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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/GADARWARA/C&I/PACKAGE- A&B /1011

FOR

"Erection, Testing, Commissioning, Post commissioning, Trial operations ,PG Test assistance & handing over of all C&I equipment of Package-A (Unit No.1) & Package-B (Unit No. 2) of 2x800 MW GADARWARA STPP, Distt: Narsinghpur (M.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)
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TENDER NO. BHEL/ NR/SCT/GADARWARA/C&I/PACKAGE- A&B /1011

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

Ref: Date: --/--/----

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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/GADARWARA/C&I/PACKAGE-A&B /1011***	
ii	**Broad Scope of job**	**"Erection, Testing, Commissioning, Post commissioning, Trial operations ,PG Test assistance & handing over of all C&I equipment of Package-A (Unit No.1) & Package-B (Unit No. 2) of 2x800 MW GADARWARA STPP, Distt: Narsinghpur (M.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*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at Noida:*** ***Start : 20/11/15 , Time :0900 HRS*** ***Closes: 14/12/15 , Time : 1200 HRS*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 14 /12/2015, Time : 1500 HRS*** ***Place : Noida***	*Applicable*
vi	**OPENING OF TENDER**	***Date : 14/12/2015 Time: 1530 HRS*** *(within 2 hours of the latest due date and time of offer*	*Applicable*

		submission). *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender*	
vii	**EMD AMOUNT**	*Rs2,00,000/-*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	***Five days before bid submission due date*** *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not Applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**		*Not Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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

3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at 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, excepting packages which are on HOLD due to reasons not attributable to Bidder..

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

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

i). Calculation of Overall 'Performance Rating' for 'similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':
This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

a) P_1, P_2, P_3 , P_4 , P_5 , …. 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** '$\mathbf{R_{BEHL}}$' **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 → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ 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) Calculation of Overall 'Performance Rating' ($\mathbf{R_{BHEL}}$) in case 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if P ≤ P_{Max}
(where P is calculated as per clause 9.I)

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

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

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

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

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

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

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

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

In case assessment of 'FIRST TIMER' cannot be done for 9 months due to **completion of work in less than 9 months**, the 'FIRST TIMER' tag will be removed and the vendor shall be considered as 'NEW VENDOR' for any new tender/s, provided the average score for which Performance Evaluation has been done, is not less than 60%.

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

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

i. up to Boiler Steam Blowing in case of Steam Generator and Auxiliaries

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

iii. Upto execution of at least 90% of anticipated contract value in case of Civil & Structures (unit wise), Enabling works and upto 90% of material unloading (in tonnage) as per the original contract in case of MM Package.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23.0 **Not Applicable**

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

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

26.0 The offers of the bidders who are on the banned/ hold list as also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.

27.0 BHEL reserves the right to go for **Reverse Auction (RA**) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

In case BHEL decides to go for Reverse Auction, only those bidders who have given their acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit „online sealed bid" in the Reverse Auction. Non-submission of „online sealed bid" by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue."

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

28.0 It may please be noted that **guidelines/rules** in respect of Suspension of Business dealings', 'Vendor evaluation format', 'Quality, Safety & HSE guidelines', etc may **undergo change** from time to time and the latest one shall be followed. The abridge version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page".**

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

Type under MSE	SC/ST owned	Others
Micro		
Small		

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

MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (format enclosed as Annexure – 4 where deemed validity of EM-II certificate of five years has expired) applicable for the relevant financial year (last audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer.

MSEs shall be exempted from payment of tender fee.

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

30.0 The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bheLcom and shall

immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

31.0 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:-

(i) Annexure-1: Pre Qualifying criteria.
(ii) Annexure-2: Check List.
(iii) Annexure-3: Modification / Deletions in Standard Clause of General Conditions of Contract (GCC) or Special Conditions of Contract (SCC)
(iv) Annexure-4: Chartered Accountant certificate for MSMED
(v) Annexure-5: General Terms and Conditions of Reverse Auction (RA)
(vi) Annexure-6: Authorization of representative who will participate in the online Reverse Auction Process
(vii) Annexure-7: Feedback Form: From where did you get information reg. this tender
(viii) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**"Erection, Testing, Commissioning, Post commissioning, Trial operations ,PG Test assistance & handing over of all C&I equipment of Package-A (Unit No.1) & Package-B (Unit No. 2) of 2x800 MW GADARWARA STPP, Distt: Narsinghpur (M.P.)"**
TENDER NO	***BHEL/ NR/SCT/GADARWARA/C&I/PACKAGE-A&B /1011***

SL NO	PRE QUALIFICATION CRITERIA	APPLICABLE/ NOT APPLICABLE	Bidders claim in respect of fulfilling the PQR Criteria (Page no of supporting document. **Bidder must fill up this column as per applicability)**
A	Submission of Integrity Pact duly signed	NOT APPLICABLE	
B B-1	**Technical (For Package A & Package B)** Bidder who wish to participate should have executed the following works during last seven years as on the date of Technical Bid Opening. B-1.1.:- C&I works for BTG/GT 'OR' CI works consisting of DCS/DDC/Station C&I in one unit of at least 400 MW rating. 'OR' B-1.2:- Execution of at least 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.	APPLICABLE	
C	**FINANCIAL**	APPLICABLE	
C-1	**TURNOVER** Bidders should have achieved an average annual financial turnover of minimum of: **For Package A**: Rs. 78 Lakhs (Rupees Seventy Eight Lakhs) **For Package B:** Rs. 75 Lakhs (Rupees Seventy Five Lakhs) Based on the audited accounts of last three Financial Years (FY) i.e 2012-2013, 2013-2014 & 2014-2015. Bidder shall submit audited annual accounts (balance sheets and profit & loss account) in support of this. In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable	APPLICABLE	

	audited statements submitted by the bidders against the requisite three years, will be averaged for three years.		
C-2	**NET WORTH** Net worth of the Bidder shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above should be positive. Net Worth = Paid up share capital* + Reserves. (* Share Capital or Partnership capital or Proprietor Capital as the case may be) (Net worth is required to be evaluated in case of companies)	APPLICABLE	
C-3	**PROFIT** Bidder should have earned cash profit in any one of the three financial years as applicable in the last three financial years defined in 'C-1' above based on latest Audited accounts. Profit shall be NET profit (PAT + Non cash expenditure viz. depreciation) earned during any one of the three financial years as in 'C-1' above.	APPLICABLE	
D	Assessment of Capacity of Bidder to execute the work as per sl. no. 9 of NIT	APPLICABLE	By BHEL
E	Approval of Customer	NOT APPLICABLE	
F	Consortium criteria	NOT APPLICABLE	
	NOTES: 1. Relevant documents, meeting above requirements shall be submitted by bidders. 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. For QR B-1 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. 4. In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the supply and Erection & Commissioning portion then value of Erection & Commissioning shall be considered as 15% of the Experience/PO/WO value.		

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 ORDER 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

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

Modification in GCC clause

I. Clause No. 2.17.5 of GCC shall be modified as below:-

Base date shall be the calendar month **of the schedule completion date of the contract. Schedule Completion date shall be the actual start date plus delivery period as defined in clause no 6.0 of TCC (Part-I).**

II. Clause No. 2.17.9 shall be modified as:-

PVC shall be applicable only **for the extended period of contract (if any) after the schedule completion date.** However, the total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:

- For the portion of backlog attributable to the contractor, **no PVC shall be paid.**
- For the period of Force Majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.
- For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months in the extended period.
- The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/ Additional Items and Extra works.

All other terms & conditions of clause no. 2.17 of GCC shall remain same.

ANNEXURE - 4

Certificate by Chartered Accountant on letter head

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

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year..... as per MSMED Act 2006 is as follows:

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

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

(Strike off which is not applicable)

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

Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/Small) (Strike off which is not applicable) and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

ANNEXURE - 5

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit "online sealed bid" in the Reverse Auction. Non submission of "online sealed bid" by the bidder for any of the eligible items for which techno commercially qualified, will be considered as tampering of the tender process and will invite actionby BHEL as per extant guidelines in vogue.

3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.

4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.

5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

6. Bidders have to fax the Compliance form before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.

7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

8. Reverse auction will be conducted on scheduled date & time.

9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.

10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, as provided on case-to-case basis to Service provider within two working days of Auction without fail.

11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL"s standard practice.

12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the

„Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.

13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action *as per extant BHEL guidelines*, shall be initiated by BHEL and the results of the RA scrapped/ aborted.

14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

15. In case BHEL decides to go for reverse auction, the H1(s) bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

ANNEXURE – 6

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

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

ANNEXURE – 7

Feedback Form: From where did you get information reg. this tender

1	NEWSPAPER ADVERTISEMENT (NAME)	
2	BHEL WEBISTE (TENDER NOTIFICATION)	
3	CENTRAL PUBLIC PROCUREMENT PORTAL OF GOVERNMENT OF INDIA (CPP PORTAL)	
4	EMAIL COMMUNICATION FROM BHEL	
5	ANY OTHER SOURCE	

Rev 01

1st June

2012

TECHNICAL CONDITION OF CONTRACT (TCC)

(Document No. PS: MSX:TCC)

BHARAT HEAVY ELECTRICALS LIMITED

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NOT FOR PUBLICATION

TENDERER'S COPY
ORIGINAL COPY

TECHINICAL CONDITIONS OF CONTRACT (TCC)

TENDER NO. BHEL/ NR/SCT/ GADARWARA/C&I/PACKAGE-A&B/1011

FOR

"ERECTION, TESTING, COMMISSIONING, POST COMMISSIONING, TRIAL OPERATIONS ,PG TEST ASSISTANCE & HANDING OVER OF ALL C&I EQUIPMENT OF PACKAGE-A (UNIT NO.1) & PACKAGE-B (UNIT NO. 2) OF 2X800 MW GADARWARA STPP, DISTT: NARSINGHPUR (M.P.)"

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

Sl. No.	Title	Description
1.	Name of the Owner	**NATIONAL THERMAL POWER CORPORATION LTD. (NTPC)**
2.	Address	Gadarwara Thermal Power Station, near Chichli&Umaraiya villages, Tehsil –Gadarwara,District– Narsinghpur Madhya Pradesh, Pin- 487551
3.	New Installation	2 x 800 MW
4.	Nearest Railway station	Gadarwara Railway Station
5.	Nearest Road	Gadarwara is located on the MP SH 22
6.	Nearest City	Jabalpur
7.	Nearest Airport	Nearest Airport is Dumna Airport, Jabalpur-129 KM and Raja Bhoj Airport, Bhopal -209 KM
8.	Highest Temperature	45 deg C
9.	Lowest Temperature	1 deg C
10.	Elevation	354.77 metres

2.0 SCOPE OF WORK

Scope of these specifications cover complete work of handling, identification, 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 require), preservative/ touch-up painting including supply of paints etc, earthing of equipment including electronic earthing and other activities required for erection, testing, commissioning, post commissioning, trial operations ,PG Test assistance & handing over of all C&I equipment of **Package-A (Unit No.1) & Package-B (Unit No. 2) of 2x800 MW GADARWARA STPP** as indicated in the BOM schedule covered within the scope of these specifications for this tender.

However, there will be two separate packages for the two units, as follows:

Package-A -- Erection, Testing, Commissioning & Handing Over of All C&I Equipments of Unit No. 1

Package-B -- Erection, Testing, Commissioning & Handing Over of All C&I Equipments of Unit No. 2

The above two packages shall be awarded to two separate contractors The scope here under is given applicable for both the packages

2.1 Scope of work for C&I of Unit No. 1 & 2 in general:

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

1. 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.

2. Erection and commissioning of control panels.

3. Erection and commissioning of All Types of Field Instruments like Temperature, Pressure and Flow instruments (local & remote).

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

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, Battery, Battery Charger etc

12. PG test assistance in C&I scope for individual as well as overall equipments.

13. Installation of danger board and first aid box wherever required.

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 BOM/ Rate Schedule is tentative only and based on detail engineering and inputs received from manufacturing units as on date which is liable for variation**.** If any item or equipment not covered in the specification but requires being 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:-Detailed BOM with specification are given in the CHAPTER-X. Contractor shall go through the detailed BOM and specification before filling the rate in the rate schedule given in Chapter-X .

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 The contractor shall co-ordinate and provide assistance for satisfactory testing, pre-commissioning, commissioning and trial run 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-in-charge feels necessary because of site conditions and also to meet system specification.

2.4.4 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. Contractor shall follow all PTW and other procedures required to execute work at site as per BHEL engineer-in-charge instruction.

2.4.5 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.

2.4.6 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.

2.4.7 The contractor at his cost shall arrange necessary security measures for adequate protection of issued BHEL and its own machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor's custodian 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.

2.4.8 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.

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

2.4.10 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.

2.4.11 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.

2.4.12 Any wrong erection shall be undone and re-erected promptly to comply withthe design requirements to the satisfaction of Site Engineer.

2.4.13 BHEL will provide vendor's technical support and IMTE's and T&P or any other equipment required for commissioning of various proprietary type special instruments/systems like Analysers, Microprocessor based relays, Flame Scanners , DAVR , Battery System, UPS, charger, The contractor shall carry out the works as per instructions of BHEL/ Vendor Engineer.

2.4.14 Filler wire/electrodes for T91 Tubes shall be supplied by BHEL manufacturing units & may be issued Free of Cost to Contractor. In case the Filler wire/ electrodes not supplied by manufacturing units the same shall be arranged by Contractor.

2.4.15 Assistance in PG test of main equipment along with all auxiliaries, completion of punch points and assistance for handing over of units to customer including additional work of temporary cable laying or equipment fixing or any shall be in the scope of contractor within the quoted rate.

2.5 SITE VISIT

Contractor should visit site and acquire full knowledge & information about site conditions. The bidder must visit site, to acquaint themselves with the conditions prevailing at site and in & around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.

2.6 SITE ORGANISATION& ERECTION SCHEDULE

2.6.1 The contractor shall provide adequate staffing in the following areas in addition tothe staffing requirements of execution as instructed/informed by BHEL:

1. Overall planning, monitoring & control.
2. Quality control and quality assurance.
3. Materials management.
4. Safety, fire & security.
5. Industrial relations and fulfillment of labor laws and other statutory obligations

2.6.2 The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.

2.6.3 On award of contract, the contractor shall submit to BHEL site organization chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. The persons, whose bio-data have been approved by BHEL, will have to be posted at site and deviations in this regard will not generally be permitted.

2.6.4 The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL.

2.6.5 The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields in erection, commissioning etc as applicable. For proper supervision of the work, the contractor shall ensure providing one qualified supervisor against deployment of 15 workmen

ERECTION SCHEDULE

2.6.6 Contractor shall submit within 30 days of LOI date, detailed program (L2 schedule) of construction / erection / commissioning, for approval to Project Manager-Noida/Construction manager Lalitpur site without fail. L2 schedule shall be the working level document demonstrating contractor's ability and methods of completing the work within the key milestones identified in the tender specification These program would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detailed monitoring, The three monthly rolling program with the first month's program being tentative based on the site conditions would be prepared based on these program. The Contractor shall also be involved along with the Customer/BHEL to tie up detailed resource mobilization plan over the period of time of the contract matching with the performance targets. Other requirements are as per Clause No. 2.9 of GCC.

2.6.7 The program would be jointly finalized by the site in-charge of the contractor with BHEL/Customer's project coordinator as well as the site planning representative. The erection program will also identify the sequential erectable item.

2.7 Contractor shall ensure following:

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

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

2.7.3 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.

2.7.2 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 labor 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 Labor 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 Labor (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 and BOCW act as applicable in state.
g) The Contractor shall arrange potable drinking water to its employees & workers.

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 panels supplied in suit of either one or more 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 and associated relays (including specialised numerical relays).

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 of 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 / NTPC 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 NTPC

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. Scope for DAVR-System comprises of DAVR panel which is connected by Input cable from DAVR to main exciter, mounting of local instruments, enclosure winding resistance &IR value of main exciter etc. Checking of healthiness of all diodes, thyristers, earth fault brush checking and dummy load test of exciter, checking of control desk and field related i/ps and o/ps to commission the excitation system fully operational. Contractor shall deploy suitable manpower having knowledge of system for specialized system like DAVR.

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 thyristor based system 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.

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

- 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.

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

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

- 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.

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

2.8.3 CABLE TRAYS/CABLE DUCTS

Cable trays shall be supplied either ladder, prefabricated, slotted or duct type. **Cost of cable tray erection as per BOQ Cum Rate Schedule shall include fabrication of supports to suit site requirement, fixing of support in position by welding as per Engineers instruction , erection and fixing of cable trays and racks by welding or by bolts and nuts. No separate payment will be released for fabrication / fixing / painting of support structure for cable trays. Approximately 5 kg of steel structure is envisaged to be fabricated / erected for every meter of cable tray, on an average. However, contractor will be paid extra for fabrication / erection of cable tray supports only for the weight in excess of weight calculated by multiplying total length of cable trays erected by 5. The payment for this additional supports, if any, will be paid as per applicable rates for structural steel fabrication / erection&shall be released after completion of cable tray erection / reconciliation of total material used in fabrication / erection of cable tray supports.** jointing of trays can be carried out by bolting / welding as per direction of Engineer.

Contractor shall carryout cutting of tray only by Hacksaw for obtaining proper routing from standard lengths supplied. Materials for support fabrication like flats, channels, angles etc. shall be supplied by BHEL free of cost. The cutting & welding points on trays will be painted by primer & Al paint by the contractor including supply of paint within the erection price and no extra cost to BHEL. These cable trays may also be required for laying copper tubing, plica type / GI flexible conduits, local cabling and metal temp. thermocouples.

Beside above angels / channels of various sizes may have to be fabricated / erected, for use as cable trays, from structural steel to be supplied by BHEL free of cost. *Payment for fabrication / erection of these type trays shall be released as per applicable rates for structural fabrication.*

In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and lying of cables etc. The covers are to be properly secured on the bottom trays and no separate payment will be made for putting these covers. If required, GI / Al strip clamps are to be used.

Note: Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable. Any minor modification in tray work as per site requirement, stipulated to be done as per drawing shall be done without any cost implications to BHEL.

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 as per requirement of Engineer-in-charge.

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. Any damage to cables on account of mishandling, cost of same shall be deducted from contractors RA bill.

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, 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.

2.8.5 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 and/or Customer requirement.

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.

2.8.6 SCOPE OF WORK FOR FIELD INSTRUMENTS

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

24. 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.

25. 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.

2.8.7 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.

2.8.8 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 boxshall be arranged by the contractor.

2.8.9 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.

2.8.10 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.

2.8.11 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

2.8.12 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 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.

5. For actuators commissioning contractor shall preferably engage specialised party to complete the work on time within the quoted rates

2.8.13 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.

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

3. 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.

4. Earth grid shall be provided by M/s NTPC and contractor has to connect to that grid as per requirement within quoted rates.

2.8.15 STRUCTURAL FABRICATION AND INSTALLATION

INSTRUMENT/ JUNCTION BOX FRAME/ PANEL BASE FRAME / CABLETRAY & 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, levelling, alignment, providing bracings and painting etc. No gas cut holes will be permitted.

3. All the fabricated supports/frames for instruments, trays, pipes, equipments, etc., shall be painted after thoroughly cleaned by wire brush, scrapping or any other method as per requirement of BHEL/NTPC. 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. If there is requirement of cable routing from one structure to another as per drawing/requirement same shall be done by contractor as per rate schedule.

6. 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.

7. 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.

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

2.8.16 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 respective cylinder. Fabrication / erection of stands for mounting of the cylinders The work also includes minor rectifications/alteration in the tubing , servicing of accessories , setting of limit switches , calibration of actuators and feedback position transmitters.

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 foundation bus duct columns, base frame of panels, Transformer 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. Welder deployed for aluminium welding shall have experienced and approved by BHEL and BHEL's Customer after due qualification process/testing.

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

4. 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.

5. 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.

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

7. 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. All T&P, manpower, supervision is in contractor's scope. Painting shall be carried out as per colour scheme approved by BHEL Engineer-in charge/ NTPC.

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. 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.

4. 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.

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

6. 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. In case of G I Structure, The cold galvanizing paint to be applied as touch up where ever needed. This is to be done as per instruction of BHEL engineer. The Paint required for this purpose is in scope of Contractor

7. The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.

8. 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.

9. Touch-up painting of LT MCC \ Control Panels or any other equipment /devices wherever necessary.

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

11. 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

The scope of commissioning work 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 if necessity is accessed by engineer-in charge BHEL and contractor engineers/supervisors shall associate with the vendors and provide

necessary manpower, T&P,IMTE's etc. The contractor shall be responsible for overall commissioning of all the instruments and systems covered in the BOQ.

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. (coupled or de-coupled)

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.

xi. PG Test of all major equipment

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, inspector etc.

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

2. 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.

3. Contractor shall arrange specialized commissioning engineers, supervisors, electricians, and 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

4. 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.

5. 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.

6. 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.

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

8. 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.

9. 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

10. Minimum requirement of Man Power for commissioning works per unit shall be as follows:

    Engineer (C&I) – 2
    Supervisor C&I) – 6
    Technician (C&I) – 12

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 within the quoted rates.

11. 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 and BHEL reserves the right to required manpower on risk and cost of Contractor.

12. All the T&P,IMTE's and other Erection & commissioning instruments/tools required for commissioning are to be arranged by the contractor.

Note: 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/NTPC FQPs/ norms. All the above will be witnessed by the BHEL engineers and a joint report/protocol shall be made and signed by contractor.It shall be responsibility of contractor to get signed all protocols /reports from BHEL and or NTPC and handing over to BHEL Engineer-in-charge. Contractor shall follow checklist of BHEL and testing & commissioning activities shall be carried out in accordance with the checklist.

S.No.	Description	Scope /to be taken care by		Remarks
3.0	**Facilities in the scope of Contractor/ BHEL**	BHEL	CONTRA-CTOR	
3.1	**ESTABLISHMENT**			
3.1.1	FOR CONSTRUCTION PURPOSE			
3.1.1.1	**Open space for office**	YES		Limited space (free of charge) As and where made available by customer M/s NTPC
3.1.1.2	**Open space for storage**	YES		**Limited space(free of charge) As and where made available by customer M/s NTPC**
3.1.2	FOR LABOUR COLONY			
3.1.2.1	**Open space**		**YES**	**Contractor have to make their own arrangement**
3.2	**ELECTRICITY**			
3.2.1	**Electricity for construction purposes (-415 V) (chargeable/free)**			**Free of Cost**
3.2.1.1	Single point source	YES		
3.2.1.2	Further distribution for the work to be done which include supply of materials & execution		**YES**	
3.2.2	**Electricity for the office, stores, etc of the bidder which include:**	YES		**Free of cost**
3.2.2.1	Distribution from single point including supply of materials & service		**YES**	
3.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		**YES**	

3.2.2.3	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above Lines		**YES**	**Contractor have to make their own arrangement**
3.2.2.4	Duties & deposits including statutory clearances for above		**YES**	
3.2.2.5	Demobilization of the facilities after completion of works		**YES**	
3.3	**WATER SUPPLY**			
3.3.1	**FOR CONSTRUCTION:**			
3.3.1.1	Making the water available at single point		**YES**	Contractor have to make bore wells itself wherever approved by M/s NTPC. For pre-commissioning and commissioning activities,NTPC will provide water.
3.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
3.3.2	**LABOUR COLONY:**			
3.3.2.1	Making the water available at single point		**YES**	**Contractor have to arrange on his own.**
3.3.2.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
3.4	**LIGHTING**			
3.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		**YES**	
3.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area		**YES**	

	3. At construction site/area			
3.4.3	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		**YES**	
3.5	**Communications facilities for site operations of the bidder**			
3.5.1	Telephone, fax , internet ,intranet, email etc.		**YES**	
3.6	**COMPRESSED AIR SUPPLY**			
3.6.1	Supply of compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage system etc.		**YES**	
3.6.2	Installation of the above system and operation & maintenance of the same		**YES**	
3.6.3	Supply of all the consumables for the above system during the contract period.		**YES**	
3.7	**ERECTION FACILITIES**			
3.7.1	Providing erection drawings for all the Equipment's covered under this scope	YES		
3.7.2	Drawings for construction method	YES	**YES**	
3.7.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		**YES**	
3.7.4	Shipping lists etc for reference & planning the Activities	YES		
3.7.5	Preparation of site erection schedules and other input requirements		**YES**	
3.7.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	YES	**YES**	
3.7.7	Weekly erection schedule based on Sl. No. 3.7.5		**YES**	
3.7.8	Daily erection/work plan based on Sl. No. 3.7.7		**YES**	

3.7.9	Periodic visit of senior official of bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two month		**YES**	
3.7.10	Preparation of preassembly bay		**YES**	All necessary materials required for preparation of preassembly bed shall be arranged by contractor at his own cost

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

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

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

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

3.11.1 All electrical installations should be as per Indian Electricity rules.

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

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

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

3.11.5 Contractor has to make their own earthling arrangement for their equipmer earthling.

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

3.11.7 Contractor should use "MCCB" and"ELCB" either on incoming or outgoing connec the DBs.

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

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

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

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

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

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

4.0 T&P,IMTEs AND MMD DEPLOYED BY CONTRACTOR (APPLICABLE FOR PACKAGE –A AND PACKAGE-B SEPARATELY)

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		Adequate 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 0-400 deg. C with standard temp. gauges & thermostatic control		2 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.
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 rated for 7 to 10 kg/cm2		4 no.
33	Standard milliamps / millivolts source of reputed make. Range 0to 50 ma and 0 to 100 mv		4 no.
34	DC power supply 0-50 VDC, 5 A make "Aplab" or equivalent (variable source)		2 nos.
35	Glass thermometer 0-120 deg. C, 0-200 deg.c and 0-600 deg.c		2 no. each
36	Equipment and consumables for LPI/MPI test on impulse pipes		1 no.
37	Insulation Tester (500 V)		03 nos.

***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. Phase wise requirement of T&P's and IMTE's etc shall be decided by Engineer-in-charge at the start of the contract.

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 being provided by BHEL for use of contractor:

5.1 To be provided on Free of hire charges and on sharing basis.

.Sl No.	Description of T&P	Capacity	Package-A Qty	Package-B Qty	Remark
5.1.1	Crawler Crane	75 T/ 100 T	1 No.	1 No.	On sharing basis
5.1.2	Crawler Crane	135 T	1 No.	1 No.	On sharing basis
5.1.3	Crawler Crane	250 T	1 No.	1 No.	On sharing basis

5.2 To be provided on Chargeable Basis and on sharing basis

Sl. No.	Description of T & P	Capacity	Package- A Qty	Package- B Qty	Remark
5.2.1	TG HALL EOT CRANE	265/25T	2	2	On sharing basis

NOTES:

1. **Cl.4.2.2.16 c. of SCC shall be read as** day-today upkeep and running maintenance like filling topping up of lubricants, changing filters, etc including repair of self starter, batteries and dynamo of these cranes shall be the responsibility of the contractor. **Manpower for these works and other crane related works is in the scope of Contractor**. If on checking it is found that the same is not followed, BHEL will exercise its right to get the job/works done at the risk and cost of contactor. BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance may be excluded from scope of contractor.

2. **Cl.4.2.2.16 e. of SCC shall be read as-The operator for BHEL's cranes 100 MT & above capacity being provided by BHEL free of cost. Further, Helpers and fuel for operation of all BHEL cranes, shall be provided by contractor within the final accepted rates.**

3. **The contractor shall make necessary arrangement like laying of steel plates, assembly & dismantling of heavy lift attachment, boom, jib etc. for movement and operation of BHEL cranes.**

4. **The cranes at Sl. No.5.1.1 to 5.1.3 shall be made available to contractor free of hire charges for specific use only wherever no other option is possible. These cranes shall be issued at the discretion of the BHEL Engineer.**

5. After handing over of The D/G EOT's (after commissioning of the EOT cranes) to Customer by BHEL, Customer shall provide skilled operation and maintenance personnel for EOT cranes available in TG hall and BFP buildings. **The customer will provide the EOT's on chargeable basis for erection of the Units/equipment's under this package. The EOT cranes shall be used by the contractor on chargeable basis; BHEL will deduct the EOT usage charges on actual basis as charged by the Customer for using EOT, from the running Bills of Contractor. Though the customer shall operate and maintain the EOT's, the contractor has also to arrange for skilled EOT operators for ensuring uninterrupted flow of work ,separately for day and night to meet project schedule, within the quoted rates. The regular maintenance of the EOT is in the scope of the NTPC, only after the handing over of the EOT's. The contractor may be required to extend help during the maintenance/Upkeep of the EOT and initial operation.**

6. **In case of other T&P mention above contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.**

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 mobilization of manpower and T&Ps by the contractor.

6.2 Delivery Period for entire work as detailed in the tender specifications for Package-A and Package-B : Each Unit (Pkg. A & Pkg. B) shall be completed within **13 months** from the Zero date as per program/milestones indicated by BHEL Engineer-In Charge. Contractor has to mobilize 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 schedules:

MILE STONES	**MONTHS**
Erection Start	ZERO
Boiler Light up	06 months
Barring Gear	07 months
Synchronization	10 months
Full Load	12 months
Trial Operation	13 months

Note: There will be phase shift of 04 Months b/w Unit No.1 & 2

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 one month from Full Load 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.

7.0 Terms of Payment

7.1 The 'Engineer In-Charge' 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:

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

7.4 PROGESSIVE PAYMENT ON PRORATA BASIS

7.4.1 85 % of contract value payable on fulfilment of following conditions:

Sl No.	Activity/Work Description	% of Unit rate
A.	**MAIN E&C EQUIPMENTS/ITEMS**	
I	**PRO RATA PAYMENTS (85%)**	
1.0	**Cable Tray and accessories**	
1.1	Fabrication and fixing/welding/bolting in position	60%
1.2	Earthing of Cable Trays	15%
1.3	Tagging of cable trays (painting cable tray numbers on sides)	5%
1.4	Covering of trays wherever envisaged	5%
	Total =	**85%**
2.0	**Cable Laying (Power Cables)**	
2.1	Laying of cables	45%
2.2	Glanding, Termination and tagging of cables	15%
2.3	Dressing and clamping of cables	10%
2.4	Testing and charging of cables	15%
	Total =	**85%**
3.0	**Cable Laying (Control and Signal Cables)**	
3.1	Laying of cables	45%
3.2	Glanding, Termination and tagging of cables	15%
3.3	Dressing and clamping of cables	10%
3.4	Shielding of Cables	5%
3.5	Testing and charging of cables	10%
	Total =	**85%**
4.0	**Junction Box/Push button station (local)**	
4.1	Erection including fixing of terminal blocks wherever applicable	75%

4.2	Name plate fixing wherever applicable, Labelling (both inside and outside) and Commissioning of connected equipment)	10%
	Total =	**85%**
5.0	**Conduits/ Impulse pipe/ tubes**	
5.1	Fabrication, Laying and Erection	50%
5.2	Leak Test/ Hydraulic test (wherever applicable, otherwise clubbed with next activity)	20%
5.3	Dressing, Clamping, tagging and painting wherever applicable	8%
5.4	Testing & commissioning of associated equipment /system	7%
	Total =	**85%**
6.0	**Miscellaneous Structural Steel including frames for Panels/Racks/ Instruments, supports for cable tray/pipes/tubes, canopies etc**	
6.1	Fabrication, Erection, alignment, Welding/bolting and wherever applicable chipping/ grouting/ painting	65%
6.2	Erection of associated items/ Equipments/ Systems as applicable	20%
	Total =	**85%**
7.0	**Panels/ Cubicles/ Desks/ racks/ Enclosures/ Monitors/ Computers/ Computer peripherals /PLCs/ UPS/ Batteries**	
7.1	Erection and Alignment	50%
7.2	Fixing of loose items/ instruments wherever applicable	5%
7.3	Pre commissioning checks, Charging of panels and Loop testing etc	15%
7.4	System Commissioning	15%
	Total =	**85%**
8.0	**Instruments/ Devices including Sensors/Cells/Probes etc**	
8.1	Calibration/ Testing/ Pre erection checks	30%
8.2	Erection/ Placement and fixing of loose items/ accessories	30%
8.3	Pre commissioning checks/ loop testing/ Simulation testing as required	10%
8.4	Remote/Local commissioning as required	15%
	Total =	**85%**
9.0	**Commissioning and Testing activities for Equipments erected by other agencies like control valves, on/off valves, electrical/ pneumatic valves, actuators, solenoid valves, valves, limit switches, ERV controllers, Power cylinders, Pressure & Temperature Gauges/ Transmitters etc**	
9.1	Removal and Refixing/ Fixing loose supplied components including tubing/hose, regulators etc	30%
9.2	Calibration/ Local testing – commissioning readiness	30%
9.3	Local Commissioning & Loop Testing as required	10%
9.4	System Commissioning or Remote Commissioning as required	15%
	Total =	**85%**

10.0	**Power Cylinders**	
10.1	Erection and alignment of Power Cylinders	**30%**
10.2	Fixing of loose items and Commissioning readiness	**30%**
10.3	Loop Checking, Calibration and Local Commissioning	**20%**
10.4	System/ Remote commissioning as required	**5%**
	Total =	**85%**
11.0	**Miscellaneous items (Items not covered under above heads)**	
11.1	Erection	50%
11.2	Alignment	10%
11.3	Testing	15%
11.4	Completion	10%
	Total =	**85%**

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

II	STAGE/ MILESTONE PAYMENT (15%)	
Sl No.	**Activity/Work Description**	**% of Unit rate**
1.	Boiler Light Up	1%
2.	ABO	1%
3.	Steam Blowing	0%
4.	Safety Valve Floating (Electronic Relief Valves)	1%
5.	Oil Flushing (TG)	0%
6.	Barring Gear (TG)	0%
7.	Rolling and Synchronization	2%
8.	Coal Firing	0%
9.	Full Load	2%
10.	Trial Operation of Unit	3%
11.	Painting	0%
12.	Area Cleaning, temporary structure cutting/removal and return of scrap	1%
13.	Punch List points/ pending points liquidation	1%
14.	Submission of "As Built Drawings"	1%
15.	Material Reconciliation	1%
16.	Completion of Contractual Obligation	1%
	Total for Milestone/Stage payments	**15%**

8.0 TAXES, DUTIES, LEVIES

8.0 TAXES & DUTIES

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

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

8.2 Service Tax & Cess on Service Tax

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

8.2.2 Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. The Service Tax Rules permit more than one option or methodology for discharging the liability of tax/levy/duty and BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor. Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract.

8.2.3 For the purpose of claiming any Service Tax from BHEL, the following procedure shall be adopted :

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

8.2.3.1.1 The name, address and registration number of the contractor

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

8.2.3.1.3 Description, classification and value of taxable service provided and

8.2.3.1.4 The Service Tax payable thereon.

8.2.4 All the four conditions shall be fulfilled in the invoice for payment of Service Tax by BHEL. Where more than one nature of Service under Service Tax Rules is involved, the invoice mentioned above shall contain the break up of all values for each nature of Service.

8.2.5 Name and address of the contractor should be same in the service tax invoice and monthly bill. Any change in the name and address in past should be supported by documentary evidence duly certified by the registering authority.

8.2.6 Purpose of above requirements, inter-alia, is to enable availment of CENVAT credit by BHEL. As per recent amendments, Time restrictions for taking Cenvat credit is within twelve months from date of invoice.

Wherever Cenvat credit could not be availed by BHEL within statutory time limit of 12 months due to delay in submission of invoices or for any other reasons attributable to contractors, Liability towards loss of such Cenvat credit shall be passed on to contractors.

8.3 **VAT (Sales Tax /WCT)**

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

8.3.2 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.

8.4 Modalities of Tax Incidence on BHEL

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

chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.

8.5 New Taxes/Levies

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

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

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

9.1 **ANY OTHER SPECIAL REQUIREMENT**

9.1.1 **THE PROCEDURE FOR SELECTION & FINALIZATION OF CONTRACTORS FOR PACKAGE-A &PACKAGE-B OF THIS TENDER FOR UNIT NO. 1 & 2 AT 2X800 MW, GADARWARA STPS OF NTPC, GADARWARA is as follows:**

9.1.1.1 There will be two units of 800 MW each AT 2X800 MW GADARWARA STPS OF NTPC, GADARWARA, DISTT. NARSINGHPUR, M.P. Package A shall consist of Unit # 1 & Package B shall consist of Unit # 2

9.1.1.2 **The two packages (Pkg A & Pkg B) shall be awarded to two separate contractors i. e. no single bidder shall be awarded more than one package.**

9.1.1.3 Bidders may submit their offer either for both the packages or any one of the packages i.e. Package-A / Package-B given in this tender. However, Bidders shall specifically confirm in their bid that they have quoted for Package-A / Package-B or both of the tender.

9.1.1.4 Bidders shall submit price bid for each package separately by enclosing each price bid in a separate envelop, clearly indicating on cover of the envelop the respective package number(A/B) besides furnishing other requisite details.

9.1.1.5 RA/Price Bid opening for Package A shall be done first.

9.1.1.6 Party who is awarded the job of Package "A" shall not be considered for participating in RA/Price bid opening of package "B".

9.1.1.7 There will be separate Contracts for each Package. Both the contracts will be treated individually as a separate contract and Contract Agreement for each package shall be signed separately.

9.2 **IMPORTANT CONDITIONS**

9.2.1 In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be as mentioned in Notice inviting tender.

9.2.2 **Modification/ deletion in Price Variation Compensation** Clause no. 2.17of GCC:

9.2.2.1 **Clause No. 2.17.5 of GCC shall be modified as below:-**

Base date shall be the calendar month **of the schedule completion date of the contract. Schedule Completion date shall be the actual start date plus delivery period as defined in clause no 6.0 of TCC (Part-I)**

9.2.2.2 **Clause No. 2.17.9 shall be modified as:-**

PVC shall be applicable only **for the extended period of contract (if any) after the schedule completion date.** However, the total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:

9.2.2.2.1 For the portion of backlog attributable to the contractor, **no PVC shall be paid.**

9.2.2.2.2 For the period of Force Majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.

9.2.2.2.3 For the portion of backlog attributable to BHEL, the PVC will be as per the indices applicable for the respective months

9.2.2.2.4 The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.

9.2.3 All other terms & conditions of Clause No. 2.17 of GCC shall remain same.

9.3 Guarantee Period

Guarantee Period will start from the date of acceptance of the trial operation of the Unit by BHEL/NTPC. Other conditions shall be as per Clause No. 2.24 of GCC

BOQ FOR THE WORK OF E/T/C OF CONTROL AND INSTRUMENTATION OF PACKAGE-A (UNIT NO.1) & PACKAGE-B (UNIT NO. 2) AT 2x800 MW GADARWARA STPP				
SL No.	**ITEM DESCRIPTION**	**UNIT**	**Qty Pkg-A**	**Qty Pkg-B**
	PANELS/RACKS/CONSOLES			
	SG & TG CONTROL PANEL			
1	suit of one panel (approx. weight 400kg, 750(L) X 800(B) X 2415(H) mm	No.	4	3
2	TG Siemens Panel (suit of one panel) (approx. weight 300kg, 1200(L) X 800(B) X 2200(H) mm	No.	9	9
3	suit of two panels (approx. weight 800kg, 1500(L) X 800(B) X 2415(H) mm	No.	11	5
4	suit of three panels (approx. weight 1200kg, 2250(L) X 800(B) X 2415(H) mm	No.	10	7
5	suit of Four panels (approx. weight 1600kg, 3000(L) X 800(B) X 2415(H) mm	No.	8	8
6	suit of five panels (approx. weight 2000kg, 3750(L) X 800(B) X 2415(H) mm	No.	2	2
7	DAVR panel (approx. 4053x800x2145 mm)	No.	1	1
8	Steam Leak Detection System Panel alongwith PC Station Size - 800x2315x800	No.	1	1
9	BLR. MAINTANENCE SYSTEM -NOTE BOOK PC	No	1	0
10	DC SCANNER AIR FAN STARTER Size - 900X1120X375 mm	No	1	1
11	Gas Analyser cabinet 2200x1000x800	No.	1	1
12	CARBON-IN-ASH ANALYSER CONTROL CABINET	No	1	1

13	ON LINE COAL FLOW MEASUREMENT SYSTEM - CONTROL CABINET Size -1200x1600x500	No	5	5
14	ON LINE COAL FLOW MEASUREMENT SYSTEM -PC	No	1	1
15	Coal Flow Monitor Assembly	Nos	9	9
16	DC Starter Cubicle 2000mm X 1500mm X 450mm	No	2	2
17	Open type transmitter rack 2000mm X 1250mm X 600mm	Nos	12	12
18	Governing console board 1200mm X1900mm X 450mm	No	2	2
19	**INSTRUMENTATION PANEL (ALSTOM SUPPLY)**			
19.1	RACK-12RX-1,4 WITH 1 JBS,1 UB ,INST HARD	No	2	2
19.2	RACK-8RX-2,3 WITH 1JBS,1 UB ,INST HARDW	No	2	2
19.3	RACK-4RX-5 WITH 1 JBS,1 UB ,INST HARDWAR	No	1	1
19.4	ENCLOSURE-10EX-1 WITH 1 JB, 1 UB ,INST H	No	1	1
20	Acoustic Steam leak detection system panel(ASLD)	No	1	1
21	Acoustic pyrometer remote cabinet including PC station (Size -1400 x 2365 x800 mm)	Set	1	1
22	FTP LOCAL STARTER Box 650x1000x300 mm	No.	2	2
23	Elevator control Panel	No.	2	2
24	SCANNER AIR FAN STARTER	No.	1	1
25	HART Management System for SMART Transmitter Panel dimension 1200X800X2415 mm	Set	1	1

26	AH Main Control Panel Size -1830x1881x611 mm Weight - 363 Kgs	No.	2	2
27	AH LCS Sector Plate 1&2 Drive Panel Size -645x610x203 mm Wright - 45 Kgs	No.	8	8
28	HWL-1,HWL-2 & MEFCV PANEL Size - 600X600X250 mm Weight - 100 kg	No.	1	1
29	SOOT BLOWER MCC Size - 22100x2250x1000 mm	No.	1	1
30	Furnace Flame Viewing System –Remote Panel Size -800x2100x600 mm Weight- 500 Kgs	No	1	1
31	Furnace Flame Viewing System –Camera Control Box Size -1220x1470x610 mm Weight -100 Kgs	No	4	4
32	Furnace Flame Viewing System –Zoom Control Box Size -400x300x210 mm Weight -27 Kgs	No	1	1
33	Gr. Feeder Remote Panel Size- 1200x2315x600	No	9	9
34	Gr. Feeder Integral Panel Size- 600x750x350	No	9	9
35	Relay based Lube Oil Purifier Control Cabinet Size - 1400x800x300	No	1	1
36	SAG Cabinet in CCR	No.	1	1
37	**Moisture Measuring System**			
37.1	Indicator cum controller placed in Control Room & Sampling System in Field	No.	1	1
38	H2 Gas Analyser Cabinet Size- 2200x1000x800	No.	2	2
39	GROUND BRUSH MONITORING SYSTEM Size - 400 X 320 X 120	Set	1	1
40	STARTING RESISTOR FOR DC SEAL OIL MOTOR	No.	1	1

	Size - 650 X 600 X 600			
	PADO + SIMULATOR			
41	Servers for PADO	Nos	6	0
42	Workstations for PADO clients	Nos	10	0
43	Printers(A4 & A3 Colour Laser Jet, Inkjet, Dot Matrix) With Printer Table and accessories	No.	11	11
44	Computer Tables alongwith chairs	No.	20	20
45	UTPC Cables	Mtr	1600	0
	HMI HARDWARES			
46	Online UPS alongwith Cabinet for Servers	Nos	4	0
47	Workstations for clients	Nos	12	0
48	Unit Control Desk for HMI Workstations	Nos	1	1
49	CCTV system (4 cameras, 4 local control boxes, Remote panel)	Set	1	1
50	**24V DC PS System each set comprising of 4X100% Rectifier Banks , 1X100% DCDB and 1 battery Health Monitoring System (SG & TG C&I)**	Set	2	2
51	**UPS DISTRIBUTION BOARDS**			
51.1	240V UPS DISTRIBUTION BOARDS Size- 1400X2365X800 mm	No.	1	1
51.2	240V UPS DISTRIBUTION BOARDS Size- 1200x800x600 mm	No.	4	4
52	**AC CONTROL SUPPLY PANEL** **1000mm(W) x 800mm(D) x 2315mm(H)**	No.	1	1
	LIE/LIR/LGB			
53	Local Instrument racks (LIR) Type B Size- 2200X1330X800 mm	No.	6	6
54	Local Instrument racks (LIR) Type C Size - 2200x1010x800 mm	No.	25	25
55	LOCAL INSTRUMENT RACK , Type-B Size - 1330x800x2300 mm	No.	2	2

56	LOCAL INSTRUMENT RACK 2400x500x2200		6	6
57	LOCAL INSTRUMENT RACK 1500x500x1600	No.	2	2
58	Local Instrument enclosures (LIE), Type-A Size - 1250x2300x800	No	1	1
59	Local Instrument enclosures (LIE), Type-B Size - 930x2300x800	No	3	3
60	Local Gauge Board (LGB)	No.	14	14
61	**PRESSURE INSTRUMENTS RACKS** Asembly/welding and onstallation 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	No	10	10
	INSTALLATION,CALIBRATION& COMMISSIOINGOFLOCAL/FIELD INSTRUMENTATION/EQUIPMENT			
62	Temperature gauges/Pressure gauges/ Diff. Pressure gauge	No.	1039	1039
63	Temp. Transmitter /Pressure Transmitters / Differential pressure/Position transmitters	No.	1050	1050
64	Level Transmitter/Level gauge	No.	32	32
65	Vibration Transducers/Monitor/ Detectors/Element	No.	68	68
66	Temp. switches/Pressure switches /DP switches	No.	79	79
67	Proximitors	No.	32	32
68	E/P Transducers	No.	8	8
69	Limit Switches	No.	125	125
70	Speed Switch/Speed Detector	No.	9	9
71	Flow meters/Flow transmitters	No.	2	2
72	Axial shift Detector	No.	3	3
73	Shaft Expansion Detedtor	No.	4	4
74	Casing Expansion Detedtor	No.	2	2
75	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments/ Field Switches (RF Type)	No.	89	89
76	Electronic/Guided Wave Radar /Ultrasonic type level Transmitters	No.	175	175

77	ERV Controller Box Size -508x610x279 mm	No.	6	6
78	FSSS SCANNER HEAD ASSY WITH ELECTRONICS	No.	40	40
79	FLAME SCANNER 19" SINGLE EURO CARD RACK WITH ELECTRONICS 431.3mm(W) x 205mm(D) x 128mm(H)	No.	10	10
80	FSSS LGM SWITCH BOX	NO	20	20
81	Oxygen analyser	Set	4	4
82	Thermocouples(K/R type)	No.	467	467
83	Cr Al Thermocouple	No.	24	24
84	RTDs	No.	561	561
85	Thermowells	No.	288	288
86	Thermometer(Bimettalic)/Gas filled/MIS	No.	48	48
87	MTM Thermo Couple up to 48 M (duplex)	No.	772	772
88	Burner Tilt shear pin failure indication box	No.	4	4
89	Furnace temp. Probe starter boxes	No.	2	2
90	Air Filter Regulators	No.	92	92
91	**INSTALLATION & FABRICATION OF STRUCTURAL STEEL**	MT	1	1
	CONTROL/SIGNAL/SCREENED/POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION			
	LT Sheilded /Screened Cable//FRLS/Power cable			
92	2P X 0.5 SQ MM	Mtr	28450	28450
93	2P X 1.3 /1.5 SQ MM	Mtr	14000	14000
94	4P X 0.5 SQ MM	Mtr	184150	184150
95	8P X 0.5 SQ MM	Mtr	76500	76500
96	12P X 0.5 SQ MM	Mtr	21700	21700
97	2C X 2.5 SQ MM	Mtr	15700	15700
98	3C X 2.5 SQ MM	Mtr	86200	86200
99	5C X 2.5 SQ MM	Mtr	6000	6000
100	7C X 2.5 SQ MM	Mtr	13000	13000
101	10C X 2.5 SQ MM	Mtr	12500	12500
102	16C X 2.5 SQ MM	Mtr	3500	3500
103	19C X 1.5 SQ MM	Mtr	7200	7200
104	4C X 1.5/2.5 MM CONTROL CABLE	Mtr	12380	12380

105	6C X 1.5/2.5 CONTROL CABLE	Mtr	380	380
106	18C X 1.5/2.5 CONTROL CABLE	Mtr	7580	7580
	LT XLPE Power Cables			
107	1C - 25- CU ARMOURED LT XLPE CABLE	Mtr.	5500	5500
108	2C-50- AL POWER CABLE	Mtr.	750	750
109	2C-25- AL POWER CABLE	Mtr.	1000	1000
110	2C-10- AL POWER CABLE	Mtr.	3000	3000
111	3C - 35- AL ARMOURED LT XLPE CABLE	Mtr.	830	830
112	3C X 16 SQ MM	Mtr	2600	2600
113	4C - 1.5 -AL- ARMPURED LT XLPE CABLE	Mtr.	1400	1400
114	1C - 95- CU ARMOURED LT XLPE CABLE	Mtr.	6670	6670
115	1C - 630- CU ARMOURED LT XLPE CABLE	Mtr.	500	500
116	4C - 2.5- CU ARMOURED LT XLPE CABLE	Mtr.	10000	10000
117	2P - 0.5 SQMM - T/C EXTENSION CABLE	Mtr.	6500	6500
118	2P Thermocouple Cable	Mtr.	7200	7200
119	16P Thermocouple Cable	Mtr.	2000	2000
120	20P Thermocouple Cable	Mtr.	2000	2000
121	Multipair Instrumentation Cable	Mtr.	10300	10300
122	Coaxial Cable	Mtr.	1680	1680
123	Ethernet Cable	Mtr.	800	800
124	Optical Fibre Cable	Mtr.	300	300
	CABLE TRAYSCOMPLETE WITH COUPLER PLATES, FASTENERS, CLAMPS AND FIXING HARDWARES ETC ERECTION INCLUDING SUPPORT & COVERS FABRICATION			
125	Ladder/ Perforated type Cable tray, W=50mm	Mtr	2600	2600
126	Ladder/ Perforated type Cable tray, W=100mm	Mtr	2900	2900
127	Ladder/ Perforated type Cable tray, W=150mm	Mtr	4176	4176
	IMPULSE PIPES/ TUBES ALONG WITH FITTINGS			
128	CS Pipe Size :21.3x3.73	Mtr	1130	1130

129	CS Pipe Size : 16x2.6	mtr	1500	1500
130	CS Pipe Size :60.3x3.91	Mtr	130	130
131	SS Pipe Size : 26.7x7.82	Mtr	60	60
132	AS Pipe Size: 21.3x3.73	Mtr	150	150
133	CS Pipe Size :21.3x7.47	Mtr	30	30
134	CS Pipe Size :21.3x4.78	Mtr	200	200
135	Cr-Al Pipe Size : 21.3x3.73	Mtr	500	500
136	SS Tube Size : 12.7 x 2.1	Mtr	2000	2000
137	SS Tube Size : 6X1.5	Mtr	70	70
138	CS Tube 88.9 X 4	Mtr	80	80
139	CS Tube 13.5X2.6	Mtr	304	304
140	CS Tube 21.3X2.3	Mtr	160	160
141	CS Tube 33.7X3.38	Mtr	2	2
142	AS Tube 13.5X2.6	Mtr	103	103
143	AS Tube 21.3X2.77	Mtr	310	310
144	T91 Tube 13.5x2.6	Mtr	39	39
145	T91 Tube 21.3x7.47	Mtr	350	350
146	1/2” CS Pipe SCH 80	Mtr	1800	1800
147	1/2” CS Pipe SCH 160	Mtr	250	250
148	3/4” CS Pipe SCH 80	Mtr.	2050	2050
149	3/4” AS Pipe SCH 80	Mtr.	400	400
150	1/2” AS Pipe SCH 160	Mtr	850	850
151	GI pipe ½” NB	Mtr	3650	3650
152	1/2" OD SEAMLESS COPPER TUBE	Mtr	2310	2310
153	1/4" OD COPPER TUBE	Mtr	740	740
154	3/4" OD COPPER TUBE	Mtr	40	40
155	1" OD COPPER TUBE	Mtr	50	50
156	1/4" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	115	115

157	1/2" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	15	15
158	1" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	5	5
159	1/2" ID PVC HOSE PIPE	Mtr	108	108
	JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS			
160	JB 12 way	No.	20	20
161	JB 24 way	No.	205	205
162	JB 48 way	No.	97	97
163	JB 72 way	No.	43	43
164	FRP JUNCTION BOX FOR 4TT-JB-A&B	No.	43	43
165	FRP JUNCTION BOX FOR 8TT-JB-A&B	No.	14	14
166	**COMMISSIONING/CALIBRATION/TESTING of control valves, on/off valves, /pneumatic valves, actuators, power cylinders etc.**			
167	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
168	Pulversier Lube oil System. The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc.approx..instrument per set RTD's (Duplex PT 100) -10 Nos Temp. gauge -2 Nos Pr. Transmitter -4 Nos Diff. Pr. Transmitter -2 Nos Pr. Gauge -5 Nos Level Transmitter -2 Nos Level gauge -1 Nos Flow Transmitter -2 Nos	Set	9	9
169	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 Switch with Local Indicator Pr. Gauge - 13 Nos Temp. gauge - 06 Nos Pr. Transmitter - 02 Nos	Set	6	6

	Level Transmitter - 04 Nos			
	Flow Indicator with Flow Switch - 01 No.			
	DP Gauge - 01 No			
	DP Switch - 01 No			
	Pr. Switch - 4 Nos			
	Level Switch - 02 Nos			
	Flow Indicator cum transmitter- 03 Nos			
	Flow Indicator - 03 Nos			
170	Commissioning of Pneumatic Actuators	Nos	26	26
171	Commissioning of Electric Actuators	Nos	6	6
172	Commissioning of Globe Valves/ Manual operated Gate valves /Control valves	Nos	125	125
173	Commissioning of motor operated dampers	Nos	15	15
174	Commissioning of Solenoid Valves	Nos	272	272
175	Commissioning of Pneumatic Dampers/ SADC	Nos	153	153
176	Commissioning of Power Cylinders	Nos	14	14

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-in charge.

ANNEXURE-A

RATE SCHEDULE FOR "PACKAGE-A (UNIT NO. 1)"

ITEM NO.	DESCRIPTION OF WORK	TOTAL VALUE "A" IN INR (IN FIGURES AND WORDS)
1.0	TOTAL LUMPSUM PRICE OF PACKAGE 'A' FOR " ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF PACKAGE-A (UNIT NO. 1) OF 2X800 MW GADARWARA STPP, DISTT-NARSINGHPUR (M.P.)	

Notes:

1. **The rates of individual item for the entire scope of work as define in BOQ Chapter X shall be arrived as per Calculation defined in Annexure-B.**
2. **The derived item rate will remain firm throughout the contract period.**

ANNEXURE-B

FOR PACKAGE- 'A' CALCULATION RATIO FOR DIFFERENT ITEMS BASED UPON TOTAL QUOTED VALUE AS PER RATE SCHEDULE OF ANNEXURE-A					
SL NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**Factor**	**Item Rate (in INR) = (A*Factor)/ 1000000**
	PANELS/RACKS/CONSOLES				
	SG & TG CONTROL PANEL				
1	suit of one panel (approx. weight 400kg, 750(L) X 800(B) X 2415(H) mm	No.	4	560.442	
2	TG Siemens Panel (suit of one panel) (approx. weight 300kg, 1200(L) X 800(B) X 2200(H) mm	No.	9	560.437	
3	suit of two panels (approx. weight 800kg, 1500(L) X 800(B) X 2415(H) mm	No.	11	962.614	
4	suit of three panels (approx. weight 1200kg, 2250(L) X 800(B) X 2415(H) mm	No.	10	1306.618	
5	suit of Four panels (approx. weight 1600kg, 3000(L) X 800(B) X 2415(H) mm	No.	8	5491.150	
6	suit of five panels (approx. weight 2000kg, 3750(L) X 800(B) X 2415(H) mm	No.	2	1705.598	
7	DAVR panel (approx. 4053x800x2145 mm)	No.	1	3777.744	
8	Steam Leak Detection System Panel alongwith PC Station Size - 800x2315x800	No.	1	1594.987	
9	BLR. MAINTANENCE SYSTEM -NOTE BOOK PC	No	1	173.800	
10	DC SCANNER AIR FAN STARTER Size - 900X1120X375 mm	No	1	841.015	
11	Gas Analyser cabinet 2200x1000x800	No.	1	494.622	
12	CARBON-IN-ASH ANALYSER CONTROL CABINET	No	1	557.048	
13	ON LINE COAL FLOW MEASUREMENT SYSTEM -CONTROL CABINET	No	5	976.674	

	Size -1200x1600x500				
14	ON LINE COAL FLOW MEASUREMENT SYSTEM -PC	No	1	172.789	
15	Coal Flow Monitor Assembly	Nos	9	473.796	
16	DC Starter Cubicle 2000mm X 1500mm X 450mm	No	2	469.197	
17	Open type transmitter rack 2000mm X 1250mm X 600mm	Nos	12	303.171	
18	Governing console board 1200mm X1900mm X 450mm	No	2	773.025	
19	**INSTRUMENTATION PANEL (ALSTOM SUPPLY)**				
19.1	RACK-12RX-1,4 WITH 1 JBS,1 UB ,INST HARD	No	2	303.171	
19.2	RACK-8RX-2,3 WITH 1JBS,1 UB ,INST HARDW	No	2	303.171	
19.3	RACK-4RX-5 WITH 1 JBS,1 UB ,INST HARDWAR	No	1	303.171	
19.4	ENCLOSURE-10EX-1 WITH 1 JB, 1 UB ,INST H	No	1	303.171	
20	Acoustic Steam leak detection system panel(ASLD)	No	1	1557.968	
21	Acoustic pyrometer remote cabinet including PC station (Size -1400 x 2365 x800 mm)	Set	1	700.028	
22	FTP LOCAL STARTER Box 650x1000x300 mm	No.	2	367.629	
23	Elevator control Panel	No.	2	388.628	
24	SCANNER AIR FAN STARTER	No.	1	841.015	
25	HART Management System for SMART Transmitter Panel dimension 1200X800X2415 mm	Set	1	2462.048	
26	AH Main Control Panel Size -1830x1881x611 mm Weight - 363 Kgs	No.	2	532.148	
27	AH LCS Sector Plate 1&2 Drive Panel Size -645x610x203 mm Weight - 45 Kgs	No.	8	294.188	
28	HWL-1,HWL-2 & MEFCV PANEL Size - 600X600X250 mm	No.	1	492.139	

	Weight - 100 kg				
29	SOOT BLOWER MCC Size - 22100x2250x1000 mm	No.	1	7067.580	
30	Furnace Flame Viewing System –Remote Panel Size -800x2100x600 mm Weight- 500 Kgs	No	1	610.047	
31	Furnace Flame Viewing System –Camera Control Box Size -1220x1470x610 mm Weight -100 Kgs	No	4	661.295	
32	Furnace Flame Viewing System –Zoom Control Box Size -400x300x210 mm Weight -27 Kgs	No	1	409.149	
33	Gr. Feeder Remote Panel Size- 1200x2315x600	No	9	649.461	
34	Gr. Feeder Integral Panel Size- 600x750x350	No	9	280.137	
35	Relay based Lube Oil Purifier Control Cabinet Size - 1400x800x300	No	1	557.048	
36	SAG Cabinet in CCR	No.	1	557.048	
37	**Moisture Measuring System**				
37.1	Indicator cum controller placed in Control Room & Sampling System in Field	No.	1	757.847	
38	H2 Gas Analyser Cabinet Size- 2200x1000x800	No.	2	407.568	
39	GROUND BRUSH MONITORING SYSTEM Size - 400 X 320 X 120	Set	1	430.683	
40	STARTING RESISTOR FOR DC SEAL OIL MOTOR Size - 650 X 600 X 600	No.	1	469.155	
	PADO + SIMULATOR				
41	Servers for PADO	Nos	6	636.574	
42	Workstations for PADO clients	Nos	10	172.789	
43	Printers(A4 & A3 Colour Laser Jet, Inkjet, Dot Matrix) With Printer Table and accessories	No.	11	62.078	
44	Computer Tables alongwith chairs	No.	20	1131.797	
45	UTPC Cables	Mtr	1600	0.829	
	HMI HARDWARES				
46	Online UPS alongwith Cabinet for Servers	Nos	4	636.574	

47	Workstations for clients	Nos	12	172.789	
48	Unit Control Desk for HMI Workstations	Nos	1	3334.645	
49	CCTV system (4 cameras, 4 local control boxes, Remote panel)	Set	1	2121.913	
50	**24V DC PS System each set comprising of 4X100% Rectifier Banks , 1X100% DCDB and 1 battery Health Monitoring System (SG & TG C&I)**	Set	2	3384.876	
51	**UPS DISTRIBUTION BOARDS**				
51.1	240V UPS DISTRIBUTION BOARDS Size- 1400X2365X800 mm	No.	1	354.196	
51.2	240V UPS DISTRIBUTION BOARDS Size- 1200x800x600 mm	No.	4	354.196	
52	**AC CONTROL SUPPLY PANEL 1000mm(W) x 800mm(D) x 2315mm(H)**	No.	1	558.778	
	LIE/LIR/LGB				
53	Local Instrument racks (LIR) Type B Size- 2200X1330X800 mm	No.	6	298.889	
54	Local Instrument racks (LIR) Type C Size - 2200x1010x800 mm	No.	25	294.183	
55	LOCAL INSTRUMENT RACK , Type-B Size - 1330x800x2300 mm	No.	2	298.889	
56	LOCAL INSTRUMENT RACK 2400x500x2200		6	303.171	
57	LOCAL INSTRUMENT RACK 1500x500x1600	No.	2	303.171	
58	Local Instrument enclosures (LIE), Type-A Size - 1250x2300x800	No	1	352.697	
59	Local Instrument enclosures (LIE), Type-B Size - 930x2300x800	No	3	298.889	
60	Local Gauge Board (LGB)	No.	14	356.046	
61	**PRESSURE INSTRUMENTS RACKS** 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	No	10	251.098	

	INSTALLATION,CALIBRATION & COMMISSIOING OF LOCAL/FIELD INSTRUMENTATION/EQUIPMENT				
62	Temperature gauges/Pressure gauges/ Diff. Pressure gauge	No.	1039	26.361	
63	Temp. Transmitter /Pressure Transmitters / Differential pressure/Position transmitters	No.	1050	36.773	
64	Level Transmitter/Level gauge	No.	32	81.172	
65	Vibration Transducers/Monitor/ Detectors/Element	No.	68	45.987	
66	Temp. switches/Pressure switches /DP switches	No.	79	32.287	
67	Proximitors	No.	32	32.406	
68	E/P Transducers	No.	8	46.003	
69	Limit Switches	No.	125	18.579	
70	Speed Switch/Speed Detector	No.	9	56.098	
71	Flow meters/Flow transmitters	No.	2	74.079	
72	Axial shift Detector	No.	3	73.397	
73	Shaft Expansion Detedtor	No.	4	73.397	
74	Casing Expansion Detedtor	No.	2	73.397	
75	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments/ Field Switches (RF Type)	No.	89	86.177	
76	Electronic/Guided Wave Radar /Ultrasonic type level Transmitters	No.	175	89.757	
77	ERV Controller Box Size -508x610x279 mm	No.	6	778.084	
78	FSSS SCANNER HEAD ASSY WITH ELECTRONICS	No.	40	123.633	
79	FLAME SCANNER 19" SINGLE EURO CARD RACK WITH ELECTRONICS 431.3mm(W) x 205mm(D) x 128mm(H)	No.	10	123.055	
80	FSSS LGM SWITCH BOX	NO	20	65.175	
81	Oxygen analyser	Set	4	422.359	
82	Thermocouples(K/R type)	No.	467	66.964	
83	Cr Al Thermocouple	No.	24	31.375	
84	RTDs	No.	561	30.231	
85	Thermowells	No.	288	24.742	
86	Thermometer(Bimettalic)/Gas filled/MIS	No.	48	25.571	
87	MTM Thermo Couple up to 48 M (duplex)	No.	772	72.726	

88	Burner Tilt shear pin failure indication box	No.	4	114.729	
89	Furnace temp. Probe starter boxes	No.	2	153.941	
90	Air Filter Regulators	No.	92	24.512	
91	**INSTALLATION & FABRICATION OF STRUCTURAL STEEL**	MT	1	895.280	
	CONTROL/SIGNAL/SCREENED/POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION				
	LT Sheilded /Screened Cable//FRLS/Power cable				
92	2P X 0.5 SQ MM	Mtr	28450	0.443	
93	2P X 1.3 /1.5 SQ MM	Mtr	14000	0.495	
94	4P X 0.5 SQ MM	Mtr	184150	0.549	
95	8P X 0.5 SQ MM	Mtr	76500	0.735	
96	12P X 0.5 SQ MM	Mtr	21700	0.788	
97	2C X 2.5 SQ MM	Mtr	15700	0.405	
98	3C X 2.5 SQ MM	Mtr	86200	0.405	
99	5C X 2.5 SQ MM	Mtr	6000	0.487	
100	7C X 2.5 SQ MM	Mtr	13000	0.536	
101	10C X 2.5 SQ MM	Mtr	12500	0.592	
102	16C X 2.5 SQ MM	Mtr	3500	0.904	
103	19C X 1.5 SQ MM	Mtr	7200	0.933	
104	4C X 1.5/2.5 MM CONTROL CABLE	Mtr	12380	0.593	
105	6C X 1.5/2.5 CONTROL CABLE	Mtr	380	0.604	
106	18C X 1.5/2.5 CONTROL CABLE	Mtr	7580	0.604	
	LT XLPE Power Cables				
107	1C - 25- CU ARMOURED LT XLPE CABLE	Mtr.	5500	0.628	
108	2C-50- AL POWER CABLE	Mtr.	750	0.644	
109	2C-25- AL POWER CABLE	Mtr.	1000	0.717	
110	2C-10- AL POWER CABLE	Mtr.	3000	0.605	
111	3C - 35- AL ARMOURED LT XLPE CABLE	Mtr.	830	0.724	
112	3C X 16 SQ MM	Mtr	2600	0.724	
113	4C - 1.5 -AL- ARMPURED LT XLPE CABLE	Mtr.	1400	0.382	
114	1C - 95- CU ARMOURED LT XLPE CABLE	Mtr.	6670	2.577	
115	1C - 630- CU ARMOURED LT XLPE CABLE	Mtr.	500	3.698	
116	4C - 2.5- CU ARMOURED LT XLPE CABLE	Mtr.	10000	0.724	
117	2P - 0.5 SQMM - T/C EXTENSION CABLE	Mtr.	6500	0.471	
118	2P Thermocouple Cable	Mtr.	7200	0.519	
119	16P Thermocouple Cable	Mtr.	2000	0.424	
120	20P Thermocouple Cable	Mtr.	2000	0.402	
121	Multipair Instrumentation Cable	Mtr.	10300	0.400	

122	Coaxial Cable	Mtr.	1680	0.829	
123	Ethernet Cable	Mtr.	800	0.667	
124	Optical Fibre Cable	Mtr.	300	2.174	
	CABLE TRAYSCOMPLETE WITH COUPLER PLATES, FASTENERS, CLAMPS AND FIXING HARDWARES ETC ERECTION INCLUDING SUPPORT & COVERS FABRICATION				
125	Ladder/ Perforated type Cable tray, W=50mm	Mtr	2600	3.602	
126	Ladder/ Perforated type Cable tray, W=100mm	Mtr	2900	4.405	
127	Ladder/ Perforated type Cable tray, W=150mm	Mtr	4176	4.993	
	IMPULSE PIPES/ TUBES ALONG WITH FITTINGS				
128	CS Pipe Size :21.3x3.73	Mtr	1130	7.866	
129	CS Pipe Size : 16x2.6	mtr	1500	7.847	
130	CS Pipe Size :60.3x3.91	Mtr	130	9.981	
131	SS Pipe Size : 26.7x7.82	Mtr	60	6.085	
132	AS Pipe Size: 21.3x3.73	Mtr	150	5.754	
133	CS Pipe Size :21.3x7.47	Mtr	30	7.847	
134	CS Pipe Size :21.3x4.78	Mtr	200	7.847	
135	Cr-Al Pipe Size : 21.3x3.73	Mtr	500	7.351	
136	SS Tube Size : 12.7 x 2.1	Mtr	2000	6.108	
137	SS Tube Size : 6X1.5	Mtr	70	6.743	
138	CS Tube 88.9 X 4	Mtr	80	7.261	
139	CS Tube 13.5X2.6	Mtr	304	5.603	
140	CS Tube 21.3X2.3	Mtr	160	6.365	
141	CS Tube 33.7X3.38	Mtr	2	8.023	
142	AS Tube 13.5X2.6	Mtr	103	12.898	

143	AS Tube 21.3X2.77	Mtr	310	5.760	
144	T91 Tube 13.5x2.6	Mtr	39	13.335	
145	T91 Tube 21.3x7.47	Mtr	350	13.335	
146	1/2” CS Pipe SCH 80	Mtr	1800	6.859	
147	1/2” CS Pipe SCH 160	Mtr	250	7.153	
148	3/4” CS Pipe SCH 80	Mtr.	2050	8.175	
149	3/4” AS Pipe SCH 80	Mtr.	400	8.129	
150	1/2” AS Pipe SCH 160	Mtr	850	8.178	
151	GI pipe ½” NB	Mtr	3650	3.913	
152	1/2" OD SEAMLESS COPPER TUBE	Mtr	2310	3.668	
153	1/4" OD COPPER TUBE	Mtr	740	2.258	
154	3/4" OD COPPER TUBE	Mtr	40	2.258	
155	1" OD COPPER TUBE	Mtr	50	0.849	
156	1/4" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	115	8.084	
157	1/2" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	15	14.315	
158	1" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	5	16.167	
159	1/2" ID PVC HOSE PIPE	Mtr	108	14.205	
	JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS				
160	JB 12 way	No.	20	46.431	
161	JB 24 way	No.	205	46.670	
162	JB 48 way	No.	97	61.185	
163	JB 72 way	No.	43	61.977	
164	FRP JUNCTION BOX FOR 4TT-JB-A&B	No.	43	53.761	
165	FRP JUNCTION BOX FOR 8TT-JB-A&B	No.	14	53.761	
166	**COMMISSIONING/CALIBRATION/TESTING of control valves, on/off valves, /pneumatic valves, actuators, power cylinders etc.**				
167	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	3486.789	
168	Pulversier Lube oil System. The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc.approx..instrument per set RTD's (Duplex PT 100) -10 Nos	Set	9	364.644	

	Temp. gauge -2 Nos Pr. Transmitter -4 Nos Diff. Pr. Transmitter -2 Nos Pr. Gauge -5 Nos Level Transmitter -2 Nos Level gauge -1 Nos Flow Transmitter -2 Nos				
169	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 Switch with Local Indicator Pr. Gauge - 13 Nos Temp. gauge - 06 Nos Pr. Transmitter - 02 Nos Level Transmitter - 04 Nos Flow Indicator with Flow Switch - 01 No. DP Gauge - 01 No DP Switch - 01 No Pr. Switch - 4 Nos Level Switch - 02 Nos Flow Indicator cum transmitter- 03 Nos Flow Indicator - 03 Nos	Set	6	537.641	
170	Commissioning of Pneumatic Actuators	Nos	26	46.276	
171	Commissioning of Electric Actuators	Nos	6	53.686	
172	Commissioning of Globe Valves/ Manual operated Gate valves /Control valves	Nos	125	59.413	
173	Commissioning of motor operated dampers	Nos	15	113.959	
174	Commissioning of Solenoid Valves	Nos	272	43.500	
175	Commissioning of Pneumatic Dampers/ SADC	Nos	153	91.033	
176	Commissioning of Power Cylinders	Nos	14	51.186	

Note: Item Rate will be calculated as below:

$$\frac{A \times \text{Factor}}{10,00,000}$$

Where A= Lumpsum Quoted value as per **Annexure-A**

ANNEXURE-C

RATE SCHEDULE FOR "PACKAGE-B (UNIT NO. 2)"

ITEM NO.	DESCRIPTION OF WORK	TOTAL VALUE "B" IN INR (IN FIGURES AND WORDS)
1.0	**TOTAL LUMPSUM PRICE OF PACKAGE 'B' FOR " ERECTION, TESTING, COMMISSIONING & HANDING OVER OF ALL C&I EQUIPMENTS OF PACKAGE-B (UNIT NO. 2) OF 2X800 MW GADARWARA STPP, DISTT-NARSINGHPUR (M.P.)**	

Notes:

1. **The rates of individual item for the entire scope of work as define in BOQ Chapter X shall be arrived as per Calculation defined in Annexure-D.**

2. **The derived item rate will remain firm throughout the contract period.**

ANNEXURE-D

FOR PACKAGE- 'B' CALCULATION RATIO FOR DIFFERENT ITEMS BASED UPON TOTAL QUOTED VALUE AS PER RATE SCHEDULE OF ANNEXURE-C					
SL NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**FACTOR**	**Item Rate (in INR) = (B*Factor)/ 1000000**
	PANELS/RACKS/CONSOLES				
	SG & TG CONTROL PANEL				
1	suit of one panel (approx. weight 400kg, 750(L) X 800(B) X 2415(H) mm	No.	3	573.004	
2	TG Siemens Panel (suit of one panel) (approx. weight 300kg, 1200(L) X 800(B) X 2200(H) mm	No.	9	572.998	
3	suit of two panels (approx. weight 800kg, 1500(L) X 800(B) X 2415(H) mm	No.	5	984.19	
4	suit of three panels (approx. weight 1200kg, 2250(L) X 800(B) X 2415(H) mm	No.	7	1335.9	
5	suit of Four panels (approx. weight 1600kg, 3000(L) X 800(B) X 2415(H) mm	No.	8	5614.23	
6	suit of five panels (approx. weight 2000kg, 3750(L) X 800(B) X 2415(H) mm	No.	2	1743.83	
7	DAVR panel (approx. 4053x800x2145 mm)	No.	1	3862.42	
8	Steam Leak Detection System Panel alongwith PC Station Size - 800x2315x800	No.	1	1631.366	
9	DC SCANNER AIR FAN STARTER Size - 900X1120X375 mm	No	1	859.866	
10	Gas Analyser cabinet 2200x1000x800	No.	1	505.709	
11	CARBON-IN-ASH ANALYSER CONTROL CABINET	No	1	569.534	
12	ON LINE COAL FLOW MEASUREMENT SYSTEM -CONTROL CABINET	No	5	998.565	

	Size -1200x1600x500				
13	ON LINE COAL FLOW MEASUREMENT SYSTEM -PC	No	1	176.661	
14	Coal Flow Monitor Assembly	Nos	9	484.416	
15	DC Starter Cubicle 2000mm X 1500mm X 450mm	No	2	479.714	
16	Open type transmitter rack 2000mm X 1250mm X 600mm	Nos	12	309.967	
17	Governing console board 1200mm X1900mm X 450mm	No	2	790.351	
18	**INSTRUMENTATION PANEL (ALSTOM SUPPLY)**				
18.1	RACK-12RX-1,4 WITH 1 JBS,1 UB ,INST HARD	No	2	309.967	
18.2	RACK-8RX-2,3 WITH 1JBS,1 UB ,INST HARDW	No	2	309.967	
18.3	RACK-4RX-5 WITH 1 JBS,1 UB ,INST HARDWAR	No	1	309.967	
18.4	ENCLOSURE-10EX-1 WITH 1 JB, 1 UB ,INST H	No	1	309.967	
19	Acoustic Steam leak detection system panel(ASLD)	No	1	1592.89	
20	Acoustic pyrometer remote cabinet including PC station (Size -1400 x 2365 x800 mm)	Set	1	715.719	
21	FTP LOCAL STARTER Box 650x1000x300 mm	No.	2	375.869	
22	Elevator control Panel	No.	2	397.339	
23	SCANNER AIR FAN STARTER	No.	1	859.866	
24	HART Management System for SMART Transmitter Panel dimension 1200X800X2415 mm	Set	1	2517.23	
25	AH Main Control Panel	No.	2	544.075	

	Size -1830x1881x611 mm Weight - 363 Kgs				
26	AH LCS Sector Plate 1&2 Drive Panel Size -645x610x203 mm Weight - 45 Kgs	No.	8	300.782	
27	HWL-1,HWL-2 & MEFCV PANEL Size - 600X600X250 mm Weight - 100 kg	No.	1	503.17	
28	SOOT BLOWER MCC Size - 22100x2250x1000 mm	No.	1	7225.99	
29	Furnace Flame Viewing System –Remote Panel Size -800x2100x600 mm Weight- 500 Kgs	No	1	623.72	
30	Furnace Flame Viewing System –Camera Control Box Size -1220x1470x610 mm Weight -100 Kgs	No	4	676.117	
31	Furnace Flame Viewing System –Zoom Control Box Size -400x300x210 mm Weight -27 Kgs	No	1	418.32	
32	Gr. Feeder Remote Panel Size- 1200x2315x600	No	9	664.018	
33	Gr. Feeder Integral Panel Size- 600x750x350	No	9	286.416	
34	Relay based Lube Oil Purifier Control Cabinet Size - 1400x800x300	No	1	569.534	
35	SAG Cabinet in CCR	No.	1	569.534	
36	**Moisture Measuring System**				
36.1	Indicator cum controller placed in Control Room & Sampling System in Field	No.	1	774.834	
37	H2 Gas Analyser Cabinet Size- 2200x1000x800	No.	2	416.703	
38	GROUND BRUSH MONITORING SYSTEM Size - 400 X 320 X 120	Set	1	440.336	

39	STARTING RESISTOR FOR DC SEAL OIL MOTOR Size - 650 X 600 X 600	No.	1	479.671	
	PADO + SIMULATOR				
40	Printers(A4 & A3 Colour Laser Jet, Inkjet, Dot Matrix) With Printer Table and accessories	No.	11	63.4697	
41	Computer Tables alongwith chairs	No.	20	1157.17	
	HMI HARDWARES				
42	Unit Control Desk for HMI Workstations	Nos	1	3409.39	
43	CCTV system (4 cameras, 4 local control boxes, Remote panel)	Set	1	2169.47	
44	**24V DC PS System each set comprising of 4X100% Rectifier Banks , 1X100% DCDB and 1 battery Health Monitoring System (SG & TG C&I)**	Set	2	3460.74	
45	**UPS DISTRIBUTION BOARDS**				
45.1	240V UPS DISTRIBUTION BOARDS Size- 1400X2365X800 mm	No.	1	362.135	
45.2	240V UPS DISTRIBUTION BOARDS Size- 1200x800x600 mm	No.	4	362.135	
46	**AC CONTROL SUPPLY PANEL 1000mm(W) x 800mm(D) x 2315mm(H)**	No.	1	571.303	
	LIE/LIR/LGB				
47	Local Instrument racks (LIR) Type B Size- 2200X1330X800 mm	No.	6	305.588	
48	Local Instrument racks (LIR) Type C Size - 2200x1010x800 mm	No.	25	300.776	
49	LOCAL INSTRUMENT RACK , Type-B Size - 1330x800x2300 mm	No.	2	305.588	
50	LOCAL INSTRUMENT RACK 2400x500x2200		6	309.967	
51	LOCAL INSTRUMENT RACK 1500x500x1600	No.	2	309.967	
52	Local Instrument enclosures (LIE), Type-A Size - 1250x2300x800	No	1	360.602	
53	Local Instrument enclosures (LIE), Type-B	No	3	305.588	

	Size - 930x2300x800				
54	Local Gauge Board (LGB)	No.	14	364.027	
55	**PRESSURE INSTRUMENTS RACKS** 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	No	10	256.726	
	INSTALLATION,CALIBRATION& COMMISSIOINGOFLOCAL/FIELD INSTRUMENTATION/EQUIPMENT				
56	Temperature gauges/Pressure gauges/ Diff. Pressure gauge	No.	1039	26.9519	
57	Temp. Transmitter /Pressure Transmitters / Differential pressure/Position transmitters	No.	1050	37.597	
58	Level Transmitter/Level gauge	No.	32	82.9911	
59	Vibration Transducers/Monitor/ Detectors/Element	No.	68	47.0181	
60	Temp. switches/Pressure switches /DP switches	No.	79	33.011	
61	Proximitors	No.	32	33.1326	
62	E/P Transducers	No.	8	47.0342	
63	Limit Switches	No.	125	18.995	
64	Speed Switch/Speed Detector	No.	9	57.355	
65	Flow meters/Flow transmitters	No.	2	75.739	
66	Axial shift Detector	No.	3	75.0417	
67	Shaft Expansion Detector	No.	4	75.0417	
68	Casing Expansion Detedtor	No.	2	75.0417	
69	Level switch/Level switch(Conductivity type)/ Level switch(Float type) / Level Instruments/ Field Switches (RF Type)	No.	89	88.1083	
70	Electronic/Guided Wave Radar /Ultrasonic type level Transmitters	No.	175	91.7687	
71	ERV Controller Box Size -508x610x279 mm	No.	6	795.524	

72	FSSS SCANNER HEAD ASSY WITH ELECTRONICS	No.	40	126.404	
73	FLAME SCANNER 19" SINGLE EURO CARD RACK WITH ELECTRONICS 431.3mm(W) x 205mm(D) x 128mm(H)	No.	10	125.813	
74	FSSS LGM SWITCH BOX	NO	20	66.636	
75	Oxygen analyser	Set	4	431.826	
76	Thermocouples(K/R type)	No.	467	68.4647	
77	Cr Al Thermocouple	No.	24	32.0787	
78	RTDs	No.	561	30.9089	
79	Thermowells	No.	288	25.2961	
80	Thermometer(Bimettalic)/Gas filled/MIS	No.	48	26.1439	
81	MTM Thermo Couple up to 48 M (duplex)	No.	772	74.3559	
82	Burner Tilt shear pin failure indication box	No.	4	117.301	
83	Furnace temp. Probe starter boxes	No.	2	157.391	
84	Air Filter Regulators	No.	92	25.0609	
85	**INSTALLATION & FABRICATION OF STRUCTURAL STEEL**	MT	1	915.347	
	CONTROL/SIGNAL/SCREENED/POWER CABLES LAYING,DRESSING,CLAMPING & TERMINATION				
	LT Sheilded /Screened Cable//FRLS/Power cable				
86	2P X 0.5 SQ MM	Mtr	28450	0.45294	
87	2P X 1.3 /1.5 SQ MM	Mtr	14000	0.50585	
88	4P X 0.5 SQ MM	Mtr	184150	0.5613	
89	8P X 0.5 SQ MM	Mtr	76500	0.75097	
90	12P X 0.5 SQ MM	Mtr	21700	0.80611	
91	2C X 2.5 SQ MM	Mtr	15700	0.41415	
92	3C X 2.5 SQ MM	Mtr	86200	0.41415	
93	5C X 2.5 SQ MM	Mtr	6000	0.49831	
94	7C X 2.5 SQ MM	Mtr	13000	0.54759	
95	10C X 2.5 SQ MM	Mtr	12500	0.60545	
96	16C X 2.5 SQ MM	Mtr	3500	0.92438	
97	19C X 1.5 SQ MM	Mtr	7200	0.95417	
98	4C X 1.5/2.5 MM CONTROL CABLE	Mtr	12380	0.60611	
99	6C X 1.5/2.5 CONTROL CABLE	Mtr	380	0.61714	

100	18C X 1.5/2.5 CONTROL CABLE	Mtr	7580	0.61714	
	LT XLPE Power Cables				
101	1C - 25- CU ARMOURED LT XLPE CABLE	Mtr.	5500	0.64173	
102	2C-50- AL POWER CABLE	Mtr.	750	0.65828	
103	2C-25- AL POWER CABLE	Mtr.	1000	0.73328	
104	2C-10- AL POWER CABLE	Mtr.	3000	0.61873	
105	3C - 35- AL ARMOURED LT XLPE CABLE	Mtr.	830	0.74056	
106	3C X 16 SQ MM	Mtr	2600	0.74056	
107	4C - 1.5 -AL- ARMPURED LT XLPE CABLE	Mtr.	1400	0.39051	
108	1C - 95- CU ARMOURED LT XLPE CABLE	Mtr.	6670	2.63504	
109	1C - 630- CU ARMOURED LT XLPE CABLE	Mtr.	500	3.78053	
110	4C - 2.5- CU ARMOURED LT XLPE CABLE	Mtr.	10000	0.74056	
111	2P - 0.5 SQMM - T/C EXTENSION CABLE	Mtr.	6500	0.48119	
112	2P Thermocouple Cable	Mtr.	7200	0.53051	
113	16P Thermocouple Cable	Mtr.	2000	0.43389	
114	20P Thermocouple Cable	Mtr.	2000	0.41142	
115	Multipair Instrumentation Cable	Mtr.	10300	0.41142	
116	Coaxial Cable	Mtr.	1680	0.84783	
117	Ethernet Cable	Mtr.	800	0.68171	
118	Optical Fibre Cable	Mtr.	300	2.22241	
	CABLE TRAYSCOMPLETE WITH COUPLER PLATES, FASTENERS, CLAMPS AND FIXING HARDWARES ETC ERECTION INCLUDING SUPPORT & COVERS FABRICATION				
119	Ladder/ Perforated type Cable tray, W=50mm	Mtr	2600	3.68314	
120	Ladder/ Perforated type Cable tray, W=100mm	Mtr	2900	4.50401	
121	Ladder/ Perforated type Cable tray, W=150mm	Mtr	4176	5.105282	
	IMPULSE PIPES/ TUBES ALONG WITH FITTINGS				
122	CS Pipe	Mtr	1130	8.04274	

	Size :21.3x3.73				
123	CS Pipe Size : 16x2.6	mtr	1500	8.02276	
124	CS Pipe Size :60.3x3.91	Mtr	130	10.2048	
125	SS Pipe Size : 26.7x7.82	Mtr	60	6.2212	
126	AS Pipe Size: 21.3x3.73	Mtr	150	5.88336	
127	CS Pipe Size :21.3x7.47	Mtr	30	8.02276	
128	CS Pipe Size :21.3x4.78	Mtr	200	8.02276	
129	Cr-Al Pipe Size : 21.3x3.73	Mtr	500	7.51614	
130	SS Tube Size : 12.7 x 2.1	Mtr	2000	6.2444	
131	SS Tube Size : 6X1.5	Mtr	70	6.89372	
132	CS Tube 88.9 X 4	Mtr	80	7.42394	
133	CS Tube 13.5X2.6	Mtr	304	5.72828	
134	CS Tube 21.3X2.3	Mtr	160	6.50755	
135	CS Tube 33.7X3.38	Mtr	2	8.20278	
136	AS Tube 13.5X2.6	Mtr	103	13.1876	
137	AS Tube 21.3X2.77	Mtr	310	5.88882	
138	T91 Tube 13.5x2.6	Mtr	39	13.6341	
139	T91 Tube 21.3x7.47	Mtr	350	13.6341	
140	1/2” CS Pipe SCH 80	Mtr	1800	7.01311	
141	1/2” CS Pipe SCH 160	Mtr	250	7.31354	
142	3/4” CS Pipe SCH 80	Mtr.	2050	8.35791	
143	3/4” AS Pipe SCH 80	Mtr.	400	8.31076	
144	1/2” AS Pipe SCH 160	Mtr	850	8.36082	
145	GI pipe ½” NB	Mtr	3650	4.0004	
146	1/2" OD SEAMLESS COPPER TUBE	Mtr	2310	3.75026	
147	1/4" OD COPPER TUBE	Mtr	740	2.30903	
148	3/4" OD COPPER TUBE	Mtr	40	2.30903	
149	1" OD COPPER TUBE	Mtr	50	0.86779	

150	1/4" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	115	8.26478	
151	1/2" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	15	14.6356	
152	1" SIZE SS DOUBLE BRAIDED TEFLON HOSE	Nos	5	16.5298	
153	1/2" ID PVC HOSE PIPE	Mtr	108	14.5233	
	JUNCTION BOXES/INDICATION BOXES/LOCAL CONTROL STATIONS				
154	JB 12 way	No.	20	47.4716	
155	JB 24 way	No.	205	47.716	
156	JB 48 way	No.	97	62.5567	
157	JB 72 way	No.	43	63.3664	
158	FRP JUNCTION BOX FOR 4TT-JB-A&B	No.	43	54.9662	
159	FRP JUNCTION BOX FOR 8TT-JB-A&B	No.	14	54.9662	
160	**COMMISSIONING/CALIBRATION/TESTING of control valves, on/off valves, /pneumatic valves, actuators, power cylinders etc.**				
161	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	3564.94	
162	Pulversier Lube oil System. The scope of work includes removal of instruments calibration, refixing, checking cable connection from JB to instruments etc.approx..instrument per set RTD's (Duplex PT 100) -10 Nos Temp. gauge -2 Nos Pr. Transmitter -4 Nos Diff. Pr. Transmitter -2 Nos Pr. Gauge -5 Nos Level Transmitter -2 Nos Level gauge -1 Nos Flow Transmitter -2 Nos	Set	9	372.817	

163	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 Switch with Local Indicator Pr. Gauge - 13 Nos Temp. gauge - 06 Nos Pr. Transmitter - 02 Nos Level Transmitter - 04 Nos Flow Indicator with Flow Switch - 01 No. DP Gauge - 01 No DP Switch - 01 No Pr. Switch - 4 Nos Level Switch - 02 Nos Flow Indicator cum transmitter- 03 Nos Flow Indicator - 03 Nos	Set	6	549.692	
164	Commissioning of Pneumatic Actuators	Nos	26	47.3133	
165	Commissioning of Electric Actuators	Nos	6	54.8892	
166	Commissioning of Globe Valves/ Manual operated Gate valves /Control valves	Nos	125	60.7448	
167	Commissioning of motor operated dampers	Nos	15	116.514	
168	Commissioning of Solenoid Valves	Nos	272	44.475	
169	Commissioning of Pneumatic Dampers/ SADC	Nos	153	93.07346	
170	Commissioning of Power Cylinders	Nos	14	52.33308	

Note: Item Rate will be calculated as below:

$$\frac{B \times \text{Factor}}{10,00,000}$$

Where B= Lumpsum Quoted value as per **Annexure-C**