excludes PVC, ORC and Extra/Supplementary Works.

SI No: 9

Clauses 2.13.1, 2.13.6 & 2.13.7 in GCC on Interest Bearing Recoverable Advances.

9.1 Clauses 2.13.1, 2.13.6 & 2.13.7 in GCC is revised as under:

9.1.1 Clause 2.13.1 in GCC is revised as "Normally no advance payment shall be payable to the contractor. Mobilization advance payment in exceptional circumstances shall be interest bearing and secured through a Bank Guarantee and shall be limited to a maximum of 5% of contract value. This 'Interest Bearing Recoverable Advance' shall be payable in not less than two installments with any of the installment not exceeding 60% of the total eligible advance".

9.1.2 Clause 2.13.6 in GCC is revised as "The rate of interest applicable for the above advances shall be the Base rate of State Bank of India prevailing at the time of disbursement of the advance + 6%, and such rate will remain fixed till the total advance amount is recovered".

9.1.3 Clause 2.13.7 in GCC is revised as "Unadjusted amount of advances paid

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shall not exceed 5% of the total contract value at any point of time. Recovery of advances shall be made progressively from each Running Bill such that the advance amounts paid along with the interest is fully recovered by the time the contractor's billing reaches 90% of contract value."

SI. No: 10 - void

SI No: 11

PRICE VARIATION COMPENSATION (PVC)

The PRICE VARIATION COMPENSATION (PVC) clause 2.17 published in General Conditions of Contract (Volume I Book-II) is revised as under.

2.17 PRICE VARIATION COMPENSATION

2.17.1 In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable (only for works executed during extended period, if any, subject to other conditions as described in this section).

2.17.2 **85%** component of executed Contract Value shall be considered for PVC calculations and remaining 15% shall be treated as fixed component. The basis for calculation of price variation in each category, their component, Base Index, shall be as under:

2.17.3

SI. No	CATEGORY	BASE INDEX	PERCENTAGE COMPONENT ('K')				
			CIVIL PACKAGES (See Note A/B/C)			MECHA NICAL PACKA GES	
			A	B**	C		
i)	LABOUR (ALL CATEGORIES)	'MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (Website: labourbureau.nic.in)	40	25	30	65	80

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ii)	HIGH SPEED DIESEL OIL	Name of Commodity: HSD Commodity code: 1202000005 (See Note E)	5	3	5	5	5
iii)	WELDING ROD	Name of Commodity: MANUFACTURE OF BASIC METALS Commodity code: 1314000000 (See Note E)			15		
iv)	CEMENT	Name of Commodity: ORDINARY PORTLAND CEMENT		20	30		
		Commodity code: 1313050003 (See Note E)					
v)	STEEL (Structural and Reinforcement Steel)	Name of Commodity: MILD STEEL: LONG PRODUCTS Commodity code: 1314040000 (See Note E)		25			
vi)	ALL OTHER MATERIALS (Other than Cement & Steel)	Name of Commodity: ALL COMMODITIES Commodity code: 1000000000 (See Note E)	40	12	20		

Note:

- A) Cement & Steel: Free Issue (BHEL Scope)
- B) Cement & Steel: In Contractor Scope
- C) Cement in Contractor Scope, and Steel is Free Issue (BHEL Scope)
- D) For Composite packages (i.e. Civil + Mechanical + Electrical and / or CI or Civil + Mechanical or Mechanical + Electrical and / or CI), the Component ('K') for various categories shall be as per respective packages as above
- E) As per the 'MONTHLY WHOLE SALE PRICE INDEX' for the respective Commodity and Type, published by Office of Economic Adviser, Ministry of Commerce and Industry, Government of India. (Website: <http://www.eaindustry.nic.in/download data 0405.asp>). Revisions in the index or commodity will be re adjusted accordingly.

2.17.4 Void

2.17.5 Payment / recovery due to variation in index shall be determined on the basis of the following notional formula in respect of the identified component ('K') viz LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS.

$$P = K \times R \times \frac{(X_N - X_0)}{X_0}$$

Where

P = Amount to be paid/recovered due to variation in the Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and

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Materials

K = Percentage component ('K') applicable for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra)

XN = Revised Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials for the billing month under consideration

Xo = Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials as on the Base date.

2.17.6 **Base date shall be the calendar month of the schedule completion date (i.e. Actual Start date + Scheduled Contractual Completion period as per Letter of Intent / award and / or work order).**

2.17.7 PVC shall not be payable for the ORC amount, Supplementary / Additional Items, Extra works. However, PVC will be payable for items executed under quantity variation of BOQ items under originally awarded contract.

2.17.8 The contractor shall furnish necessary monthly bulletins in support of the requisite indices from the relevant websites along with his Bills.

2.17.9 The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.

2.17.10 PVC shall be applicable only, during extended period of contract (if any) after the scheduled completion period and for the portion of work delayed/backlog for the reasons not attributable to the contractor.

However, the total Quantum of Price Variation Amount payable/recoverable shall be regulated as follows:

- i) For the portion of shortfall/backlog not attributable to contractor, PVC shall be worked out on the basis of indices applicable for the respective month in which work is done. Base index shall be applicable as defined in clause 2.17.5
- ii) In case of Force Majeure, the PVC shall be regulated as per (a) or (b) below.

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- a) Force Majeure is invoked before “Base Date” / “revised base date” (as explained below) OR immediately after “base date” / “revised base date” in continuation (i.e. during the period when PVC is not applicable):
 - vii. Base date shall be revised: Revised Base date = Previous base date + duration of Force Majeure.
No PVC will be applicable for the work done till revised base date.
 - viii. PVC will be applicable for the work done after “base date”/ “revised date” as the case may be (during extended period when delay is not attributable to contractor). PVC shall be worked out on the basis of indices applicable for the respective month in which work is done with base index as on “base date”/ “revised base date” as the case may be.
- b) Force Majeure is invoked after “base date”/ “revised base date” as the case may be (during extended period when delay is not attributable to contractor).
 - 2. PVC shall be applicable for the work done after revocation of Force Majeure.
 - 3. PVC for the work done after revocation of Force Majeure shall be worked out on the basis of indices applicable for the respective month on which work is done excluding the effect of change in indices during total period of Force Majeure(s) invoked after “base date” / “revised base date” as the case may be. Base index shall be taken as on “base date” / “revised base date” as the case may be.

The total amount of PVC shall not exceed 15% of the cumulatively executed contract value. Executed Contract value for this purpose is exclusive of PVC, ORC, Supplementary / Additional items and Extra works except items due to quantity variation

SI No: 12

Clauses 2.21 in GCC regarding Arbitration is amended as below

2.21 ARBITRATION & CONCILIATION

2.21.1 ARBITRATION:

- 2.21.1.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in

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Clause 2.21.2 herein below or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, commence arbitration in respect of such Dispute by issuance of a notice in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice'). The Notice shall contain the particulars of all claims to be referred to arbitration in sufficient detail and shall also indicate the monetary amount of such claim. The arbitration shall be conducted by a sole arbitrator to be appointed by the Head of the BHEL Power Sector Region issuing the Contract within 60 days of receipt of the complete Notice. The language of arbitration shall be English.

The Arbitrator shall pass a reasoned award.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder as in force from time to time shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be Chennai (the place from where the contract is issued). The Contract shall be governed by and be construed as per provisions of the laws of India. Subject to this provision 2.21.1.1 regarding ARBITRATION, the principal civil court exercising ordinary civil jurisdiction over the area where the seat of arbitration is located shall have exclusive jurisdiction over any DISPUTE to the exclusion of any other court.

2.21.1.2 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through

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AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018 as amended from time to time.

2.21.1.3 The cost of arbitration shall initially be borne equally by the Parties subject to the final allocation thereof as per the award/order passed by the Arbitrator.

2.21.1.4 Notwithstanding the existence of any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner unless the dispute inter-alia relates to cancellation, termination or short-closure of the Contract by BHEL.

2.21.2 CONCILIATION:

If at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract), which the Parties are unable to settle mutually, arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee (IEC) to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Procedure 2.3 enclosed in Vol 1A Part II Chapter 9. The Procedure 2.3 together with its Formats will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this

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GCC.

The Contractor hereby agrees that BHEL may make any amendments or modifications to the provisions stipulated in the Procedure 2.3 enclosed in Vol 1A Part II Chapter 9 from time to time and confirms that it shall be bound by such amended or modified provisions of the Procedure 2.3 with effect from the date as intimated by BHEL to it.

2.21.3 No Interest payable to Contractor

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

SI No: 13: Reverse Auction – not applicable for this tender

SI No: 14

Existing format on Monthly Performance Evaluation of Contractor, as available in Form No F-14 of Volume ID Forms and procedure stands Deleted. Form No.- F-14 (Rev 01) is enclosed.

SI No: 15

Existing format on Monthly Performance Evaluation of Contractor, as available in Form No F-15 of Volume ID Forms and procedure stands Deleted. Form No.- F-15 (Rev 02) is enclosed.

SI No:16

Clause 2.22 in GCC regarding Retention Amount is revised as under:

2.22 Performance Security Deposit

2.22.1 After award of work, before commencement of work at site Vendor shall submit 5% of the contract value towards Performance Security Deposit, in the form of (a) or (b) below.

- (a) CASH (DD/ Online payment), 5% of the contract Value towards Performance Security Deposit, before commencing the contract (or)

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(b) Recovery 5% from Each Running Bill towards Performance security deposit.

(Note: Subcontractor has to choose either Option (a) or (b) before issue of Detailed LOI).

(c) However, Performance Security Deposit on part of PVC will be recovered at the rate of 5% from every running bill towards performance security deposit.

2.22.2 Refund of Performance Security Deposit:

- a) 50% of Performance Security Deposit shall be released along with the final bill.
- b) Balance 50% will be released after completion of Performance Guarantee Period (i.e., after expiry of Guarantee period), provided all the defects noticed during the guarantee period have been rectified to the satisfaction of BHEL Site Engineer/ BHEL Construction Manager, and after deducting all expenses/ other amounts due to BHEL under the contract/ other contracts entered into by BHEL with them. This portion of Performance Security Deposit, amount can be released on commencement of the Guarantee Period, on submission of equivalent Bank Guarantee.

SI No: 17

Existing format for Integrity Pact, as available in Volume ID Forms and procedure stands Deleted. Revised Format is enclosed.

SI No: 18

Existing format on No Deviation Certificate, as available in Form No F-03 of volume ID Forms and procedure stands Deleted. Revised Form No.- F-03 Rev 01 is enclosed.

SI No: 19

Existing format on BANK GUARANTEE FOR SECURITY DEPOSIT, as available in Form No F-11 (Rev 00) of Volume ID Forms and procedure stands Deleted. Refer format provided in Volume IA Part II Chapter 8 & 9 of TCC

SI No: 20

Clause 2.15.5 on Extra Works of Contract (GCC), Volume-IC, Book-II, is revised as under:

2.15.5 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS: Single composite average

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labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework / repairs / rectification / modification / fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit, storage and erection damages, payment, if found due will be at Rs 108/- per man hour.

VOLUME-IA PART – II

CHAPTER 2 to 18

In next 481 pages as below

Description	Chapter	No. of pages
Aux Boiler Piping	Chapter-2	12
Technical Conditions of bunker	Chapter-3	108
Welding schedule (Enclosed welding schedule is for information only and the applicable welding schedules will be issued during erection of work at site)	Chapter-4	40
GA Drawings – Typical	Chapter-5	02
General Guidelines for Insulation works	Chapter-6	54
Painting schedule	Chapter-7	32
Guidelines for Heat treatment	Chapter-8	18
Guidelines for Welding & NDE	Chapter-9	98
HSE plan for site operations by subcontractor	Chapter-10	72
FORM F-14, Rev 01	Chapter-11	06
FORM F-15, Rev 02	Chapter-12	06
T&P Hire Charges	Chapter-13	10
Proforma for bank guarantee – Earnest Money Deposit	Chapter-14	03
Proforma for bank guarantee – security Deposit	Chapter-15	03
Procedure for conduct of conciliation Proceedings	Chapter-16	11
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