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T E N D E R S P E C I F I C A T I O N

TENDER NO. BHEL/ NR/SCT/BARA/C&I/PACKAGE-A/912

FOR

"ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF UNIT NO. 1 AND STATION C&I OF UNIT NO. 1, 2 &3 (PACKAGE-A) OF 3X660 MW BARA STPP, DISTT: ALLAHABAD (U.P.)"

PART I – TECHNICAL BID

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

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

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
Power Sector – Northern Region,
Plot No. 25 , Sector - 16A ,
Distt. Gautam Budh Nagar, NOIDA – 201 301(INDIA)
Phone: 0091-0120- 2416273 / 2416296
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TENDER NO. BHEL/ NR/SCT/BARA/C&I/PACKAGE-A/912

IMPORTANT NOTE

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

THIS TENDER SPECIFICATION ISSUED TO:

M/S----------

Rev 01
1st Jun
2012

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited

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NOTICE INVITING TENDER (NIT)

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

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To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	**BHEL/ NR/SCT/BARA/C&I/PACKAGE-A/912**	
ii	Broad Scope of job	**"ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF UNIT NO. 1 AND STATION C&I OF UNIT NO. 1, 2 &3 (PACKAGE-A) OF 3X660 MW BARA STPP, DISTT: ALLAHABAD (U.P.)""**	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	***Applicable***
b	Volume-IB	*Special Conditions of Contract (SCC)*	***Applicable***
c	Volume-IC	*General Conditions of Contract (GCC)*	***Applicable***
d	Volume-ID	*Forms and Procedures*	
e	Volume-II	*Price Schedule (Absolute value).*	***Applicable***
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :*** ***Start 05.03.2013 , Time :09:00 Hrs*** ***Closes: 25.03.2013 , Time : 12:00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	***Applicable/*** ~~*Not applicable*~~
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 25.03.2013 , Time : 15:00 Hrs*** ***Place : BHEL PSNR NOIDA***	***Applicable***
vi	**OPENING OF TENDER**	***Date : 25.03.2013*** *(Within 2 hours of the latest due date and time of offer submission).* *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date &*	***Applicable***

		time of offer submission and opening of tenders get extended to the next working day. *(2) Bidder may depute representative to witness the opening of tender*	
vii	**EMD AMOUNT**	***Rs 2,00,000***	***Applicable***
viii	**COST OF TENDER**	***Rs 2000/-***	***Applicable***
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Date:* ***15.03.2013*** *Along with soft version also, addressing to undersigned & to others as per contact address given below*	***Applicable***
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		~~*Applicable*~~*/* ***Not Applicable***
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**		~~*Applicable*~~*/* ***Not Applicable***
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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

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

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

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

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

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

Sl no	Description	Remarks

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

	PART-I B	
	ENVELOPE – II superscribed as: PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**:-	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender **OR**	

	Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender 2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)	

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

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

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

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

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

9.0 Assessment of Capacity of Bidders:

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

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The 'Load' is the sum of the unit wise identified packages (refer Table-1) for contracts with BHEL Regions. The cut off month for reckoning 'Load'

shall be the month, two (2) months preceding the month corresponding to the 'latest date of bid submission', in the following manner:

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

i). Total number of Packages
Total number of Packages in hand = P
Where
- P is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced.

ii) Weightage "A" assigned to bidders based on Total number of Packages 'P':
a) If 'P' = 0-9, : "A" will be equal to '4'
b) If 'P' = 10-18, : "A" will be equal to '3'
c) If 'P' = 19-36, : "A" will be equal to '2'
d) If 'P' = 37-60, : "A" will be equal to '1'
e) If 'P' is above 60 : "A" will be equal to '0'

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

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

i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions:
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 , …. P_N etc be the packages (**under execution**/ executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (ie $P_T = P_1 + P_2 + P_3 + P_4 + .. P_N$)

b) Number of Months 'T_1' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1. Similarly T_2 for package P_2, T_3 for package P_3, etc for the tendered scope. Now calculate cumulative total months '$\mathbf{T_T}$' for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e $\mathbf{T_T} = T_1 + T_2 + T_3 + T_4 + .. T_N$)

c) Sum 'S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$,…. $S_{1\text{-}N}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}N}$). Similarly S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3, etc for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e 'S_T'$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

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

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

Aggregate of months for each of the similar package for which performance should have been evaluated in all the Regions

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions →	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
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) = $\mathbf{S_T}$

ii) Weightage "B" assigned to bidders based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions, for the respective Package:

a) If $\mathbf{R_{BHEL}}$ is ≥ 80%, "B" will be equal to '6'
b) If $\mathbf{R_{BHEL}}$ is ≥ 75% < 80%, "B" will be equal to '5'
c) If $\mathbf{R_{BHEL}}$ is ≥ 70% < 75%, "B" will be equal to '4'
d) If $\mathbf{R_{BHEL}}$ is ≥ 65% < 70%, "B" will be equal to '3'
e) If $\mathbf{R_{BHEL}}$ is ≥ 60% < 65%, "B" will be equal to '2'
f) If $\mathbf{R_{BHEL}}$ is < 60%, "B" will be equal to '0'

III. 'Assessment of Capacity of Bidder' to be Qualified for the tender:

Shall be based on the sum of the weightages obtained in 'LOAD' (A) and 'PERFORMANCE' (B) as below:

a) **If the sum (A+B) is 6 or above for each of the applicable Package, then the Bidder is considered 'Qualified' for the tender**
b) **If the sum (A+B) is less than 6 for any of the applicable Package, then the Bidder is considered 'NOT Qualified' for the tender**

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

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

c) Vendors who are first timers to any BHEL Region, may be considered subject to satisfying other tender conditions. Eligibility of the party for the next tender of any package in that Region shall be subject to the bidder satisfying the 'Assessment of Capacity of Bidder' for a period of first **nine months** after commencement of work or contract duration whatever is lesser.

In case the first timer is executing any other packages in any BHEL Region, then the performance evaluation will be based on the data available for the other packages though not similar, for the 'Period of assessment', for the purpose of 'Assessment of Capacity of Bidder'

d) Vendors who are not first timers and who have not been executing any package or packages similar to the packages under the tender in the 'Period of assessment', shall be considered qualified subject to them satisfying all other tender conditions.

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

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

i. upto Boiler Steam Blowing in case of Steam Generator and Auxilliaries

ii. upto Synchronisation in case of all other works excepting sl no (i) and (iii)

iii. upto execution of at least 75% of anticipated contract value (unit wise), in case of Enabling works or Civil & Structures.

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

g) Performance evaluation in CL 9 above is applicable to Prime bidder and consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site**,** bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.**

16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

17.0 In case BHEL decides on a `Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .

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

20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement with a validity period of six months initially. In case the consortium is awarded the contract, then the Consortium Agreement between the Prime Bidder and Consortium Partner or partners shall be extended till contractual completion period including extension periods if any applicable.

23.2 'Stand alone' bidder cannot become a '**Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding**. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected.

23.3 Number of partners for a consortium Bidding (or Technical Tie up) shall be as specified in the PQR

23.4 Prime Bidder shall be as specified in the Pre Qualification Requirement, else the bidder who has the major share of work

23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder' as specified in clause 9.0

23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'

23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified

23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.

23.9 Prime Bidder shall be responsible for the overall execution of the contract

23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats

23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.

23.12 In case the prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.

23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of two similar works with the same consortium partner or partners under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'stand alone' bidder for similar works, subject to certification from BHEL about the active involvement of the Prime Bidder for satisfactory execution of the works.

23.14 The consortium partner shall submit SD equivalent to 2% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value.

23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also

24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 Order of Precedence

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

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

for BHARAT HEAVY ELECTRICALS LTD

(SCT)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03 Annexure-3 Reverse Auction Details
04 Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**"ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF UNIT NO. 1 AND STATION C&I OF UNIT NO. 1, 2 &3 (PACKAGE-A) OF 3X660 MW BARA STPP, DISTT: ALLAHABAD (U.P.)", DISTT: ALLAHABAD (U.P.)"**
TENDER NO	**BHEL/ NR/SCT/BARA/C&I/PACKAGE-A/912**

SL. NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria Name and Description of qualifying criteria
A	Submission of Integrity Pact duly signed. (if applicable)	Not Applicable
B	Assessment of Capacity of Bidder to execute the work as per sl no. 9 of NIT (if applicable)	Applicable
C	FINANCIAL CRITERIA	
C1	TURNOVER Tenderers should have an average annual turnover of minimum of Rs 147 Lakhs (Rs One Crore Forty Seven Lakhs only) based on the audited accounts of last three financial years (2009-10, 2010-11 & 2011-12). Bidders shall submit audited annual accounts (balance sheets and profit & loss account) in support of this.	
C2	NETWORTH Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C1' above should be positive	
C3	PROFIT Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three years defined in 'C1' above based on latest Audited Accounts.	
D	Technical	
D1	Bidder who wish to participate should have executed during last seven years as on the date of Technical Bid Opening. D1.1:- C&I works for BTG/GT 'OR' CI works consisting of DCS/DDC/Station C&I in one unit of atleast 400 MW rating. 'OR'	

	D1.2:- Execution of atleast one contract of C&I works consisting of DCS/DDC/Station C&I in any Industry with its executed value of Rs 280 Lakhs or more.	
E	**Approval of Customer (if applicable)** **Note: Names of bidders who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval. Price bid of only those bidders shall be opened who are approved by customer.**	**Applicable**
F	**Consortium criteria (if applicable)**	**Not Applicable**

NOTES:

(1) For QR D1 above the word 'Executed' means the bidder should have achieved the criteria specified in the QRs even if the Contract has not been completed or closed.

(2) If the Qualifying work is executed in the last seven years period, as specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.

(3) In case audited Financial statements have not been submitted for all the three years as indicated against C1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years.

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK OREDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

ANNEXURE - 2

CHECK LIST

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

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

19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable/~~Not Applicable~~	YES/NO
20	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE - 3

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

Against this enquiry for the subject item / system with detailed scope of supply as per our tender specification, BHEL-PSNR, NOIDA may resort to "REVERSE AUCTION PROCEDURE" i.e. **ONLINE BIDDING on INTERNET.**

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on Internet.
3. In case BHEL decides to conduct reverse auction, BHEL's service provider shall contact the vendor directly and impart them the training.
4. Business rules like event date, time, start price, bid decrement, extensions, etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the compliance form in the prescribed (provided by service provider) before start of Reverse auction. Without this the vendor will not be eligible to participate in the event.
6. **Total Price quoted shall be inclusive of all taxes except service tax in line with the NIT conditions for the subject work in Indian Rupees (INR), which is to be worked out as per the BOQ (Rate Schedule) given in tender enquiry and subsequent changes made, if any. EXCEL Sheet shall be provided, if applicable.**
7. Reverse auction will be conducted on schedule date & time.
8. At the end of reverse auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to fax the duly signed filled-in prescribed format as provided on case-to-case basis to BHEL through service provider after completion of event on the same day preferably.
10. Any variation between the on-line bid value and signed document will be considered as sabotaging the tender process and will invite disqualification of vender to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse auction procedure for this tender enquiry, the price bids and price impacts, if any already submitted and available with BHEL shall be opened as per BHEL standard practice.

Authorization of representative who will participate in the on line Reverse Auction Process;

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

TECHINICAL CONDITIONS OF CONTRACT (TCC)

TENDER NO. BHEL/ NR/SCT/BARA/C&I/PACKAGE-A/912

FOR

"ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF UNIT NO. 1 AND STATION C&I OF UNIT NO. 1, 2 &3 (PACKAGE-A) OF 3X660 MW BARA STPP, DISTT: ALLAHABAD (U.P.)"

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

Chapter - 1: Project Information

1. PROJECT INFORMATION

Name of the Owner	:	**PRYAGRAJ POWER GENERATION COMPANY LTD.**
Address		Prayagraj Super Thermal Power Project, Bara, District- ALLAHBAD (UTTAR PARDESH)
2. New Installation	:	3 x 660 MW
3. Nearest Railway station	:	Loghara station on Mumbai - Howrah main line (3 km west of site)
4. Nearest Road	:	NH-76(500 m SW of SITE)
5. Nearest City	:	ALLAHBAD (34 KM)
6. Nearest Airport	:	BAMROLI AIRPORT, ALLAHBAD (28 km)
7. Highest Temperature	:	42.3 C^0 (MAY)
8. Lowest Temperature	:	8.7 C^0 (JANUARY)
9. Relative Humidity 15-20% during summer	:	70-80% during monsoon
Seismic Zone	:	III

Chapter - 2: SCOPE OF WORKS

2.0 SCOPE OF WORK

2.0.1 Scope of these specifications cover complete work of handling, transportation of materials from Project storage yard / stores to erection site / place of erection , storage at erection site, preservation, watch and ward, dressing, chipping and leveling of foundations, cleaning , checking, testing, pre-assembly, erection, calibration, alignment, welding, wherever required, preservative/ final painting including supply of paints etc, earthing of equipment, including other activities required for erection, testing, commissioning, post commissioning, trial operation, PG test assistance & handing over of **All C&I equipment of Unit No. 1 and Station C&I of Unit No. 1 ,2 &3 of 3x660 MW Bara STPP** as indicated in the rate schedule covered within the scope of these specifications for this tender.

2.1 SCOPE OF WORK FOR C&I PACKAGE IN GENERAL

The Scope of C&I work covered in the above packages shall be as follows:

1. Erection and commissioning of Control/DCS panels of SG, TG and station C&I.

2. Erection and commissioning of All Types of Field Instruments like Temperature, Pressure and Flow instruments (local & remote) and special instruments like EWLI, SWAS System, Flue Gas analyser etc.

3. Erection and commissioning Man Machine Interface & Data Acquisition System consists of Operator Workstations (max Station),Engineering station (common for SG/TG/GT),Computers / PLC based Equipment, Laser printers (B/W-A3),Ethernet Switches

4. Erection and commissioning of all types of Control room mounted instruments like Recorders, Indicators, Microprocessor based panels, DCS system and its accessories like system panels, PC, printers, furniture etc.

5. Erection & Testing of all types of control/instrumentation cables etc

6. Erection of all types of Hardware like impulse pipes, cable trays & tray supports etc.

7. Fabrication and installation of steel supports, wherever required

8. Erection Installation of canopy for outdoor pushbutton stations/motors/panels/ instrumentation.

9. Commissioning of all Types of Electrical/ Pneumatic operated Valves/Actuators/ Controllers and Relief Valves.

10. Supply of adequate quantity of touch up paint and paints as required for items covered in scope of works

11. Erection and commissioning of UPS, ACDB, Battery, Battery Charger, DCDB etc.

2.2 The scope of specification covers the installation, testing and commissioning of the all equipment, hardware along with accessories as detailed in Bill of Materials given in Chapter X.

2.3 The quantity indicated in the BOQ/ Rate Schedule is tentative only and based on engineering and inputs received from manufacturing units as on NIT date which is liable for variation**.** If any item or equipment not covered in the specification but requires to be erected/commissioned to complete the system, the same shall be carried out by the contractor. Equivalent unit rate for those item or equipment shall be considered wherever possible from the BOQ. Payment will be made as per actual quantum of job executed at the unit rate accepted by BHEL. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.

Note:

1. **Detailed BOQ with specification are given in the CHAPTER-X. Contractor shall go through the detailed BOQ and specification before filling the rate in the rate schedule given in Chapter-XI.**

2.4 GENERAL

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

2.4.1 Identification of equipment at storage yard, technical assistance for checking and making the shortage/damage reports, taking delivery from storage yard/ stores and calibration, erection, aligning, fastening, supporting, cleaning, checking, testing, commissioning, troubleshooting and carrying out statutory tests as required, trial operation, up to the time of completion of commissioning activities and commercial operation of the unit and handing over to customer or till completion of contract period whichever is earlier, along with the supply of all consumables, tools and tackles and testing instruments.

2.4.2 It is not the intent to specify herein all details of material. Any item related to this work not covered, but necessary to complete the system will be deemed to have been included in the scope of the work.

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

2.4.4 Contractor shall erect all items/materials etc. as per sequence prescribed by BHEL at site. BHEL engineer depending upon the availability of materials/work fronts etc will decide the sequence of erection/commissioning methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection/commissioning adopted in erection/commissioning of similar job or for any reasons whatsoever.

2.4.5 Site testing wherever required shall be carried out for all items/materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.

2.4.6 The contractor shall co-ordinate and provide assistance for satisfactory testing, pre-commissioning, commissioning, trial run and PG test of the connected equipment under overall guidance of BHEL and shall locate any cause of malfunction and rectify the same for proper operation. Testing shall also include any additional tests, which the Engineer feels necessary because of site conditions and also to meet system specification.

2.4.7 The work shall be executed under the usual conditions without affecting power plant construction and in conjunction with other operations and contracting agencies at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

2.4.8 The contractor shall take delivery of item, materials, from the storage yard / stores/ sheds of BHEL / customer which are within plant premises. He shall also make arrangements for, safe custody, watch and ward of equipment after it has been handed over to him till they are fully erected, tested and commissioned till the contract period. The contractor shall note that items/materials shall be transported to erection site / assembly yard etc. by the prescribed route without disturbing and causing damage to other works in the most professional manner. All items, Hardware, etc. shall be stored in appropriate manner as per BHEL's instructions.

2.4.9 The contractor shall take delivery of items/materials, and consumables from the stores/ storage area / sheds of BHEL / customer after getting approval of engineer / customer in the prescribed indent forms of BHEL / customer.

2.4.10 After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in packed condition to BHEL stores. In case of any use over actual design requirements, BHEL reserves the right to recover the cost of material used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

2.4.11 Contractor shall, transport all materials to site and unload at site / working area, or pre-assembly yard for inspection and checking. All material handling equipment required shall be arranged by the contractor.

2.4.12 Contractor shall retain all T&P/Testing instrument/Material handling instrument etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge.

2.4.13 Contractor shall remove all scrap materials periodically generated from his working area in and around power station and collect the same at one place earmarked for the same. Load of scraps is to be shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect. All the package materials, including special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.

2.4.14 If any item or equipment not covered but requires being erected/commissioned, same shall be carried out by the contractor. Equivalent or proportional unit rate shall be considered wherever possible from the BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.

2.4.15 The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor’s construction equipment and materials. The contractor may consult the Engineer-in-Charge on the arrangements made for general site security for protection of his machinery equipment tools etc.

2.4.16 The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor’s site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in- Charge.

2.4.17 The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances.

2.4.18 Scope of work covered under this specification requires quality workmanship, engineering and construction management. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments, calibrating equipment etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployed by contractor shall match with above scope of works.

2.4.19 All the surplus, damaged, unused materials, package materials, containers, special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.

2.4.20 Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer.

2.4.21 BHEL will provide vendor’s technical support for commissioning of various proprietary type special instruments/systems like Analysers, Vibration

Monitoring System, Microprocessor based relays, Flame Scanners etc. The contractor shall carry out the works as per instructions of BHEL/ Vendor Engineer.

2.4.22 PG Test Assistance

2.5 Contractor shall ensure following:

I. Contractor has to maintain contact with local hospital having ambulance facility, scanning & other ultra modern medical facilities required during emergency.

II. Contractor has to ensure pre employment medical check for all staff & workers.

III. Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following

- Male nurse (in shifts)
- Oxygen set up
- Breathing apparatus
- Eye wash facility
- Stretcher
- Trauma blanket
- Medicines.

In addition to above, BHEL (through its other contractor) has arranged ambulance at work site for emergency purpose, which can be utilized by the contractor in case of emergency. The charges for the same will be decided mutually at site. In case, under unavoidable circumstances, if the ambulance is not available / being used elsewhere, the contractor will have to arrange for the same as under clause 2.3 (I).

2.6 The contractor shall comply with following towards Social Accountability;

a) The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.

b) The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.

c) The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.

d) The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimation/ Corporal punishment for failure in meeting with relevant requirements.

e) The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.

f) The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.

g) The Contractor shall arrange potable drinking water to its employees & workers.

2.7 In order to meet the environmental concerns it is expected that the contractor shall plant, protect and maintain at least 500 trees or equivalent in the vicinity of the project as per the available space and as per the advice of Engineers.

2.8 The contractor's scope of work is further described in the clauses hereafter:

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

2.8.1 CONTROL PANELS(max DNA based/C&I /DCS panel/UCP etc)

1. Panels to be install are microprocessor based max DNA control, ECP etc supplied in suit of either one/two/three or loose shipping sections with integral base frame or loose base frame. These panels may have to be installed as stand-alone or in-group consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.

2. Installation of panel shall include checking of foundation, chipping of floor, fixing of base frame, fixing of anti-vibration pads, levelling, alignment, bolting with base frame/ welding of base frame with floor inserts and grouting of panels and base frames, mounting of panel canopy wherever supplied as part of panel, drilling of gland plates, sealing of panels/ cable entries.

3. Where the base frame is not supplied as part of panel supply, the contractor shall fabricate the base frame from structural items at site. Payment for such fabrication will be effected on measured quantity at the rate applicable for structural steel fabrication and installation. Proper sealing of all the holes and cable entries (even if the cable has been laid by others) in the panel is in the contractor's scope

4. Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. This shall be a part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc.

5. Checking, testing, mounting/fixing in the panel all loose supplied items modules, relays, switches, lamps, push buttons, meters and all other items.

6. Checking and testing of internal wiring/components

7. Mounting of microprocessor based amplifier chassis (to be supplied by BHEL-Trichy) in mAXDNA FSSS panel (to be supplied by BHEL-EDN).

8. Interconnection among panels, engineering control, diagnostic, plant monitoring system, control desk and field equipment/instruments.

9. Charging the system, checking and testing functional operation, simulation testing, checking signal flow.

10. Software/hardware setting of parameters, logic etc.

11. Software programming, erasing, calibration etc.

12. Commissioning of all auto control loops.

13. All the panels and JBs shall be electrically earthed to the nearest earth grid by means of GI wire/Flats as per the instructions of BHEL engineer

14. The contractor shall prepare all erection/ commissioning log sheets, protocols / test certificates as per field quality plan, get it signed by the concerned BHEL / PPGCL Engineer and submit the same to BHEL Engineer as per his instruction.

15. The charged and commissioned equipment shall be maintained by the contractor till the same is taken over by M/s PPGCL

16. Any items like lamps, lens, fuse / relays / instruments missed form the custody if the contractor shall be replaced by the contractor at free of cost.

17. The contractor shall close unused opening at the panel bottom plate with suitable material in consultation with Site Engineer at free of cost.

18. If any removal / Re-fixing of contactors / relays becomes necessary for the completion of the system, the same shall be done by the contractor at free of cost.

19. Scope of work shall also cover drilling of bottom gland plates for cable entry as required.

20. The contractor shall calibrate and commission all panel mounted instruments, protection relays, transducers, Recorders, Indicators, energy meters etc.

21. Unit rate shall also include Testing, Calibration and adjustment of relays, electronic cards and instruments, transducers mounted on the panels.

2.8.2 UPS,BATTERY AND BATTERY CHARGER

The batteries are of heavy duty type capable of providing normal and emergency DC loads. The cells will be mounted on insulators carried on suitable wooden stands. The chargers are fully thyristorised and shall comprise of Silicon Controlled Rectifier with transformer, switchgear and automatic

regulation. The float and boost chargers will be housed in separate cubicles and mounted side by side. Tentative details are given in the BOM.

Lump sum shall be quoted for Erection and commissioning of UPS and Battery. No additional payment shall be made for any variation in the number of cells. The unit rate quoted for erection of UPS and battery will include the following works.

SCOPE OF WORK FOR BATTERY

1. Collecting the batteries and all the accessories from stores and assembling on the wooden racks and fixing the all loose items supplied with the battery charger as per drawings and making any minor modifications or changes in wiring, if required, without any extra cost.

2. Filling the shells with loose supplied alkali/acid- if applicable.

3. Arranging for suitable load for charging and discharging during charging and discharging cycles.

4. Arranging manpower in shift during charging and discharging cycles which is to be carried out round the clock as per the code of practice and conducting other routine test as per the IS under the supervision of the BHEL engineer.

5. Arranging necessary tools, T&P, Testing & calibration instruments required for erection and commissioning of the above electrical equipment/panel.

2.8.3 CABLE TRAYS/CABLE DUCTS

1. Various types of sheet metal, galvanized cable tray, i.e. perforated, ladder type, sheet metal duct, solid bottom trays, pre-fabricated structural trays etc., will be supplied in standard lengths along with accessories and hardware viz; coupler plate, tray covers and tray clamps etc.

2. **Erection of cable tray/cable duct shall include cutting, laying, jointing, fixing tee/reducers/ bends/clamps, fixing of tray covers, hardware, fabrication & welding of tray supports as per tray route layout etc.**

2. Fabrication of bends/tee/ reducers from straight length of tray is within the scope of work and rate quoted shall be inclusive in unit rate (in running meter). All site welds of cable trays shall be painted with approved primer and cold galvanizing paint, which shall be arranged by the contractor.

3. **I**n case structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.

4. Cable trays/duct etc may have to be routed underground in cable trench, over head on structure, along the walls, floors etc.

5. Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.

2.8.4 CABLE LAYING (POWER/CONTROL / INSTRUMENTATION/COMPENSATING/FIBRE OPTIC/ETHERNET SHIELDED/ UNSHIELDED CABLES / PLUG-IN CABLES / Coaxial / UTP / STP /DATA HIGHWAY, ARMOURED / UN-ARMOURED,SINGLE / MULTI-CORE, PVC / HR PVC / FRLS / TEFLON / XLP INSULATION)

1. Cable laying includes cutting to the required length, laying in overhead Cable racks / underground cable trenches, pipes, flexible conduits, dressing/clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JBs, providing printed ferrules (ferrule printing machines to be provided by contractor for printing necessary cross ferruling details) / PVC numerical / alphabetical ferrules (where printed ferrules not possible at all) machine engraved ferrules sleeve/ ferrule, termination by using crimp type copper tinned/aluminium lugs, insulated/un-insulated, crimp and soldered termination, plug-in connections with insert type crimping, providing identification cable tags of PVC/aluminium at both the ends and at appropriate interval (Approximately 30meters) throughout the route length, continuity checking, insulation resistance checking. Contractor to arrange adequate numbers of his own ferrule printing machines.

2. Entry to the panels, JB's may be at top, side or bottom. All cable are required be supported and clamped near to the panel.

3. **PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metal as per site requirement, clamping and dressing material such as suitable cable ties/ clamps etc with hardware, PVC sleeves etc. shall be supplied by contractor within the quoted rate for cable laying. Only Cable Lugs & Glands Shall Be Issued By BHEL As Free Issue Item.**

4. All care should be taken to avoid abrasion, tension, twisting, kinking and stretching of cables during installation.

5. Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/field device end and continuity is maintained through JBs and earthed at panel end only. While terminating the shield wire in either panel or JBs, PVC sleeves are to be used to avoid two-point earthing.

6. Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be

sealed. The required material for doing so shall be included by contractor in the cabling

7. Contractor shall carefully plan the cutting schedule of each cable drum in consultation with BHEL site engineer such that wastages are minimized. Recovery will be made in case the wastages are exceeding the wastage allowances fixed in this contract.

2.8.4.1 CABLE TERMINATION

1. The Cost Of Cable Laying As Per BOQ Cum Rate Schedule shall also include the cost of termination with suitable crimping type lugs & ferrules

2. Only Cable Lugs & Glands Shall Be Issued By BHEL as Free Issue Item. Drilling of holes in gland plates of control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL.

3. The contractor shall carryout insulation testing, simulation testing etc. as per the instructions of Engineer at site.

4. Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.

2.8.5 SCOPE OF WORK FOR FIELD INSTRUMENTS

1. The type of instruments to be erected and commissioned shall be as detailed below:

2. All types of transmitters like temperature, pressure, flow, level transmitters etc. Local mounted pressure gauges, DP gauges, thermocouples, RTDs, temperature gauges, temperature switches, pressure switches, DP switches, flow switches and limit switches and flow indicator level switches etc.

3. Air filter regulators, Air lock off valves etc.

4. Panels / Control desk mounted Instruments like indicators, recorder, console and electronic modules etc.

5. I / P converters and local controllers.

6. Pneumatic operated control valves, trip valves, solenoid valves, power cylinders, etc. and electrically operated valves.

7. Special instruments like vibration sensors, electronic water level indicator, Gas analyser, PC based instruments, etc.

8. Prior to installation, all the local & remote Instruments, thermocouples/RTDs, I/P converters, etc. shall be calibrated. Similarly, limit switches, flow switches, level switches, solenoid valves, air filter regulator, purge meters, etc. shall be checked for proper operation.

9. The scope of work for each instrument shall include calibration, installation, loop checking, commissioning and troubleshooting until satisfactory performance as per operational and system requirement and maintenance till the end of contract period or trial operation whichever is earlier.

10. **In case any instrument requires recalibration to achieve the expected performance, the same shall be carried out at no extra cost.** If any re-calibration or replacement of instruments and rechecking of cable termination is found necessary during commissioning, the same shall be done at free of cost.

11. If any instrument is to be relocated for satisfactory performance, the same shall be carried out by the contractor.

12. Fabrication and installation of racks and supports for instruments, wherever required, shall be carried out by the contractor. Steel materials required for fabrication shall be supplied by BHEL.

13. The scope shall also include marking Tag numbers on the instruments or racks, either by paint or a separate tag plate as per BHEL Engineer's directive.

14. For field mounted instruments, pre-fabricated canopies shall be provided by BHEL. Mounting of canopies shall be done by the contractor as part of scope.

15. The scope of work for pressure/differential pressure transmitters, gauges, switches, shall include fixing the instruments on the racks / supports along with manifolds, and associated fittings and clamps.

16. The scope of work for Temperature transmitters, I/P converters, Air filter/Air lock off valves, Purge meters, Rotameters, position transmitter, probes etc shall include fixing the instruments on the racks / supports along with associated fittings and clamps.

17. The scope of work for control room mounted instruments shall cover mounting of instruments on panels / desk wiring, minor grinding on the cut out of panels for proper fixing.

18. The scope of work for erection of Casing temperature thermocouple of turbine/ metal temperature thermocouple (MTM) shall cover laying, dressing and clamping, supply and fixing of tag plates, etc.

19. The scope of work for erection and checking of thermocouple, RTD etc. shall include cleaning of thermo well stubs threads using tap sets, fixing of thermo wells, seal welding of thermo well, wherever required as per BHEL directive of site engineers.

20. The scope of work for temperature switches, gauges shall include providing suitable support for capillary type temperature Gauges/switches besides the works covered above for RTD & T/C.

21. The scope of work for erection and commissioning of float type Level switches includes fixing of switches on float chambers and fixing of float chambers on stand pipe, any minor modification required to match Float chamber with tapping point, providing supports wherever required etc.

22. The scope of work for Electronic type Level switches includes fixing of Electrode standpipe, Electrodes, Electronic unit, any minor modification required to match Float chamber/ Electrode standpipe with tapping point, integration of all loose supplied items etc .

23. The scope of work for special instruments like, Electronic water level indicator, Flue Gas analysers, SWAS Analyser, etc. shall include installation of all loose items which are not explicitly mentioned, but comes as part of the system, integration of total system and commissioning. The quantities of loose supplied items are approximate only. No extra payment will be applicable for any variation in quantity or for any additional items supplied as part of equipment.

24. For Special Instruments like, Analysers, SWAS System, DCS/PLC vendor support shall be provided by BHEL for commissioning. The contractor shall provide necessary assistance for commissioning activities.

25. All instruments are generally covered in the BOM. However, if any instruments not covered, but requires being erected/commissioned, same shall be carried out by the contractor.

26. In case of Instruments that are mounted and supplied along with main equipment, the contractor shall carry out removal, calibration, re-fixing and commissioning of same, as per requirement.

2.8.6 RIGID & FLEXIBLE CONDUITS

1. Cables shall normally be laid on cable trays. However, in case of shorter routes where trays are not possible, suitable GI pipe/flexible conduits shall be used.

2. The scope of works for flexible conduit includes drilling of the holes on the plates, fixing of the end connectors, providing suitable supports and fixing tag marks wherever specified as required by BHEL. The supply of suitable clamps, fasteners and tag plates are in contractor's scope.

3. Fixing end connectors shall be part of scope of flexible conduit laying.

2.8.7 JUNCTION BOXES/CJCBs/PUSH BUTTON BOXES

Different type of Junction boxes/CJCBs/Bush button boxes shall be supplied by BHEL. The scope of installation of Junction boxes/Bush button boxes shall be as follows:

1. The unit rate quoted for erection of junction boxes/push button boxes shall include providing necessary supports, drilling of bottom gland plates for cable glands as required, Painting the tag No of JB or fixing a separate tag plate as required on junction boxes/push button boxes, minor chipping, grouting as required for mounting the JBs/PB and supply of all bolts and nuts (Fasteners) including grouting bolts as required for mounting the junction box/push button.

2. Fabrication and fixing of supports shall be on tonnage basis.

3. The contractor shall close all unused holes on the gland plates using suitable material in consultation with Site Engineer at free of cost.

4. All bolts and nuts (Fasteners) required for mounting the junction box shall be arranged by the contractor.

2.8.8 SCOPE OF WORK FOR IMPULSE PIPES

1. Fabrication and erection of channel / angle / slotted angle supports, cleaning impulse pipe with wire brush and compressed air, edge preparation, cold bending, laying to the required slopes, clamping, welding of isolation / drain valves and fittings by butt / socket welding / swoze lock joints. Servicing of valves, connecting with the process end and to the instruments, NDT, Hydraulic testing the impulse lines, and painting the lines as per requirement of BHEL engineer.

2. The impulse line may have to be cleaned chemically for removing grease / rusting. Proper tagging of valves and impulse lines on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of Impulse / draft pipe lines due to site requirement in general.

2.8.9 SCOPE OF WORK FOR COPPER/ SS TUBES

1. Fabrication and erection of single angle supports / tray supports for single multi run tube. Laying tubes in the angles / trays from the panel to the equipment, instrument to instrument, air supply line to drive / instrument, air line connections, clamping properly as per standard ferruling and termination at both ends. This includes all fittings and needle valves, stop valves etc. also. Proper tagging of valves and pneumatic tubes on both ends shall be done for proper identification. No extra charges will be claimed by contractor for any modification carried out after laying of pneumatic tubes / draft pipe lines due to site requirement in general.

2.8.10 SCOPE OF WORK FOR PRE-FABRICATED/ SEMI-FABRICATED LIR/ LIE/ GAUGE BOARDS

1. If the frame or rack is supplied as a pre-fabricated item like LIR, same shall be erected, grouted and painted as per site requirement.

2. If any frame or support or rack supplied as semi-fabricated item, same shall be assembled at site either by welding or bolting and erected, grouted and painted as per site requirement.

3. Unit rate quoted for such pre-fabricated /semi-fabricated items like LIE/LIR and enclosure shall be on Number basis. Unit rate shall cover installation, grouting, painting and supply of nuts, bolts, anchor fasteners, grouting materials such as cement, sand etc as required. Unit rate shall also include full painting of impulse line fitted and supplied along with LIR/LIE/LGB.

4. Wherever LIR/LGB/LIE are supplied with instruments mounted on them, the rate quoted for LIR/LGB/LIE shall include calibration of all the instruments mounted on them as detailed in the BOQ. However if the instruments supplied as loose items, the instruments shall be calibrated and mounted on the LIR/LGB/LIE and separate calibration/erection /commissioning charges shall be applicable in line with other instruments erection

2.8.11 SCOPE OF WORK FOR ELECTRIC & PNEUMATIC ACTUATORS

1. Pneumatic actuators shall be calibrated at site

2. For calibration of any Pneumatic Actuator at field, temporary air supply, if required, shall be arranged by the contractor.

3. All calibration instruments required for calibration of actuators shall be arranged by the contractor.

4. For all electrical actuators of the valves, functioning, setting and performance of limit switches/torque switches of various positions shall be checked before and after installation of the actuators. The position transmitters for inching applications shall also be calibrated.

2.8.12 SCOPE OF WORK FOR THE INSTRUMENTS MOUNTED AND SUPPLIED ALONG WITH EQUIPMENT/ SKIDS

1. Scope of work covers removal, re-calibration, re-fixing, re-termination of cables, checking the continuity, replacing any defective parts or replacing the total instrument, if required.

2. The scope also covers collecting the replacement instruments/parts from BHEL/customer stores, stockyard etc.

2.8.13 SCOPE OF EARTHING

1. The scope of earthing covered in this contract is above ground earthing i.e equipment earthing. Scope of earthing covers earthing of field Instruments, JBs, Branch trays, LIR/LIE, JB, Push Button boxes etc. All

DCS and its accessories, PLC/Instrumentation panels/systems etc, shall be earthed to a separate Electronic earth grid.

2. Different type of earthing materials shall be supplied and same shall be erected as per site requirement.

3. The scope of work shall include supply of fasteners, lugs, minor civil works etc.

4. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the contractor at site.

2.8.14 STRUCTURAL FABRICATION AND INSTALLATION

INSTRUMENT/ JUNCTION BOX FRAME/ PANEL BASE FRAME / CABLE TRAY & MISC STRUCTURES FABRICATION

1. Structural steel material like MS angles, channels, beams, flats, plates etc. shall be supplied in running meter and the same shall be used for misc fabrication if required and the same shall be used for fabrication of panel base frame, cable tray supports, Canopies for instruments/panels/ drives/JB's/Push Buttons etc., Instrument/Junction box frames, Impulse Pipe/Instrument Air Pipe supports and instruments etc.

2. This shall include cutting to size, contouring of ends for connections if required, welding, grinding of excess weld deposits/burrs, drilling of holes for mounting of device/instrument, installation at location, leveling, alignment, providing bracings and painting etc. No gas cut holes will be permitted.

3. All the fabricated supports/frames for instruments, trays, pipes, electrical equipment, etc., shall be painted after thoroughly cleaned by wire brush, scrapping or any other method as per requirement of BHEL/UPRVUNL. Paints and other associated items are in the scope of the contractor.

4. Frame installation at site may involve mounting either on concrete floor by grouting / using anchor fasteners or on steel structure by welding etc. All consumables including anchor fasteners shall be arranged by the contractor. Where required, as part of work, concrete floors may have to be chipped out to reinforcement depth for anchoring the frames. Wherever grouting is required, contractor shall arrange all the required material including cement / grout mix, shuttering etc., necessary labour and meet all other requirements as part of work.

5. In case, structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.

6. In certain packages, members of frames/rack for mounting of junction boxes/

instruments may be supplied readymade. These have to be assembled prior to installation. The installation rate as quoted shall include assembly of the frames.

7. **Gas cutting of tray/impulse pipe support and holes in frame is not permitted. Only hacksaw cutting/ drilled hole shall be permitted.**

2.8.15 POWER CYLINDER ERECTION

Platforms on which Power Cylinders are to be mounted are usually provided by the Civil Contractor / other agency. However minor structure work required shall form a part of the work within the quoted rate of the the respective cylinder . Fabrication / erection of stands for mounting of the cylinders The work also includes minor rectifications/alterationin the tubing , servicing of accessories , setting of limit switches , calibration of actuators and feedback position transmitters

2.8.16 C&I LAB

Scope of work includes the setup & handing over of C&I lab having the following equipment:

S.No.	Lab Instruments	Qty.(in nos.)
1	Electronic Test Bench	1
2	Pneumatic Test Bench	1
3	Dead Weight Tester	1
4	Vacuum Tester	1
5	Hydraulic Pressure Gauge Tester	1
6	Portable Hydraulic Pressure Generator	1
7	Portable Pressure Calibrator	3
8	Test Manometers	2
9	U -Tube Manometer	2
10	Air sets	4
11	Portable Electro-pneumatic Calibrator	2
12	Fluidised Temperature bath	1
13	Thermocouple Test Furnace	1
14	Barometer	1
15	Mercury Thermometers	24
16	Flow meter calibrator	2
17	Portable Tachometer	2
18	Coil winding Machine	1
19	Stop watches	3
20	Precision Instrument Radial Drilling Machine	1

21	Jeweler's Lathe	1
22	Standard tool box	5
23	Wet and Dry Bulb Hygrometer	1
24	Soldering and Desoldering Stations with all accessories	2
25	Vacuum Pump	1
26	Solder sucker	2
27	Digital Mulitmeter	
a.	Digital Multimeter, 3½ digit hand held	10
b.	Digital Multimeter, 4½ digit hand -held	4
c.	Digital Multimeter, 4½ digit desk top	2
d.	Digital Multimeter, 5½ digit desk top	2
e.	Digital Multimeter, 6½ digit desk top	2
28	Portable Current Calibrator	5
29	Portable milli-volt Calibrator	5
30	Resistance Thermometer Bridge	2
31	Decade Resistance Box	2
32	Variac	1
33	Rheostat/Potentiometer	10
34	Test RTD	2
35	Portable Thermocouple/RTD calibrator/Simulator	1
36	Portable Multi Function Counter	1
37	Digital Storage Oscilloscope	1
38	Power Pack	3
39	Portable Vibration Meter	1
40	RCL Bridge	1
41	pH Simulator	1
42	MultiChannel Simulation Unit(Analog)	1
43	Digital Channel Simulator	1
44	Function Generator	1
45	Portable Infrared Thermometer	1
46	Clip On AC Power Meter	1
47	Portable Gas Analyser	1
48	Portable Surface pyrometer(infra red)	1

49	Lab PC+ laser printer(A4,B/W)	1
50	Digital megger	2
51	Portable Vibration Analyser/Dynamic balancer	1
52	Portable Universal input type 30-point chartless recorder	1
53	Single battery cell charger	2
54	Test bench for Electrical actuator	
55	Visual training aid	
a.	LCD projector	1
b.	Lap top PC	1
c.	Engraving machine	1

2.9 SCOPE OF CIVIL WORKS

1. The scope of civil works covers minor civil works like drilling, chipping and punching & opening in concrete floors, slabs, brick walls, grouting of base frame of panels etc. Scope of civil works also covers minor civil works required for installation of push button stations, Junction Boxes.

2. Scope of civil works includes supply of grouting materials like cement, sand, etc., and cleaning of all debris at free of cost.

2.10 WELDING, NON-DESTRUCTIVE TESTING ETC.

1. Installation of equipment involves good quality welding, NDE checks etc.

2. Welding of all structural steel & aluminium shall be done only by the qualified and approved welders.

3. All the welders shall be tested and approved by BHEL engineer/ Customer's quality engineer before they are actually engaged on work though they may possess IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.

4. The welded surface shall be cleaned of slag and painted with primer paint to prevent corrosion. For this paint will be supplied by the contractor.

5. Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

6. Certain types of coated welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the coated welding electrodes have to be carried in portable ovens.

2.11 MEASUREMENTS & WASTAGE & CUTTING ALLOWANCES

1. For all payment purposes, measurement shall be made on the basis of the actual execution of work in line with drawings/documents/site requirements. Physical measurements shall be made by the contractor in the presence of the Engineer.

2. The measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible conduits, trays etc., shall be made on the basis of length actually laid.

3. All the surplus, scrap and serviceable materials, out of the quantity issued to the contractor shall be returned to BHEL in good condition and as directed by the engineer.

4. All materials returned to stores should carry aluminium tag indicating the size and type. Cables more than 15 meters length is termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation.

5. **While carrying out material reconciliation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity (ies) will be taken as the net quantity (ies) issued to the contractor. Material reconciliation shall be done and allowable scrap quantity calculated as per wastage allowance percentage specified above. Any scrap/wastage generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor**.

6. For all site-fabricated steel items such as supports, racks, frame, Canopy etc. physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.

7. Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard Performa prescribed for this purpose by the site in charge.

8. The erection contractor shall make every effort to minimize wastage during erection work. Cutting and wastage allowance shall be computed on length, weight of material actually used, measured and accepted. In any case, the wastage shall not exceed the following limits;

Sl.No.	Item	%Wastage on issued Qty
01.	Each iron/steel section	2
02.	Each size of control / shielded cable	2
03.	Each size of power cables	1
04.	Impulse pipe/tubes/GI pipes/copper tube	1

9. If the actual wastage is more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.

10. The cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. For this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length and the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Any jointing shall have to be approved by BHEL engineer. All the cut pieces/bits of cables, which are not used, shall be returned to the purchaser for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.

2.12 FINAL PAINTING

1. The contractor shall provide all the primer, paint, and other consumables like brush, cleaning agents etc. for the painting of all the erected equipment like supports, racks, frames, canopy, LIE/LIR/LGB, impulse pipes etc. carried out by the contractor. All T&P, manpower, supervision is in contractor's scope. Painting shall be carried out as per colour scheme approved by BHEL/ PPGCL

2. All metal parts of the equipment including supports, structures, etc., as applicable shall be painted after thoroughly cleaning the surface from dust, rust, greases, oils, scales, etc, by wire brush, scrapping etc; as specified in relevant erection documents. The above parts shall then be painted with specified two coats of specified paint over the shop primer/paint.

3. In the case of steel fabricated items, raw steel after fabrication has to be surface cleaned and subsequent painting to be carried out.

4. Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by the specified method and then primer coat applied. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned as per specifications, coated with suitable primer and then coated with final paint coats. The dry film thickness after final coat should be as per specification. The color, shade etc. shall be as per specification.

5. Paint and other materials so purchased shall be ISI marked and as per drawing, documents and specifications and painting should be as per colour scheme and quality approved / specified by Engineer. Painting schedule will be furnished at site. Valid Test certificate for the paint so supplied shall be made available before use of the same on work.

6. **In order to have consistency in painting system, it is preferable that all the supplies are sourced from one single manufacturer.**

7. All the fabricated frames, racks, supports, panel base frame etc. wherever applicable shall be painted with two coats of primer and followed by two coats of paint as specified earlier herein. All the welded joints of G I Structure, GI cable trays shall be applied with cold galvanizing paint .This is to be done as per instruction of BHEL engineer. The Paint required for this purpose is in scope of Contractor

8. The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.
9. The contractor shall ensure availability of Ford Cup-4 to measure consistency of paint, Automatic magnetic gauge to measure the dry film thickness and SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.
10. 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.

11. Touch-up painting of Control Panels or any other equipment /devices wherever necessary.

12. The primer shall be compatible with the final coat paint schedule.

13. Colour Banding, Legend and Identification Marking, Direction marking etc. shall be in scope of the contractor. Letter writing shall be done in Hindi / English or in both languages. The painters have to undergo test and only qualified painters will be allowed to work.

2.13 TESTING, PRE-COMMISSIONING, AND POST COMMISSIONING

1. The scope of commissioning works covers commissioning of all instruments/equipment/systems covered in the BOQ including loop checking and establishing the operation of instruments/equipment/systems to meet plant commissioning/operation. BHEL will provide vendor supports for special or proprietary type instruments/systems and contractor engineers/supervisors shall associate with the vendors and provide necessary manpower, T&P etc. The contractor shall be responsible for overall commissioning of all the instruments and systems covered in the BOQ.

2. Scope of commissioning starts with the commissioning of various equipment/ instruments/ systems erected by the contractor and making them available, as required, for the various commissioning activities of the main plants. The commissioning activities of the main plant shall be as below:

    i. Trial run of various equipment.

    ii. Light up of boiler.

iii. Boiler acid cleaning.

iv. Boiler alkali boil out.

v. Turbine barring gear.

vi. Steam blowing of piping

vii. Turbine rolling.

viii. Safety valve floating.

ix. First synchronization of unit.

x. Full load operation of unit.

3. The above commissioning activities, tests, trial runs may have to be repeated till satisfactory results are obtained to the satisfaction of customer / consultant / statutory authorities like boiler inspector, electrical inspector etc.

4. The contractor shall co-ordinate with other contractor's during the above main plant commissioning activities to ensure successful commissioning of total plant.

5. The pre commissioning activities of the plant will start with run of various equipment prior to light up of boiler and commissioning operations shall continue till the unit is handed over to customer. The contractor shall simultaneously start commissioning activities for the equipment erected to match with the various milestone activities of commissioning programme of the project.

6. Contractor shall arrange specialized commissioning engineers, supervisors, electricians, instrument mechanics in each area to be associated with BHEL commissioning staff. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted. It shall be specifically noted that above employees of the contractor may have to work round the clock along with BHEL commissioning engineers involving considerable payment of overtime, which forms part of Contractors Scope

7. The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same.

8. If at any time the requisite manpower, consumables, T & P are not arranged by the contractor to meet the schedule, BHEL shall make alternate arrangements and recover the cost with overhead from the running bills of the contractor.

9. After erection of various equipment prior to commissioning and after commissioning, protocols have to be made with BHEL's customer. The

formats will be given by BHEL and have to be printed by the contractor in adequate numbers.

10. For electrical works, 415 volts and above, the contractor has to bring qualified electricians and the total work has to be certified by electrical license holder.

11. In case any rework/repair/rectification/modification/fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning at any stage, the same has to be rectified by the contractor at his cost. If 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. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.

12. During commissioning activities and carrying out various tests, if any of the instruments has to be temporarily erected and commissioned to suit the commissioning activities, the contractor have to carry out the erection of the same. After completion of activities the temporary systems have to be removed and returned to stores and no extra rate shall be paid for this

13. Minimum requirement of Man Power for commissioning works shall be as follows:

    a. Engineer (C&I) − 4
    b. Supervisor C&I) − 6
    c. Technician (C&I) − 15

    The above commissioning group shall be identified at the Pre-commissioning and commissioning time. The above commissioning group shall have the knowledge of various systems referred in the tender and also should have adequate experience. The above manpower for commissioning is only tentative and for any additional manpower as per site requirement the same shall be arranged by the contractor.

14. **If the contractor fails to deploy the above Engineer/Supervisor/ Technician at appropriate time of commissioning, no payment shall be made against commissioning activities as per terms of payment**.

15. All the T&P instruments required for commissioning are to be arranged by the contractor. (However, any special instruments, which are of proprietary nature, shall be arranged by BHEL.)

16. It shall be the responsibility of the contractor to arrange and complete all the testing, pre-commissioning and commissioning activities for the particular equipment as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. All the above will be witnessed by the BHEL engineers and reports signed shortly. Contractor shall follow checklist of BHEL and testing & commissioning activities shall be carried out in accordance with the checklist.

17. PG Test Assistance

PG test is to be conducted and laying of impulse pipes, temporary cables etc. shall be done by the contractor. Payments will be made as per item rates of comparable similar or identical items in the rate schedule. Such temporary installations shall have to be dismantled and returned to BHEL Stores, after the completion of PG Test for which no separate payment is admissible

Chapter - III: Facilities in the scope of Contractor/BHEL

S.No.	Description	Scope /to be taken care by		Remarks
		BHEL	CONTRACTOR	
1.1.0	**ESTABLISHMENT**			
1.1.1	**FOR CONSTRUCTION PURPOSE**			
A.	Open space for office	**YES**		Free of charge. As and where made available by customer M/s **PPGCL /BHEL**
B.	Open space for storage	**YES**		Free of charge. As and where made available by customer M/s **PPGCL /BHEL**
1.1.2	**FOR LABOUR COLONY**			
A	Open space	**YES**		Free of charge. As and where made available by customer M/s **PPGCL /BHEL**
1.2.0	**ELECTRICITY**			
1.2.1.	Electricity for construction purposes (chargeable/free)			**FREE OF CHARGE**
1.2.1.1	Single point source	**YES**		
1.2.1.2	Further distribution for the work to be done which include supply of materials & execution		**YES**	
1.2.2	**Electricity for the office, stores, canteen etc of the bidder which include:**			

1.2.2.1	Distribution from single point including supply of materials & service		**YES**	
1.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		**YES**	
1.2.2.3	Duties & deposits including statutory clearances for above		**YES**	
1.2.2.4	Demobilization of the facilities after completion of works		**YES**	
1.2.2.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above lines		**YES**	**Chargeable** As per PPGCL/UPPCL standard rates Contractor shall install calibrated energy meter for metering electricity **consumption**
1.3.0	**WATER SUPPLY**			
1.3.1	**FOR CONSTRUCTION :**			
1.3.1.1	Making the water available at single point		**YES**	Free. As and where made available by BHEL/M/s **PPGCL**
1.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
1.3.2	**LABOUR COLONY:**			
1.3.2.1	Making the water available at single point		**YES**	Contractor have to **arrange on his own**
1.3.2.2	Further distribution as per the requirement of work including supply of materials &		**YES**	

	execution			
1.4.0	**LIGHTING**			
1.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		**YES**	
1.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		**YES**	
	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		**YES**	
1.5.0	**Communications facilities for site operations of the bidder**			
	Telephone, fax , internet ,intranet, email etc.		**YES**	
1.6.0	**COMPRESSED AIR SUPPLY**			
1.6.1	Supply of compressor and all other equipments required for compressor & compressed air system including pipes, valves,storage system etc.		**YES**	
1.6.2	Installation of the above system and operation & maintenance of the same		**YES**	
1.6.3	Supply of all the consumables for the above system during the contract period.		**YES**	
	ERECTION FACILITIES			
2.1.1	Providing erection drawings for all the Equipments covered under this scope	**YES**		
2.1.2	Drawings for construction method	**YES**	**YES**	In consultation with

				BHEL
2.1.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		**YES**	**do**
2.1.4	Shipping lists etc for reference & planning the activities	**YES**	**YES**	**do**
2.1.5	Preparation of site erection schedules and other input requirements		**YES**	**do**
2.1.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	**YES**	**YES**	**do**
2.1.7	Weekly erection schedule based on Sl. No.2.1.5		**YES**	**do**
2.1.8	Daily erection/work plan based on Sl. No.2.1.7		**YES**	**do**
2.1.9	Periodic visit of senior official of bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two month		**YES**	**do**
2.1.10	Preparation of preassembly bay		**YES**	**do**

3.1 BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.

3.2 The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

3.3 Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.

3.4 The contractor while drawing construction power supply from Distribution Board should strictly adhere to following points.

a) All electrical installations should be as per Indian Electricity rules.

b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.

c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.

d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.

e) Contractor have to make their own earthing arrangement for their equipment / DB earthing.

f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.

g) Contractor should use “MCCB” and “ELCB” either on incoming or outgoing connections to the DBs.

h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.

i) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

3.5 ELCB will be tested once in a week or as directed by BHEL by actually simulating the earth leakage for all installations and the same shall be recorded in the logbook to be maintained by the contractor.

3.6 In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.

3.7 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed, as per instructions of BHEL, by the contractor at his cost. In the event of his failure to do so, the Engineer will get it done and expanses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

3.8 Compressor required capacity for construction purposes shall be arranged by Contractor.

3.9 Contractor should install a PC ALONG WITH MODEM to connect with our server (LAN) AT SITE.

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

4.0 T&P AND MMD DEPLOYED BY CONTRACTOR

S.NO.	EQUIPMENT	CAPACITY	QTY
1.	Welding Generators & Transformers, Rectifiers & TIG Welding sets		APR
2.	Chain pulley blocks	5/10 T	APR
3.	Trailer with Pulling Unit	10 / 20 MT	1 No.
4.	Hydra crane	14/18 MT	1 No.
5.	Copper tube bender and cutter sizes 6mm, 8mm, 1/2", 1/4"		2 No. each
6.	Pipe bending machine – 2" size		2 No.
7.	Dye sets for threading upto 2" pipe.		2 Set
8.	Tap sets for both BSP and NPT threads upto 1" each		2 Set each
9.	Crimping tools up to all size of cables under scope of work		Adequat e nos.
10.	Hydraulic crimping tool		2 No.
11.	Vacuum Cleaner (Industrial)		2 No.
12.	Grinding Machine		2 No
13.	Drilling Machines		APR
14.	Electric Winches		APR
15.	Phase sequence indicator		1 No.
16.	Digital Multimeters 3½ digit of reputed make		10 No.
17.	Digital,41/2 digit Motwane/HIL/Fluke		8 no.
18.	Analog multimeter		6 no.
19.	250V/500 V / 1000V rated Hand operated megger Mains/battery operated		2 no. each
20.	Tong Testers AC 5/10,25/60/300 ,Amp Range ,of reputed make		2 No. each
21.	Tong Testers DC 30/60/300 A		2 No.
22.	Stop watch		2 No.

23.	Tele talk 2 wire system		12 set
24.	Ferrule printing machine		4 no.
25.	Dead Weight Tester rated 400 Kg/cm2 with weights & test gauge facility		2 no.
26.	Oil temperature bath suitable to calibrate the instruments range 0-300 deg. C with standard temp. gauges & thermostatic control		4 no.
27.	Standard gauges 12" dial size make		
28.	A) 0-1 kg/cm2 pressure gauge(vacuum gauge) B) 0 – 5 or 6 kg/cm2 pressure gauge C) 0 – 10 kg/cm2 – do – D) 0 – 25 kg/cm2 – do – E) 0 – 60 kg/cm2 – do – F) 0 – 100 kg/cm2 –do – G) 0 – 250 kg/cm2 – do – H) 0 – 600 kg/cm2 – do – I) 0.2 to 1 kg -- do --		2 no. 2 no. 2 no. 2 no. 2 no. 2 no. 2 no. 2 no. 2 no. 2 no.
29.	Manometers (+/-) 1000 mm water column With hand bulb for lab and small manometers for field purpose.		4 no.
30.	Manometer (+/-) 500mm mercury column with hand bulb for lab and small manometer for field purpose.		2 no.
31	Inclined manometer (+/-) 300 mm water column		2 no.
32	Portable air compressor with drier and regulator	Suitable capacity	3 no.
33	Vacuum pump		2 no.
34	Standard milliamps / millivolts source of reputed make. Range 0to 50 ma and 0 to 100 mv		4 no.
35	DC power supply 0-50 VDC, 5 A make "Aplab" or equivalent (variable source)		2 nos.
36	Single phase variac 250 V, 8 amp		2 no.
37	3 phase variac rating 5 amps		2 no.
38	Glass thermometer 0-120 deg. C, 0-200 deg.c and 0-600 deg.c		2 no. each
39	Primary current injection kit		1 no.
40	Secondary current injection kit up to 300 amp		1 no.
41	DC shunt 400 amp 75 mv		1 no.
42	Tachometer non-contact type 0 to		1 no.

	4000 rpm		
43	Decade resistance box		2 sets
44	Relay testing kit		1 no.
45	Equipment and consumables for LPI/MPI test on impulse pipes		1 no.
46	Function generator		1 no.

***APR- Contractor have to deploy as per the requirement of the BHEL site as decided by BHEL Engineer**

NOTES:

1. **The above list specifies only major T&P/MMD (may not be complete) to be deployed by the contractor. All additional/ other tools and plants which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate/ price.**

2. If works gets delayed due to non-availability of T&P and MMD, BHEL reserves the right to get work done at the risk & cost of contractor without prejudice to right of BHEL as in GCC

3. All testing instruments shall have calibration certificate issued by recognized /accredited agencies.

4. Contractor shall maintain calibration records as per the BHEL format and produce them whenever called for by BHEL Engineers.

5. Wherever frequent calibration is required, contractor shall arrange adequate number of instruments such that the work does not suffer for want of test instruments.

6. Contractor must re-ascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.
7. Other terms and conditions regarding above items shall be as per T&P clause in SCC

5.0 T&P AND MMD DEPLOYED BY BHEL ON SHARING BASIS

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

S.NO.	EQUIPMENT	CAPACITY	QTY
T&Ps			
1.	EOT crane in TG Hall		As required
2.	Suitable capacity crane		APR

NOTES:

1. Any other special T&P if supplied by the manufacturer and available with the customer will also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition.
2. Other terms and conditions regarding above items shall be as per T&P clause in SCC

Chapter - VI: TIME SCHEDULE

6.0 TIME SCHEDULE

6.1 The contractor is required to commence the work within 15 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor.

6.2 Entire work as detailed in the tender specifications shall be completed **within 22 months** from the Zero date as per programme/ milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL's commitments to their customer as indicated from time to time.

6.3 The contractor has to augment his resources in such a manner that following tentative dates of major milestones of erection & commission are achieved on specified schedule for Unit #1:

MILE STONES	MONTHS
Erection Start	ZERO
Boiler Light up	05 months
Barring gear	08 months
Synchronization	09 months
Full Load	11 months
Trial Operation	12 months

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

6.5 The contractor has to ensure that work is completed in all respects leaving no pending points. However the punch list/ pending points, which are possible to be attended at site, shall be fully liquidated within two months from successful trial operation of the unit.

6.6 The work under the scope of this contract is deemed to be complete in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.

Chapter - VII: TERMS OF PAYMENT

7.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

7.2 Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.

7.3 Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment at different stages of erection as explained hereunder:

7.4 **Interest bearing recoverable advance : Applicable as per Clause No. 2.13 of GCC**

7.5 **PROGESSIVE PAYMENT ON PRORATA BASIS**

I. **85** % of contract value payable on fulfilment of following conditions:

(A) For Equipment / items such as Panels, ACDB UPS, Battery & Charger, Cable Trays, cable, JBs, impulse pipe, tubing etc. where no calibration is required

(i) 50% of item rate shall be payable on erection \ installation /cable laying
(ii) 20% of item rate on final alignment, welding, clamping, termination etc.
(iii) 10% of item rate on testing, pre-commissioning, charging etc.
(iv) 5 % of item rate on pending point clearance

(B) For equipment/items where calibration and testing is required.

i) 20% of item rate on calibration and testing
ii) 30% of item rate on erection, installation alignment and termination wherever involved.
iii) 15% of item rate on individual device loop checking/hydro test/ charging of installation and panels.
iv) 15% of item rate on system loop checks, pre-commissioning checks by simulation/ field calibration or with actual system operation.
v) 5% of item rate on pending points clearance.

(C) STAGE/MILESTONE PAYMENTS (15% of Contract value)

1.	Boiler Light up	1%
2.	Barring Gear (TG)	1%
3.	Rolling and Synchronization	1%
4.	Full Load	2%
5.	Trial Operation of Unit	2%
6.	PG test Completion	2%
7.	Completion of Painting (including arrow marking, nomenclature, etc	2%
8.	Area cleaning, temporary structures cutting/removal and return of scrap	1%
9.	Punch List points/pending points liquidation	1%
10.	Material Reconciliation	1%
11.	Completion of Contractual Obligations	1%

Note:

1. **If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site in-charge, at his discretion, after recording reasons for exercising such option, can split and release payment up to 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone/ commissioning activity.**

2. Payment of retention amount and final bill shall be as per clause No. 2.22 and 2.23.2 of GCC.

Chapter - VIII: TAXES, DUTIES, LEVIES

8.0 TAXES, DUTIES, LEVIES

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

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

8.1 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be exclusive of Service Tax and Cess on Output Services.

Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. The Service Tax Rules permit more than one option or methodology for discharging the liability of tax/levy/duty and BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the

Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor. Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract.For the purpose of claiming any Service Tax from BHEL, the following procedure shall be adopted :

Contractor shall submit serially numbered Service Tax and Cess Invoices, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely:

1. The name, address and registration number of the contractor

2. The name and address of the party receiving taxable service (BHEL)

3. Description, classification and value of taxable service provided and

4. The Service Tax payable thereon.

All the four conditions shall be fulfilled in the invoice for payment of Service Tax by BHEL.

Where more than one nature of Service under Service Tax Rules is involved, the invoice mentioned above shall contain the break up of all values for each nature of Service.

8.2 VAT (Sales Tax /WCT)

The rates quoted by the Contractor shall be inclusive of VAT/Sales Tax and BHEL shall not reimburse any amount on this account due to any reason whatsoever.

The Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill.

Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted.

In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing all their material, plant and equipment etc at site for the execution of the work, including arrangement of Road Permits if and as applicable under the relevant VAT Act.

8.2.1 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with

regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.

8.2.2 New Taxes/Levies

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

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

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

Chapter - IX: Others

9.0 OTHERS

9.1 For reverse auction/ for Price Bid opening, only those bidders will be considered who will be qualified for the subject job on the basis of pre-qualification evaluation/ Techno-commercial bids. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

Chapter - X: BILL OF QUANTITY (BOQ)

BOQ FOR ERECTION, TESTING, COMMISSIONING OF ALL CONTROL & INSTRUMENTATION AND STATION C&I PACKAGE OF UNIT NO.1 &3 AT 3x660 MW BARA STPP.

S. NO.	ITEM DESCRIPTION	UNIT	Common/Station C&I	Per unit	Total Qty.
	PANELS/RACKS/CONSOLES				
	SG & TG CONTROL PANEL				
1	suit of one panel (approx. weight 400kg, 900(L) X 900(B) X 2500(H) mm	No.		05	05
2	suit of two panels (approx. weight 800kg, 1800(L) X 1000(B) X 2500(H) mm	No.	02**	10	12
3	suit of three panels (approx. weight 1200kg, 2700(L) X 1000(B) X 2500(H) mm	No.	01**	7	8
4	suit of five panels (approx. weight 2000kg, 4500(L) X 1000(B) X 2500(H) mm	No.		1	1
	STATION C&I CONTROL PANEL				
5	suit of one panel (approx. weight 400kg, 900(L) X 900(B) X 2500(H) mm	No.	02**	04	14
6	suit of two panels (approx. weight 800kg, 1800(L) X 1000(B) X 2500(H) mm	No.	03**	13	42
7	suit of three panels (approx. weight 1200kg, 2700(L) X 1000(B) X 2500(H) mm	No.	01**	09	28
8	DAVR panel	SET		01	01
9	Grounding Brush Monitor			01	01
10	Electrical Control Panel 750x800x2415 mm	No.		01	01
11	Electrical Interface System Panel 750x800x2415 mm	No.	01**	01	02
12	Gas Analyser cabinet 1200x800x2110 mm	No.		02	02
13	Acoustic Steam leak detection	No.		01	01

	system panel(ASLD) 800x800x2415 Mm				
14	Vibration Monitoring System 800X800X2415 mm	Set		02	02
15	Acoustic pyrometer remote cabinet including PC station (approx. 1400 x 2365 x800 mm)	Set		01	01
16	FTP LOCAL STARTER Box 650x1000x300 mm	No.		02	02
17	Elevator control Panel	No.		01	01
18	SCANNER AIR FAN STARTER 900x1120x375 mm	No.		01	01
19	HART Management System for SMART Transmitter Panel dimension 1200X800X2415 mm	Set		01	01
20	AH Main Control Panel 1830x2186x611 mm	No.		01	01
21	AH LCS Sector Plate 1&2 Drive Panel 645x673x203 mm	No.		06	06
22	HWL-1&2 and MEF Control valve Pan 600x600x210 mm	No.		01	01
23	SOOT BLOWER MCC (23250 L X2250 H X1000 W)	No.		01	01
24	Furnace Flame Viewing System –Ren Panel 700x700x2100 mm	No		01	01
25	Furnace Flame Viewing System – Local Panel 1220x1470x610 mm	No		02	02
26	GRAVIMETRIC FEEDER REMOTE PANEL 1200 x 2315X600 mm	No.		07	07
27	Gravimetric Feeder Integral Panel 600x750x350 mm	NO.		07	07
28	NETWORK PANEL 800x800x2415 mm	No.		03	03
29	Power Distribution Panel 2800x800x2415 mm	No.		01	01
30	Starter cabinet for Emergency Lube Oil Motor, DC seal oil Motor 1000X800X2200 mm	No.		02	02

31	Max engineer/max storian/max operator/max link stations/station supervisor/shift in charge terminal/MIS PC/PCAL PC/LVS PC/24" TFT monitor	Nos.	10**	34	44
32	PRINTERS(A4 & A3 COLOUR LASER JET, INKJET, DOT MATRIX) WITH PRINTER TABLE and accessories	No.	01**	06	07
33	LARGE VIDEO SCREEN(80" ,resolution 1400x1050 pixels	No.		06	06
34	Ethernet switches-16 ports	Set		01	01
35	Control Desk	Set		01	01
36	Computer Furniture(for all servers ,pc, printer)	Set		01	01
	LIE/LIR/LGB				
37	Local Instrument racks (LIR) Type A 1650x2150x800	No.		38	38
38	Local Instrument racks (LIR) Type B 1300x800x2150 mm	No.		29	29
39	Local Instrument racks (LIR) Type C 800x850x1650 mm	No.		11	11
40	Local Instrument enclosures (LIE) Type A 1450x2200x950	No.		9	9
41	Local Instrument enclosures(LIE) Type B 1100x800x2300 mm	No.		12	12
42	Local Instrument enclosures(LIE) Type C 700x600x2100 mm	No.		2	2
43	Local Gauge Boards(LGB) Approx. Size 1400x550x1900 mm	No.		10	10
	PRESSURE INSTRUMENTS RACKS (IR1 to IR7) Assembly/welding and installation of Instrument Racks with loose supplied prefabricated materials of suitable size, like equal/unequal angles, canopy mounting plates, LHS/RHS stands etc., necessary welding, fixing with fasteners and grouting				
44	Rack of size 2150x700x2150 mm	No.		09	09
45	Rack of size 1250x700x2150 mm	No.		09	09
	24 V DC BATTERY & CHARGER SYSTEM				

46	24 V DC Battery for SG and TG	Set		01	01
47	24 V DC Battery for Station C&I	Set		01	01
48	24 V DC Battery for (Common)	Set		01	01
49	24 V DC Battery Charger for SG ,TG along with DCDB	Set		01	01
50	24 V DC Battery Charger for Station C&I along with DCDB	Set		01	01
51	24 V DC Battery charger (Common) along with DCDB	Set		01	01
52	UPS system comprising of the following: UPS Panel, Voltage stabilizer cubicle, Input Iso. Transformer cubicle, Static invertors etc. UPS Panel:1640x900x2000 ACDB Approximate Size and weight: 900x800x2100 mm; 600 kg. UPS batteries-Ni cd battery	Set		01	01
	INSTALLATION,CALIBRATION & COMMISSIOING OF LOCAL/FIELD INSTRUMENTATION/EQUIPMENT				
55	Flow meters/Flow transmitters	No.		186	
56	Temperature gauges/Pressure gaug Pressure gauge	No.	981*	435	1416
57	Temp. Transmitter /Pressure Transmitters / Differential pressure/Position transmitters	No.	627*	235	862
58	Level Transmitter/Level gauge	No.	153*	37	190
59	Temp. switches/Pressure switches /DP switches	No.	36*	247	283
60	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments	No.	18*	41	59
61	Pneumatic Pressure controller with accessories	Set		1	1
62	Electronic/Guided Wave Radar /Ultrasonic type level Transmitters	No.		383	383
63	Limit switches	No.		56	56
64	Conductivity cell	No.		6	6

65	ERV Controller	No.		04	04
66	ASLD sensor assy	No.		24	24
67	Sonic tube & sensor asy	No.		24	24
68	Field amplifier Box	Set		24	24
69	Rotor Stoppage Alarm Box-including sensors for Air pre heaters	No.		2	2
70	Reverse Rotation Monitoring system	No.		3	3
71	Flame scanner head assy. Along with fibre optic cable length 130 “,lens barrel assembly	No.		32	32
72	Microprocessor based Flame scanner amplifier	No.		8	8
73	Hand Held HART communicator	Set		01	01
74	Conductivity/Dissolved oxygen/sodium/pH/silica/analyser	No.	86*		86
75	Gas Analyser			02	02
76	Moisture sensor			01	01
77	Cathode conductivity		15*		15
78	Flue gas analysers comprising of SOX/NOX/CO/Co2 analyzer, along with Sensor head, in situ probe, Pressure, temp. transmitter, Display, control & Air drier unit other accessories. The analyser to be installed at 88 ML of chimney	Set		01	01
79	Steam and water analysis system, SWAS consisting of: Conductivity analyser-13 No. pH analyser-10 No. Dissolved oxygen analyser-5 No. Silica analyser-1 No. Sodium analyser-1 No. Conductivity analyser with drawable type-2 no. SWAS primay rack- 2 set Wet panel-1 set Dry panel- 1 set Chiller-1 set	Set		01	01
80	Oxygen Analyser –Low temperature along with Electronic Unit and other accessories.	Set		10	10
81	Thermocouples(K/R type)	No.		444	444
82	RTDs with thermo well	No.	375*	380	755
83	Cr- Al Thermocouple assy	No.	606*	773	1379
84	MTM Thermo Couple up to 32 M (duplex)	No.		359	359

85	Thermo well	No.		40	40
86	Thermometer(Bimettalic)/Gas filled/MIS	No.		27	27
87	Co –AXL dial thermometer	No.		7	7
88	Bearing Elerment	No.		16	16
89	Burner Tilt shear pin failure indication box	No.		4	4
90	Heavy Duty Limit switch(Burner tilt)			20	20
91	Furnace temp. Probe	No.		2	2
92	HEA exciter box assembly	Set		20	20
93	Air Filter Regulators	No.		65	65
94	I/P Converters	No.	36*	26	62
95	Vibration Transducers/ Detectors/Element	No.	186*	108	294
96	Shaft Axial Detector	No.		2	2
97	Proximitors	No.		6	6
98	Solenoid Valves	No.		135	135
99	Speed Regulators / Air lock valves in oil gun corner rack	No.		40	40
100	Speed measuring loop	Set		6	6
101	Coal bunker level Monitoring system consists of Ultrasonic level sensor-14 no. and transmitter-14 no., Extension cable 320 mtr, Junction box-8 no. and Local panel -02 nos	Set		1	1
102	Recorder 3/6/24 channel	No.		1	1
103	Electronic /Digital Indicators (Bar Graph Indicators, Temperature Indicators etc.)	No.		20	20
104	Pressure/ Temperature Indicators (Moving Coil Type)	No.		5	5
105	Speed switch / Speed detector	No.		4	4
106	GPS based Master & Slave clock system	Set	01**		1
	CONTROL/SIGNAL/SCREENED/ POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION				
107	2P X 0.5 SQ MM	Mtr		34115	34115
108	4P X 0.5 SQ MM	Mtr	111000*	81600	192600
109	8P X 0.5 SQ MM	Mtr	255000*	50250	305250
110	12P X 0.5 SQ MM	Mtr	15000*	9300	24300
111	20P X 0.5 SQ MM	Mtr	15000*		15000

112	2P X 1.5 SQ MM	Mtr		11500	11500
113	4P X 1.5 SQ MM	Mtr		5000	5000
114	2C X 2.5 SQ MM	Mtr		3300	3300
115	3C X 2.5 SQ MM	Mtr	36000*	70700	106700
116	4C X 2.5 SQ MM	Mtr		4100	4100
117	7C X 2.5 SQ MM	Mtr		23000	23000
118	10C X 2.5 SQ MM	Mtr		24500	24500
119	14C X 2.5 SQ MM	Mtr		3200	3200
120	16C X 2.5 SQ MM	Mtr		3500	3500
121	19C X 2.5 SQ MM	Mtr		7550	7550
122	3C X 16 SQ MM	Mtr		1700	1700
123	2/3Tx 0.5/1.5 SQ MM	Mtr		5200	5200
124	2Px16 AWG T/C ext. cable	Mtr		16435	16435
125	4Px16 AWG T/C ext. cable	Mtr		2000	2000
126	6Px16 AWG T/C ext. cable	Mtr		50000	50000
127	Flame scanner cables	Mtr		6000	6000
128	UTP E-CAT cable	Mtr		5000	5000
129	Fibre optic cable	Mtr		3500	3500
130	Compensating cable	Mtr		3600	3600
131	Extension cable	Mtr.		960	960
132	**EARTHING MATERIAL**				
	65 x 10 mm GI earthing flat	Mtr		2340	2340
133	50 x 6 mm GI earthing flat	Mtr		2820	2820
134	25x3 mm GI earthing flat	Mtr		2260	2260
135	8SWG Galvanised steel wire	Mtr		4660	4660
136	Earthing Pit	No.		1	1
137	**CABLE TRAYSCOMPLETE WITH COUPLER PLATES, FASTENERS, CLAMPS AND FIXING HARDWARES ETC ERECTION INCLUDING SUPPORT & COVERS FABRICATION**				
	Ladder/ Perforated type Cable tray, W=50mm	Mtr		4975	4975
138	Ladder/ Perforated type Cable tray, W=100mm	Mtr		6575	6575
139	Ladder/ Perforated type Cable tray, W=150mm	Mtr	3000*	750	3750
140	Ladder/ Perforated type Cable	Mtr	14000*		14000

	tray, W=300mm				
141	Ladder/ Perforated type Cable tray, W=600mm	Mtr	12000*		12000
142	**CABLE TRAY ACCESSORIES**				
	Ladder/ Perforated type Horizontal 90 deg bend-600 mm radius, Vertical 90 deg bend-600 mm radius, Tees -600 mm radius, Cross -600 mm radius				
	600 mm wide	No.	44*		44
143	300 mm wide	No.	62*		62
144	**INSTALLATION & FABRICATION OF STRUCTURAL STEEL**	Mtr			
	ANGLE ,ISMC,PLATES etc	MT		44	44
145	**IMPULSE PIPES/ TUBES ALONG WITH FITTINGS**				
	Copper Tube-6mm/8mm/1/4”	Mtr		4520	4520
146	1’ CS Pipe SCH 80	Mtr		1025	1025
147	CS Pipe 21.3 x3.73	Mtr		400	400
148	CS Pipe 60.3x3.91	Mtr		60	60
149	1/2” CS Pipe SCH 80	Mtr		6000	6000
150	1/2” CS Pipe XXS	Mtr		500	500
151	1/2” CS Pipe SCH 160	Mtr		1600	1600
152	3/4” CS Pipe SCH 80	Mtr.		3600	3600
153	1’ AS Pipe	Mtr		1000	1000
154	1/2” AS Pipe SCH 160	Mtr		700	700
155	1/2” AS Pipe SCH 80	Mtr		650	650
156	1/2” AS Pipe XXS	Mtr		900	900
157	1/2” SS Pipe SCH 40	Mtr		1500	1500
158	1/2” SS Pipe SCH 80	Mtr		450	450
159	1/2” SS Pipe SCH 160	Mtr		300	300
160	Cr-Al pipe 21.3x3.73	Mtr		330	330
161	Seam less CS tube 13.5x2.6	Mtr		423	423
162	Carbon steel tube 88.9x4	Mtr.		40	40
163	Carbon steel tube 33.7x3.38	Mtr		2	2
164	Seam less CS tube 21.3x2.3	Mtr		140	140
165	Seam less AS tube 21.3x2.77	Mtr		710	710
166	Seam less AS tube 13.5	Mtr		206	206
167	SS Tube 12.7x2.1	Mtr		700	700

168	SS Tube 6x1.5	Mtr		30	30
169	GI pilica conduit with fittings(up to 1" size)	Mtr		1500	1500
170	GI pilica conduit with fittings(above 1" size)	Mtr		1500	1500
171	GI Rigid conduit up to 1"	Mtr		1500	1500
172	GI pipe ½" NB	Mtr		3600	3600
173	GI pipe 1" NB	Mtr		150	150
174	Flexible conduiting /Rubber hoses/pipes	Mtr		1000	1000
175	**JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS**				
	JB 12 way	No.		37	37
176	JB 24 way	No.		145	145
177	JB 36 way	No.		33	33
178	JB 48 way	No.		118	118
179	JB 64 way	No.		5	5
180	JB 72 way	No.		53	53
181	JB 96 way	No.		2	2
182	6 way miniature Junction box	No.		32	32
183	Local oil gun maintenance switch	No.		16	16
184	Local start stop Push button	No.		11	11
185	Erection & commissioning of C&I Lab specifications as as per C I 2.8.16	Set	1**		1
186	**COMMISSIONING/CALIBRATION/ TESTING of control valves, on/off valves, electrical/pneumatic valves, actuators, power cylinders etc.**				
	Commissioning of Pneumatic actuators(Power cylinder) -On/Off type	No.		68	68
187	Commissioning of Pneumatic actuators(Power cylinder) -Regulating type	No.		123	123
188	SADC drives	No.		88	88
189	Over fire air tilt drives	No.		4	4
190	Pulversier Lube oil skid The	Set		7	7

	scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. approx.. instrument per set RTD-04 no., Temp. Gauge-02 no. ,Pressure switch-03 no., Pressure gauge-02 no., level switch-02 no., Level gauge-01 no., Flow switch-02 no.				
191	Lub oil skids for FD/ ID/ PA Fans The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc. The approximate total quantity of instruments for all the 06 Nos skids put together is given below: DP Gauges - 06 Nos., Pressure Gauges – 18 Nos , Temperature Gauges – 12 Nos, Diff. Pressure Transmitters- 06 Nos, Pressure Transmitters-12 Nos, Pressure Switches – 06 Nos, Level transmitters-06 Nos, Flow indicator with flow switch - 06 Nos	Set		6	6
192	Gravimetric feeder mounted C&I Equipment like motion ,monitor sensor, micro switches, etc.	Set		7	7
193	Commissioning of Electric actuators/dampers/valves Open/Close type	No.		55	55
194	Commissioning of Control Valves	No.		51	51
195	Commissioning of motorised actuators Open/close type	No.		56	56
196	Commissioning of Pneumatic Valves/Safety relief valves/NRV	No.		50	50

*- **Common for all three units station C&I (PEM/EDN supplied)**

****-Common for all three units**

NOTE: The Dimension & quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual qty erected / commissioned as certified by BHEL Engineer

Chapter - XI: RATE SCHEDULE

RATE SCHDELUE FOR ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF UNIT NO. 1 AND STATION C&I OF UNIT NO. 1, 2 &3 (PACKAGE-A) OF 3X660 MW BARA STPP, DISTT: ALLAHABAD (U.P.)".

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
	PANELS/RACKS/CONSOLES			
1	Control Panel (approx. weight 400kg, 900(L) X 900(B) X 2500(H) mm suit of one panel	No.	19	
2	Control Panel (approx. weight 800kg, 1800(L) X 1000(B) X 2500(H) mm suit of two panels	No.	54	
3	Control Panel (approx. weight 1200kg, 2700(L) X 1000(B) X 2500(H) mm suit of three panels	No.	36	
4	Control Panel (approx. weight 2000kg, 4500(L) X 1000(B) X 2500(H) mm suit of five panels	No.	1	
5	DAVR panel	SET	1	
6	Grounding Brush Monitor		1	
7	Electrical Control Panel 750x800x2415 mm	No.	1	
8	Electrical Interface System Panel(CAR-11) 750x800x2415 mm	No.	2	
9	Gas Analyser cabinet 1200x800x2110 mm	No.	2	
10	Acoustic Steam leak detection system panel(ASLD) 800x800x2415 Mm	No.	1	
11	Vibration Monitoring System 800X800X2415 mm	Set	2	
12	Acoustic pyrometer remote cabinet including PC station (approx. 1400 x 2365 x800 mm)	Set	1	
13	FTP LOCAL STARTER Box 650x1000x300 mm	No.	2	
14	Elevator control Panel	No.	1	
15	SCANNER AIR FAN STARTER 900x1120x375 mm	No.	1	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
16	HART Management System for SMART Transmitter Panel dimension 1200X800X2415 mm	Set	1	
17	AH Main Control Panel 1830x2186x611 mm	No.	1	
18	AH LCS Sector Plate 1&2 Drive Panel 645x673x203 mm	No.	6	
19	HWL-1&2 and MEF Control valve Pan 600x600x210 mm	No.	1	
20	SOOT BLOWER MCC (23250 L X2250 H X1000 W)	No.	1	
21	Furnace Flame Viewing System – Remote Panel 700x700x2100 mm	No	1	
22	Furnace Flame Viewing System – Local Panel 1220x1470x610 mm	No	2	
23	GRAVIMETRIC FEEDER REMOTE PANEL 1200 x 2315X600 mm	No.	7	
24	Gravimetric Feeder Integral Panel 600x750x350 mm	NO.	7	
25	NETWORK PANEL 800x800x2415 mm	No.	3	
26	Power Distribution Panel 2800x800x2415 mm	No.	1	
27	Starter cabinet for Emergency Lube Oil Motor, DC seal oil Motor 1000X800X2200 mm	No.	2	
28	Max engineer/max storian/max operator/max link stations/station supervisor/shift in charge terminal/MIS PC/PCAL PC/LVS PC/24” TFT monitor	Nos.	44	
29	PRINTERS(A4 & A3 COLOUR LASER JET, INKJET, DOT MATRIX) WITH PRINTER TABLE and accessories	No.	7	
30	LARGE VIDEO SCREEN(80” ,resolution 1400x1050 pixels	No.	6	
31	Ethernet switches-16 ports	Set	1	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
32	Control Desk	Set	1	
33	Computer Furniture(for all servers ,pc, printer)	Set	1	
	LIE/LIR/LGB			
34	Local Instrument racks (LIR) Type A 1650x2150x800	No.	38	
35	Local Instrument racks (LIR) Type B 1300x800x2150 mm	No.	29	
36	Local Instrument racks (LIR) Type C 800x850x1650 mm	No.	11	
37	Local Instrument enclosures (LIE) 1450x2200x950	No.	9	
38	Local Instrument enclosures Type B 1100x800x2300 mm	No.	12	
39	Local Instrument enclosures Type C 700x600x2100 mm	No.	2	
40	Local Gauge Boards(LGB) Approx. Size 1400x550x1900 mm	No.	10	
	PRESSURE INSTRUMENTS RACKS (IR1 to IR7)			
41	Rack of size 2150x700x2150 mm	No.	9	
42	Rack of size 1250x700x2150 mm	No.	9	
	24 V DC BATTERY & CHARGER SYSTEM			
43	24 V DC Battery for SG and TG	Set	1	
44	24 V DC Battery for Station C&I	Set	1	
45	24 V DC Battery for (Common)	Set	1	
46	24 V DC Battery Charger for SG ,TG along with DCDB	Set	1	
47	24 V DC Battery Charger for Station C&I along with DCDB	Set	1	
48	24 V DC Battery Charger for Common along with DCDB	Set	1	
49	UPS system including ACDB & UPS batteries	Set	1	
	INSTALLATION,CALIBRATION & COMMISSIOING OF LOCAL/FIELD INSTRUMENTATION/EQUIPMENT			

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
50	Flow meters/Flow transmitters	No.	186	
51	Temperature gauges/Pressure gauge Pressure gauge	No.	1416	
52	Temp. Transmitter /Pressure Transmitters / Differential pressure/Position transmitters	No.	862	
53	Level Transmitter/Level gauge	No.	190	
54	Temp. switches/Pressure switches /DP switches	No.	283	
55	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments	No.	59	
56	Pneumatic Pressure controller with accessories	Set	1	
57	Electronic/Guided Wave Radar /Ultrasonic type level Transmitters	No.	383	
58	Limit switches	No.	56	
59	Conductivity cell	No.	6	
60	ERV Controller	No.	04	
61	ASLD sensor assy	No.	24	
62	Sonic tube & sensor assy	No.	24	
63	Field amplifier Box	Set	24	
64	Rotor Stoppage Alarm Box-including sensors for Air pre heaters	No.	2	
65	Reverse Rotation Monitoring system	No.	3	
66	Flame scanner head assy. Along with fibre optic cable length 130 “,lens barrel assembly	No.	32	
67	Microprocessor based Flame scanner amplifier	No.	8	
68	Hand Held HART communicator	Set	01	
69	Conductivity/Dissolved oxygen/sodium/pH/silica/analyser	No.	86	
70	Gas Analyser	No.	02	
71	Moisture sensor	No.	01	
72	Cathode conductivity	No.	15	
73	Flue gas analysers comprising of SOX/NOX/CO/Co2 analyzer.	Set	01	
74	Steam and water analysis system(SWAS)	Set	01	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
75	Oxygen Analyser –Low temperature along with Electronic Unit and other accessories.	Set	10	
76	Thermocouples(K/R type)	No.	444	
77	RTDs with thermo well	No.	755	
78	Cr- Al Thermocouple assy	No.	1379	
79	MTM Thermo Couple up to 32 M (duplex)	No.	359	
80	Thermo well	No.	40	
81	Thermometer(Bimettalic)/Gas filled/MIS	No.	27	
82	Co –AXL dial thermometer	No.	7	
83	Bearing Elerment	No.	16	
84	Burner Tilt shear pin failure indication box	No.	4	
85	Heavy Duty Limit switch(Burner tilt)	No.	20	
86	Furnace temp. Probe	No.	2	
87	HEA exciter box assembly	Set	20	
88	Air Filter Regulators	No.	65	
89	I/P Converters	No.	62	
90	Vibration Transducers/ Detectors/Element	No.	294	
91	Shaft Axial Detector	No.	2	
92	Proximitors	No.	6	
93	Solenoid Valves	No.	135	
94	Speed Regulators / Air lock valves in oil gun corner rack	No.	40	
95	Speed measuring loop	Set	6	
96	Coal bunker level Monitoring system consists of Ultrasonic level sensor-14 no. and transmitter-14 no., Extension cable 320 mtr, Junction box-8 no. and Local panel -02 nos	Set	1	
97	Recorder 3/6/24 channel	No.	1	
98	Electronic /Digital Indicators (Bar Graph Indicators, Temperature Indicators etc.)	No.	20	
99	Pressure/ Temperature Indicators (Moving Coil Type)	No.	5	
100	Speed switch / Speed detector	No.	4	
101	GPS based Master & Slave clock	Set	1	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
	system			
	CONTROL/SIGNAL/SCREENED/ POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION			
102	2P X 0.5 SQ MM	Mtr	34115	
103	4P X 0.5 SQ MM	Mtr	192600	
104	8P X 0.5 SQ MM	Mtr	305250	
105	12P X 0.5 SQ MM	Mtr	24300	
106	20P X 0.5 SQ MM	Mtr	15000	
107	2P X 1.5 SQ MM	Mtr	11500	
108	4P X 1.5 SQ MM	Mtr	5000	
109	2C X 2.5 SQ MM	Mtr	3300	
110	3C X 2.5 SQ MM	Mtr	106700	
111	4C X 2.5 SQ MM	Mtr	4100	
112	7C X 2.5 SQ MM	Mtr	23000	
113	10C X 2.5 SQ MM	Mtr	24500	
114	14C X 2.5 SQ MM	Mtr	3200	
115	16C X 2.5 SQ MM	Mtr	3500	
116	19C X 2.5 SQ MM	Mtr	7550	
117	3C X 16 SQ MM	Mtr	1700	
118	2/3Tx 0.5/1.5 SQ MM	Mtr	5200	
119	2Px16 AWG T/C ext. cable	Mtr	16435	
120	4Px16 AWG T/C ext. cable	Mtr	2000	
121	6Px16 AWG T/C ext. cable	Mtr	50000	
122	Flame scanner cables	Mtr	6000	
123	UTP E-CAT cable	Mtr	5000	
124	Fibre optic cable	Mtr	3500	
125	Compensating cable	Mtr	3600	
126	Extension cable	Mtr.	960	
	EARTHING MATERIAL			
127	65 x 10 mm GI earthing flat	Mtr.	2340	
128	50 x 6 mm GI earthing flat	Mtr.	2820	
129	25x3 mm GI earthing flat	Mtr.	2260	
130	8SWG Galvanised steel wire	Mtr.	4660	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
131	Earthing Pit	No.	1	
	CABLE TRAYSCOMPLETE WITH COUPLER PLATES, FASTENERS, CLAMPS AND FIXING HARDWARES ETC ERECTION INCLUDING SUPPORT & COVERS FABRICATION			
132	Ladder/ Perforated type Cable tray, W=50mm	Mtr	4975	
133	Ladder/ Perforated type Cable tray, W=100mm	Mtr	6575	
134	Ladder/ Perforated type Cable tray, W=150mm	Mtr	3750	
135	Ladder/ Perforated type Cable tray, W=300mm	Mtr	14000	
136	Ladder/ Perforated type Cable tray, W=600mm	Mtr	12000	
137	**CABLE TRAY ACCESSORIES**			
	Ladder/ Perforated type Horizontal 90 deg bend-600 mm radius, Vertical 90 deg bend-600 mm radius, Tees -600 mm radius, Cross -600 mm radius			
138	600 mm wide	No.	44	
139	300 mm wide	No.	62	
	INSTALLATION & FABRICATION OF STRUCTURAL STEEL	Mtr		
140	ANGLE ,ISMC,PLATES etc	MT	44	
	IMPULSE PIPES/ TUBES ALONG WITH FITTINGS			
141	Copper Tube-6mm/8mm/1/4”	Mtr	4520	
142	1’ CS Pipe SCH 80	Mtr	1025	
143	CS Pipe 21.3 x3.73	Mtr	400	
144	CS Pipe 60.3x3.91	Mtr	60	
145	1/2” CS Pipe SCH 80	Mtr	6000	
146	1/2” CS Pipe XXS	Mtr	500	
147	1/2” CS Pipe SCH 160	Mtr	1600	
148	3/4” CS Pipe SCH 80	Mtr.	3600	
149	1’ AS Pipe	Mtr	1000	
150	1/2” AS Pipe SCH 160	Mtr	700	
151	1/2” AS Pipe SCH 80	Mtr	650	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
152	1/2" AS Pipe XXS	Mtr	900	
153	1/2" SS Pipe SCH 40	Mtr	1500	
154	1/2" SS Pipe SCH 80	Mtr	450	
155	1/2" SS Pipe SCH 160	Mtr	300	
156	Cr-Al pipe 21.3x3.73	Mtr	330	
157	Seam less CS tube 13.5x2.6	Mtr	423	
158	Carbon steel tube 88.9x4	Mtr.	40	
159	Carbon steel tube 33.7x3.38	Mtr	2	
160	Seam less CS tube 21.3x2.3	Mtr	140	
161	Seam less AS tube 21.3x2.77	Mtr	710	
162	Seam less AS tube 13.5	Mtr	206	
163	SS Tube 12.7x2.1	Mtr	700	
164	SS Tube 6x1.5	Mtr	30	
165	GI pilica conduit with fittings(up to 1" size)	Mtr	1500	
166	GI pilica conduit with fittings(above 1" size)	Mtr	1500	
167	GI Rigid conduit up to 1"	Mtr	1500	
168	GI pipe ½" NB	Mtr	3600	
169	GI pipe 1" NB	Mtr	150	
170	Flexible conduiting /Rubber hoses/pipes	Mtr	1000	
	JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS			
171	JB 12 way	No.	37	
172	JB 24 way	No.	145	
173	JB 36 way	No.	33	
174	JB 48 way	No.	118	
175	JB 64 way	No.	5	
176	JB 72 way	No.	53	
177	JB 96 way	No.	2	
178	6 way miniature Junction box	No.	32	
179	Local oil gun maintenance switch	No.	16	
180	Local start stop Push button	No.	11	
181	Erection & commissioning of C&I	Set	1	

S. NO	ITEM DESCRIPTION	UNIT	Qty.	Total Amount (in Rs.)
	Lab specifications as as per C l 2.8.16			
	COMMISSIONING/CALIBRATION/TESTING of control valves, on/off valves, electrical / pneumatic valves, actuators, power cylinders etc.			
182	Commissioning of Pneumatic actuators(Power cylinder) -On/Off type	No.	68	
183	Commissioning of Pneumatic actuators(Power cylinder) -Regulating type	No.	123	
184	SADC drives	No.	88	
185	Over fire air tilt drives	No.	4	
186	Commissioning of Pulversier Lub oil skid	Set	7	
187	Commissioning of ID/PA/FD fan lub oil skid	Set	6	
188	Commissioning of Electric actuators/dampers/valves Open/Close type	No.	55	
189	Gravimetric feeder mounted C&I Equipment like motion ,monitor sensor, micro switches, etc.	Set	7	
190	Commissioning of Control Valves	No.	51	
191	Commissioning of motorised actuators Open/close type	No.	56	
192	Commissioning of Pneumatic Valves/Safety relief valves/NRV	No.	50	