TENDER SPECIFICATION No

BHE/PW/PUR/KORSR1-ESP PKG-I/1200

FOR

Dismantling of Existing ESP Internals & other components, Disposal of the same to scrap yard, Transportation of materials from Customer storage to site of work and carrying out modifications as required, Erection, Testing & commissioning and Application of Insulation/cladding for the work of Renovation & Retrofitting of existing Electrostatic Precipitators & ducts for Unit# 1(200MW), Unit#2 (200MW) & Unit# 4 (500 MW) sets.

AT

KorbaSuperThermal Power Station-Korba
District :Korba, Chhatissgarh

TECHNICAL BID - VOLUME- I

Volume I Tender Specifications consists of:

- **Notice Inviting Tender**
- **Volume 1 A - Technical Conditions of Contract,**
- **Volume 1 B - Special conditions of Contract,**
- **Volume 1 C - General conditions of Contract**
- **Volume 1 D - Forms & Procedures**

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Western Region-SAS
345, Kingsway, Shreemohini complex, 5th floor -Nagpur- 440 001

Tender Specification No.

BHE/PW/PUR/KORSR1-ESP PKG-I/1200

FOR

Dismantling of Existing ESP Internals & other components, Disposal of the same to scrap yard, Transportation of materials from Customer storage to site of work and carrying out modifications as required, Erection, Testing & commissioning and Application of Insulation/cladding for the work of Renovation & Retrofitting of existing Electrostatic Precipitators & ducts for Unit# 1(200MW), Unit#2 (200MW) & Unit# 4 (500 MW) sets.

AT

Korba SuperThermal Power Station-Korba
District :Korba, Chhatissgarh

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender
LAST DATE FOR TENDER SUBMISSION Refer Notice Inviting Tender .

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

M/s. ……

…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

ADDITIONAL GENERAL MANAGER (Purchase)
Place: Nagpur
Date :

CONTENTS			
Volume No	Description	Hosted in website bhel.com as files titled	No. of pages
NIL	Tender Specification Issue Details	(Part of **Vol-IA-1200**)	1
NIL	Notice Inviting Tender	(Part of **Vol-IA-1200**)	21
I-A	Technical Conditions of Contract	Vol-IA-1200	66
I-B	Special Conditions of Contract	Vol-IBCD-1200	47
I-C	General Conditions of Contract	(Part of **Vol-IBCD-1200**)	29
I-D	Forms & Procedures	(Part of **Vol-IBCD-1200**)	71
II	Price Bid Specification	Vol-II-1206	3

5 Nos Drawings are uploaded as file titled ‘Drawings 1200’

1200

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited

Ref: BHE/PW/PUR/KORSR1-ESP PKG-I/1200 Date: 29/11/2013

NOTICE INVITING TENDER (NIT)

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

==========

To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	BHE/PW/PUR/KORSR1-ESP PKG-I/1200	
ii	**Broad Scope of job**	Dismantling of Existing ESP Internals & other components, Disposal of the same to scrap yard, Transportation of materials from Customer storage to site of work and carrying out modifications as required, Erection, Testing & commissioning and Application of Insulation/cladding for the work of **Renovation & Retrofitting of existing Electrostatic Precipitators & ducts for Unit# 1(200MW), Unit#2 (200MW) & Unit# 4 (500 MW)** sets AT Korba SuperThermal Power Station-Korba District :Korba, Chhatissgarh	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*

iv	**Issue of Tender Documents**	***1. Sale from BHEL PS Regional office at :*** ***Start : 29/11/2012 ,*** ***Closes: 26/12/2013 , Time : 16.00 Hrs*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 27/12/2013, Time 15.00 Hrs*** ***Place : BHEL PS Regional office at :Nagpur*** Tenders being submitted through representative shall be submitted at dispatch section of of PSWR HQ Office after making entry/registration at the reception. For any assistance on the matter kindly contact following officials: Pratish Gee Varghese/Sr Engineer(Purchase Shivkesh Meena / Engineer (Purchase)	*Applicable*
vi	**OPENING OF TENDER**	***1 hours after the latest due date and time of Offer submission*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender*	*Applicable*
vii	**EMD AMOUNT**	*Rs 2,00,000/- (Rupees Two Lakhs Only)*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Five days before the due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	*Date :*	*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	**Shri Kanwarjit Singh, IRS (Retd.)** D-6/11, Ground Floor, Vasant Vihar, New Delhi - 110 057 E-mail address (kanwarfeb@gmail.com)	*Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer.

Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.

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

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

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	○ Envelopes I ○ Envelopes II ○ Envelopes III	

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

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

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

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

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

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

i). Total number of Packages
Total number of Packages in hand = P
Where
- 'P' is the sum of all unit wise identified packages under execution with BHEL Regions as of the cut off month defined above, including packages yet to be commenced, excepting packages which are on HOLD due to reasons not attributable to Bidder..

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

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

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

a) P_1, P_2, P_3 , P_4 , P_5 , …. P_N etc be the packages (**under execution**/ executed during the 'Period of Assessment' in all Regions) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (ie $P_T = P_1 + P_2 + P_3 + P_4 + .. P_N$)

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

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

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

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

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

$$= \frac{\text{-------}}{T_T}$$

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 $P \leq P_{Max}$
(where P is calculated as per clause 9.I)

IV. **Explanatory note**:

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

Table-1

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

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

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

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

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

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

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

d) In the unlikely event of all bidders shortlisted against Technical and Financial Qualification criteria not meeting the criteria on 'Assessment of Capacity of Bidders' detailed above, OR leads to a single tender response on applying the criteria of 'Assessment of Capacity of Bidders' or due to non-approval by Customer, then BHEL at its discretion reserves the right to consider the further processing of the Tender based on the **Overall Performance Rating** '**R_{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 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

26.0 Order of Precedence

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

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

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

for BHARAT HEAVY ELECTRICALS LTD

AGM Pur

Enclosure

01.Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Integrity Pact
03. Annexure-4: Important Information.
03 Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	Dismantling of Existing ESP Internals & other components, Disposal of the same to scrap yard, Transportation of materials from Customer storage to site of work and carrying out modifications as required, Erection, Testing & commissioning and Application of Insulation/cladding for the work of Renovation & Retrofitting of existing Electrostatic Precipitators & ducts for Package-I consists of 3 Units, **Unit# 1, 2(200MW) & Unit#4(500 MW) sets.**
Tender NO	**BHE/PW/PUR/KORSR1-ESP Pkg I/1200**

SL NO	**PRE QUALIFICATION CRITERIA**	**Bidders claim in respect of fulfilling the PQR Criteria**	
		Name and Description of qualifying criteria	Page no of supporting document. **Bidder must fill up this column as per applicability**
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium/Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	**APPLICABLE**	
B	**Technical** The bidder should have executed Erection & commissioning (E&C)of atleast one unit of complete Boiler / ESP of 190MW or higher rating in the last seven years as on latest date of bid submission. OR The bidder should have executed Renovation & Modernization (R&M) of atleast one unit of complete Boiler / ESP of 100MW or higher rating in the last seven years as on latest date of bid submission. Note: Job of Annual Overhauling and Capital Overhauling shall not be considered for the	**APPLICABLE**	

	experience of R&M job		
C	**Financial** **TURNOVER** Bidders must have achieved an average annual financial turnover (audited) of Rs 436.2 lakhs or more over last three financial years i.e., 2010-11, 2011-12 and 2012-13	**APPLICABLE**	
C-2	**NETWORTH** (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive	**APPLICABLE**	
C-3	**PROFIT** Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in 'C-1 above based on latest Audited Accounts.	**APPLICABLE**	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)	**APPLICABLE**	By BHEL
E	Approval of Customer (if applicable) **Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval.	**APPLICABLE**	BY BHEL
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
F	Technical Tie up criteria (if applicable)	Not applicable	
	Explanatory Notes for the PQR (unless otherwise specified in the PQR): 1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures 2. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e total divided by three. 3. C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)		

4. C-3:- PROFIT : shall be NET profit (PAT + Non cash expenditure viz depreciation) earned during any one of the three financial years as in C-1 above
5. ~~'Additional' Criteria in respect of 'Technical' criteria of PQR (as in 'B' above) for Civil, Electrical, CI, unless otherwise specified :~~
    1. ~~Bidder should have executed similar work of any one of the following:~~
        a. ~~One (1) work of value not less than Rs XXX~~
        ~~OR~~
        b. ~~Two (2) works of not less than Rs YYY~~
        ~~OR~~
        c. ~~Three (3) works of not less than Rs ZZZ~~
        ~~(Value XXX, YYY, ZZZ shall be as indicated by BHEL~~
    2. ~~'Similar' work for criteria 5 above means~~
        a. ~~Civil or Structures or Civil & Structures or Chimney respectively as applicable to the tendered scope in respect of 'CIVIL' Works~~
        b. ~~Electrical works in respect of 'ELECTRICAL'~~
        c. ~~CI works in respect of 'CI' Works~~
        d. ~~Material Handling and/or Management works in respect of 'MM' works~~
6. Time period for achievement of the 'Technical' criteria of PQR (as in 'B' above) will be the last 7 years ending on the 'latest date' of Bid submission
7. 'EXECUTED' means the Vendor should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed
8. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:
    1. "BOILER LIGHT UP" in respect of Boiler & Aux and ESP
    2. ~~"SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG~~
    3. ~~"STEAM BLOWING COMPLETION" in respect of at least Main Steam Line of Power Cycle Piping~~
    4. ~~"HYDRAULIC TEST" of the system in respect of Structures, Pressure parts/IBR Piping~~
    5. ~~"CHARGING" in respect of power Transformers, Bus ducts, HT/LT switchgears~~
    6. ~~"Completion of RCC Shell and liner (steel or brick as per tendered scope) up to the HEIGHT specified using slip form" in case of RCC Chimney.~~
    7. ~~Achievement of physical Quantities as per respective PQRs in respect of Civil & Structures and Piling Works~~
    8. ~~'Readiness for coal Filling" in respect of Bunker Structure Work.~~
9. Boiler means HRSG or WHRB or any other types of Steam Generator

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

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

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~~	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

INTEGRITY PACT

Between

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

And

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

Preamble

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

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

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

Section 1 - Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for itself or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 the Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The bidder(s)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

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

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption

approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on his subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

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

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from his sub-contractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

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

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

Section – 8 Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractors(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sib-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meeting could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those Bidders/ Contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

_____ _____

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

Annexure-4

IMPORTANT INFORMATION

1. **The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification -→ List of Banned Firms)**

2. **All Statutory Requirements as applicable for this project shall be complied with.**

3. **Please take note of following Revised Tender Clauses:**

   i. Notice Inviting Tender: Sl No 9

   ii. General conditions of Contract: Clause No 1.15.13 (New), Clause No 2.8.3, 2.8.4 and 2.8.5

4. Following Notes are added to Form F- 15 of Volume I D 'Forms & procedures'

   i. It is only indicative and shall be as per the online format issued by BHEL time to time.
   ii. No request will be entertained after specified date of the current month w.r.t the changes requested in the scores of immediate previous month.

5. **PRICE VARIATION CLAUSE**

Revision in Price Variation Compensation Clause no. 2.17 of Vol I C GCC:

Clause No. 2.17.9 of Vol IC GCC is revised as below:-

PVC shall be applicable only during the extended period of contract (if any) after the schedule completion date for the portion of work delayed / backlog for the reasons not attributable to Contractor. However total quantum of Price Variation amount payable/recoverable shall be regulated as follows:

i. For the portion of backlog attributable to the contractor and for the portion of backlog due to force majeure condition during contract period, PVC shall not be paid.
ii. For the period of force Majeure during extended contract period, PVC will be as per the indices applicable at the beginning of the force majeure period.
iii. void
iv. The total amount of PVC shall not exceed 20% of the cumulatively executed contract value during the extended contract period. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works.

Clause No. 2.17.5 of is modified as below:-

Base date shall be the calendar month of the (schedule completion date of the contract + Period extended for the reasons attributable to Contractor & Force Majeure Condition). Schedule Completion date shall be the actual start date plus contract period as defined in Chapter VI 'Vol IA TCC'

6. OVER RUN COMPENSATION

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

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

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

7. Broad Terms & Conditions of Reverse Auction

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction:

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

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

7.2. The philosophy followed for reverse auction shall be English Reverse (No ties). English Reverse (No ties) is a type of auction where the starting price and bid decrement are announced before start of online reverse auction. The interested bidders can thereupon start bidding in an iterative process wherein the lowest bidder at any given moment can be displaced by an even lower bid of a competing bidder, within a given time frame. The bidding is with reference to the current lowest bid in the reverse auction. All bidders will see only the current lowest quoted price. The term „No ties" is used since more than one bidder cannot give an identical price, at a given instant, during the reverse auction. In other words, there shall never be a tie in the bids.

7.3. Technically and commercially acceptable bidders only shall be eligible to participate.

7.4. 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. Business rules for Reverse Auction and other information like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.

7.5. After receipt of "online sealed bids" by the participating bidders, start price & bid decrement will be decided by BHEL, before the online Reverse Auction. Only those bidders who have submitted the "on-line sealed bid" within the scheduled time shall be eligible to participate further in RA process. **However, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA.** Once participating bidders have given 'Online Sealed Bid' and 'start price' & 'bid decrement' is decided by BHEL, Bidding for RA will start as per RA schedule specified in business rules. Bidders may then submit their bids (current L-1 price(s) lowered by multiple decrements). If the 'start price' decided by BHEL is same as the 'Online Sealed Bid' price of any bidder, then that bidder shall be reckoned as current L1 automatically at the start of Reverse Auction and no acceptance of that price is required i.e (RA shall deemed to have started at this stage for further bidding)

7.6. 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.

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

8. **Subject Project Consists of R&M works of 6 Units of ESP, which is split into two packages consisting of 3 units each. This tender is for the first Package (Pkg I). BHEL at its discretion may not consider the tenderer who shall be awarded the subject package (Pkg I) for the tender of second Package (Pkg II)**

1200

VOLUME – IA
Part I & II
TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

KORBA SUPER THERMAL POWER PROJECT

1. Purchaser / Owner : **N T P C Limited**

2. Project Title : Stage-I & II (3**X200 & 3X500MW) Korba STPP (ESP PKG)**

LOCATION AND APPROACH :

NEAREST TOWN IS RENUKUT AT A DISTANCE OF 50 KM FROM THE PROJECT. THE NEAREST BROADGAUGE RAIL HEAD SHAKTINAGAR RAILWAY STATION, IS APPREOXIMATELY 2.0 KM AWAY FROM PROJECT SITE. MIRJAPUR STATION IS APPROXIMATELY 200 KM AWAY FROM THE PROJECT. PROJECT IS ACCESSIBLE BY ALL SEASON ROAD FROM VARANASI - RABERTSGANG – RENUKUT OR SINGRAULI – WAIDHAN ROAD. THE NEAREST AIR PORT IS VARANASI.

OTHER IMPORTANT DATA

HIGHEST AMBIENT TEMPERATURE: 44^0 C

LOWEST AMBIENT TEMPERATURE: 1^0 C

The Bidder shall visit site and get acquainted himself with the conditions prevailing at site before submission of the bid. The information's given here in under are for general guidance and shall not be contractually binding on BHEL/ Owner. All relevant site data's/information's as may be necessary shall have to be obtained /collected by the Bidder.

PREAMBLE:

NTPC KorbaSuper Thermal Power Project located in Korba district ofChhattisgarh comprising of 3 units of 200 MW (Stage-I-units 1,2 & 3) each and 3 units of 500 MW (Stage-II-units 4,5&6) each.The stage-I & stage-II units are supplied by BHEL and commissioned in 1983-84 and 1987-89 respectively.

The stage-I & stage-II units are provided with BHEL make ESPs to control the particulate emission. The stage-I ESP (of type 2x 2FAA-7X32-11190) was originally designed for an outlet emission of 300 mg/Nm3 and stage-II ESP (of type 4xFAA-6X45-4X48125-2) was originally designed for an outlet emission of 396 mg/Nm3.Due to deterioration in the coal quality & change in operating condition of the boiler, the present level of emission is more than the specified norms by pollution control board.Therefore NTPC intends to take up Renovation & Retrofitting of existing ESPs to meet the latest environmental norms of Chhattisgarh Environment Conservation Board (CECB) to reduce the emission level to 50 mg/Nm3.

Renovation & Retrofitting for STAGE-I (3x200MW)

It is proposed that, the existing ESP's casing will be modified to accommodate taller electrodes of latest design after dismantling the existing complete internals, retaining the existing supporting structures,hoppers,casing etc. The modified ESP will have seven field arrangements with extended casing length at the trailing end as shown in the ESP layout sketch.

In addition to the above, it is also proposed to install one number of additional new ESP in parallel for 200 MW units in the space available on the side of existing ESPs and connected with the ducting system.

Existing ducting system will be retained and modified suitably at the ESP inlet and outlet to the extent necessary.

The layout of the proposed system is as per the drawing enclosed with the specification.

Renovation & Retrofitting for STAGE-II (3x500MW)

It is proposed that , the existing ESP's casing will be modified to accommodate taller electrodes of latest design after dismantling the existing complete internals, retaining the existing supporting structures,hoppers,casing etc., In addition two numbers of field is added in series.

Existing ducting system will be retained and modified suitably at the ESP inlet and outlet to the extent necessary.
The layout of the proposed system is as per the drawing enclosed with the technical offer.

Renovation & Retrofitting job shall be carried out in two packages i.e. Package-I consists of Unit# 1, 2 (200MW) & Unit # 4 (500 MW) sets and Package-II consists of Unit# 3 (200MW), Unit # 5 & 6 (500 MW) sets.

Now this tender is for of **Unit# 1, 2(200MW) & Unit #4(500 MW) sets.**

Dismantling of Existing ESP Internals & other components, Disposal of the same to scrap yard, Transportation of materials from Customer storage to site of work and carrying out modifications as required, Erection, Testing & commissioning and Application of Insulation/cladding for the work of Renovation & Retrofitting of existing Electrostatic Precipitators & ducts for Package-I consists of **Unit# 1, 2(200MW) & Unit#4(500 MW) sets.**

List of components required to be dismantled & re use from the dismantled materials is given elsewhere in this contract. Also list of new materials with weight which are to be erected is given in this contract. Given lists are tentative not exhaustive, it may vary. Apart from the given scope of list, additional work may be arisen which will be paid as per quoted rate per MT.

SCOPE OF WORK FOR RENOVATION & RETROFITTINGFOR 200 MW(U#1 & 2)

AA.The following activities are based on technical offer of BAP/Ranipet and tender specification.

1.Dismantling of existing ESP's internals and roof as below:

- collecting electrode, emitting electrode,emitting frame, collecting system,rapping mechanism,
- Inlet / outlet funnel, roof beam, roof panel,
- ESP inlet duct, ESP outlet duct to the extent required,
- Roof mounted electrical items like TR sets, rectifier handling, insulator housing, disconnecting switch, gear motor, interlock, Cables etc.
- Insulation & cladding for duct from APHoutlet duct to ID fan inlet duct including ESP & hoppers.
- All Expansion joint from APH outlet duct to ID fan inlet duct to be replaced with new metallic type expansion joint.
- ESP control room items - EC panels, interconnecting cables from ACP to LTboard.

The following items in existing ESP are to be retained for re-use.

- ESP casing,Hopper,ESP supporting structure,Inlet duct & supporting structure
- outlet duct & supporting structure,Gate at inlet duct
- Opacity monitor
- Cable trays and supports
- ACP
- LTMSB

The following items in existing ESP are tobe dismantled and relocated for re-use.

- Gate at ESP outlet duct
- Gate at ESP outlet common duct

2. Transportation of dismantled items to customer scrapyard.

3. Erection and commissioning of proposed retrofitting is as per the drawing enclosed with the technical specification.
   Renovation as per the ESP scope of supply and the salient features are as under.

- Increasing the existing casing height from 9.0 m to 12.5 m.
- Erection of 12.5 m tall collecting electrode system, emitting electrode system, rapping system and other internals etc.,
- Extension of one field in series between ESP outlet and ID fan after Dismantling the outlet funnel , ducting, supporting structures etc.,
- Erection of one number of parallel ESP on one side of existing ESP.
- Erection of funnel, ESP inlet/outlet duct.
- Erection of duct supporting structures.
- Erection of TR sets and control cubicles
- Repair/ strengthening the existing ESP supporting structures.
- Laying of cables & terminations along with cable trays as required.
- Electrical and C & I work as mentioned in the scope for Electrical works.
- Testing & commissioning of ESP fields.
- Erection and commissioning of guillotine gate with actuator-2 nos. per boiler in the parallel ESP.
- Arranging the air in leakage test materials, test instruments and conducting the air in leakage test for all 6 ESP passes.
- Erection & commissioning of extension of ash handling system (all mechanical/Electrical /C &I) for new parallel ESP, one no. new series fields in existing 2 nos. ESP & integrating with existing ash handling.

SCOPE OF WORK FOR ERECTION AND COMMISIONING FOR 500 MW(U # 4)

The following activities are based on technical offer of BAP/Ranipet and tender specification.

AA. Dismantling of existing ESP's internals and roof as below:

- collecting electrode, emitting electrode, emitting frame, collecting system, rapping mechanism,

- ESP outlet funnel, roof beam, roof panel,
- ESP outlet duct (ID Fan inlet common bus duct retained),
- 'Q' Row column & its bracings at ESP outlet side.
- Roof mounted electrical items like TR sets,
- rectifier handling, insulator housing,
- disconnecting switch, gear motor, interlock,
- Cables etc.
- Insulation & cladding for duct from APH outlet
- duct to ID fan inlet duct including ESP & hoppers.
- All Expansion joint from APH outlet duct to ID
- fan inlet duct to be replaced with new metallic
- type expansion joint.
- ESP control room items - EC panels, interconnecting cables from ACP to LT board.

The following items in existing ESP are retained for re-use.

- ESP casing,
- Hopper,
- ESP supporting structure
- ESP inlet funnel (to be modified as per drawing)
- Inlet duct & supporting structure
- ID Fan inlet common bus duct & supporting
- structure from 'R' row onwards
- Gate at inlet duct
- Opacity monitor
- Cable trays and supports
- ACP
- LTMSB

The following items in existing ESP are to be dismantled and relocated for re-use.

- Gate at ESP outlet duct,

2. Transportation of Dismantled items to customer scrap yard.
3. Erection and commissioning of proposed retrofitting is as per the ESP scope of supply in the offer and salient features are as under.

- Increasing the existing casing height from 12.5 m to 15 m.
- Erection of 15 m tall collecting electrode system, emitting electrode system, rapping mechanism along with motorsand other internals etc.,

- Extension of one field in series between ESP outlet and ID fan after Dismantling the outlet funnel , ducting, supporting structures etc.,
- Erection of funnel, ESP inlet/outlet duct.
- Erection of duct supporting structures.
- Erection of TR sets and control cubicles
- Repair/ strengthening the existing ESP supporting structures.
- Laying of cables and terminations along with cable trays as required.
- Electrical and C & I work as supplied by BHEL.
- Testing & commissioning of ESP fields.
- Arranging the air in leakage test materials, test instruments and conducting the air in leakage test for all 6 ESP passes.
- Erection & commissioning of extension of ash handling system (all Mechanical/Electrical / C &I) as required and integrating with existing ash handling system.

SPECIAL NOTES:

1. VOID
2. Fuel for operation of the BHEL Cranes to be provided by Bidder.
3. Erection of Dummy plates for bypassing the duct at ESP outlet side of 500MW Units is in bidder scope of work.
4. Bidder to erect temporary bypass duct which are required for operation of 500MW Boilers during retrofitting work. After completion of retrofitting work same shall be removed & permanent by pass duct to be erected from ESP outlet to re locatedgate
5. Bidders are strongly advised to visit the site to acquaint themselves with the working conditions and the project requirements for execution of the job.

BB.Detail scope for Erection of new additional ESP in Unit # 1 & 2(200 MW)

This work involves transportation of erection materials from storage yard to erection site, pre assembly erection testing and commissioning of new ESP including interconnecting ducts and gates. The work includes erection of gates, dampers, platforms and erection of electrical components like geared motors, Transformers, heaters etc. However, the commissioning of electrical equipment erected by tender will be carried out by electrical.To provide the required assistance during commissioning activities. The work scope includes application of thermal insulation and cladding. **Scope also include supply and application of paints as required.**

CC:Duct modifications to suit the new and renovated ESP:

The existing ducts to be dismantled and modified to suit the new ESP and as well as modified/renovated ESP. The duct materials will be supplied by BHEL free of cost as erection materials. Necessary works like fabrications,preassembly, erection, testing and commissioning to be carried out by bidder, ifrequired.The old and removed duct materials have to be re used for

certain modifications. The work involves re location of duct expansion joints, gates/dampers as required for satisfactory completion of work.

DD: Bypass duct (unit 4 outlet side)

To facilitate the customer to run unit as per load requirement, during shutdown of unit ,in each pass by-pass duct is proposed to be erected at ESP outlet to facilitate Retrofitting of passes one by one without taking further shutdown for isolation of passes. The work involves pre assembly, erection including temporary and permanent supports interconnection to existing ducts at ESP outlet including relocation of isolation gates ,expansion joints etc. The work also includes application of insulation and al cladding/sheeting. Prospective bidders are requested to visit site and assess the quantum of work to be completed during shutdown of the unit.

EE: R&M of ESP U # 1& 2(200MW)

ESP existing passes R&M work will be done after completion of new pass of ESP commissioning& hookup with the ESP inlet &ID Fan inlet duct; retrofitting of ESP one pass shall be taken up by isolation of inlet & outlet gates of ESP and unit will be in service with new ESP pass and one old ESP pass. Retrofitting of other passes will be done in similar way without shutting down of the Unit. The scope of work involves dismantling ofhandlingequipments with structure, HVR Transformers, disconnecting switches, outer and inner roof, roof beam (LR & TR), geared motors with rapping shafts etc located on top of ESP. Dismantling of ESP internals including collecting and emitting frames, support and shaft insulators emitting and collecting electrodes, rapping mechanism, shafts, Inner roof insulation & all outer side Insulation of ESP & related ducts etc. All electrical items including cables & cable trays, all internals will be removed only hoppers and their associated heaters; JBS, etc. will be retained. Apart from the above other items also to be removed if required for completion of work.

The ESP height will be increased from 9 M to 12.5 M height by extending the wall & Casing columns height with proper structure. After increasing the height Regular ESP erection with all required items like LR & TR Beams, support insulators frames inner and outer roofs, disconnection switches etc with new frames, new electrodes will be carried out as a new ESP. All the removed materials to be shifted to customer stores yard as instructed by customer.

Once the ESP erection works are completed, the ESP will be cold commissioned. After cold commissioning, the ESP will be charged with flue gasses by opening the gates. The dummy plates if any erected for safe isolation will be removed and all finally three ESPs will be in service

During R&M of ESP, the tests like air tightness test, GD test etc as required for satisfactory performance is to be conducted by renderer.

FF: R&M of ESP U # 4(500MW)

The ESP height will be increased from 12.5 m to 15 m height by extending the wall & Casing columns height with proper structure. After increasing the height Regular ESP erection with all required items like LR & TR Beams, support insulators frames inner and outer roofs, disconnection switches etc with new frames, new electrodes will be carried out as a new ESP.
Extension of one field in series between ESP outlet and ID fan after Dismantling the outlet funnel , ducting, supporting structures etc.,
Once the ESP erection works are completed, the ESP will be cold commissioned. After cold commissioning, the ESP will be charged with flue gasses by opening the gates. The dummy plates if any erected for safe isolation will be removed and all finally three ESPs will be in service

During R&M of ESP, the tests like air tightness test, GD test etc as required for satisfactory performance is to be conducted by renderer.

GG: Miscellaneous works:

As the work is to be carried out in running plant with confined space, miscellaneous works like shifting/ rerouting of ducts, pipes, cable trays with all type of cables of nearby equipmentwill have to be carried out during shutdown periodfor facilitating the retrofit work. Such works have to be carried out under supervisions and guidance of customer and BHEL.

HH: T&P, cranes, erection tools etc

All the tools tackles, Cranes (except those being provided by BHEL), Derricks arrangements (Structural material for fabrication of Derik will be provided by BHEL on returnable basis) requiredfor satisfactory and safe execution of work to be arranged by contractor at his cost. No T&P will be provided by BHEL except open space for their office. The quoted rate includes entire completion of work including arrangements for laborcolony forms their workers stay&theirtransportation.

Due to confined space, there may be most of the areas being non-approachable by crane. Agency has to use improvised methods for dismantling and assembly /erection of various equipment, components etc. to complete the erection of new ESP &retrofitting work. These methods may include tying of ropes through existing structures /equipment such as chimney, conveyor structure and other available structures etc. At some locations, such structures are not available and crane also cannot approach .In such cases, derrick arrangement to be made for dismantling and erection. Bidders are strongly advised to visit the site along with BHEL officials to assess the possibility of using alternate arrangements apart from crane. No separate payment shall be made for any such arrangements used during the execution of the contract. All safety precautions have to be taken for such alternate arrangements and no damage should be caused to the existing equipment, structure, customer property etc.

All the above activities included in the quoted rate. No separate amount will be paid for any work. The ESP R&M work completion means completion of work in all respects and takeover by customer. Any miscellaneous works arises for satisfactorily completion of work to be carried out by bidder without any extra amount.

1.2.1.1 Receipt of materials / component to be erected by the contractor, loading and transportation from the storage yard to the project site, stacking, storage and preservation.

1.2.1.2 Preassembly, Erection, Testing, Commissioning, Trial operation and reliability operation of equipment.

1.2.1.3 Final painting including supply of paints.

1.2.2 **INSULATION& CLADDING:**

2 100 % Insulation & cladding from APH outlet duct to ID fan inlet duct to be replacedincluding existing ESP & its hoppers

2.2.1 **PAINTING**

The scope of work shall include supply and application of final painting for all the components.

1.2.4 **PENALTY / LIQUIDATE DAMAGE:**

Penalty / Liquidate Damage shall be applicable for delay in completion of works as per BHEL RM recommendations.

Shutdown period will be 45 Days for U 1 &2 and 60 days for U-4.shall be provided by NTPC for facilitating duct modification in order to isolate one pass at a time and continue operation of the ESP with remaining passes. The schedule of shut down for each unit shall be intimated by NTPC in due course.

Note:

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

Sl.No	Description PART I	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.1.0	**ESTABLISHMENT**			
1.3.1.1.1	FOR CONSTRUCTION PURPOSE:			
A	Open space for office	Yes		
B	Open space for storage	Yes		
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
D	Bidder's all office equipments, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
F	Fire fightingequipments like buckets, extinguishers etc		Yes	
G	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.3.1.1.2	FOR LIVING PURPOSES OF THE BIDDER			
A	Open space		Yes	
B	Living accommodation		Yes	
1.3.1.2.0	**ELECTRICITY**			
1.3.1.2.1	Electricity For construction purposes (to be specified whether chargeable or free)			
1.3.1.2.1.1	Single point source	Yes		Free for construction purpose. Chargeable for labour colony etc
1.3.1.2.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	

Sl.No	Description PART I	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:		Yes	
1.3.1.2.2.1	Distribution from single point including supply of materials and service		Yes	
1.3.1.2.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	
1.3.1.2.2.3	Duties and deposits including statutory clearances for the above		Yes	
1.3.1.2.2.4	Living facilities for office use including charges		Yes	
1.3.1.2.2.5	Demobilization of the facilities after completion of works		Yes	
1.3.1.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	
1.3.1.3.0	**WATER SUPPLY**			
1.3.1.3.1	For construction purposes:			
1.3.1.3.1.1	Making the water available at single point	**YES**		
1.3.1.3.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.3.2	Water supply for bidder's office, stores, canteen etc			
1.3.1.3.2.1	Making the water available at single point		Yes	
1.3.1.3.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	

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

Sl.No	Description	Scope to be taken care by		Remarks
	PART II	**BHEL**	**Bidder**	
	ERECTION FACILITIES			
1.3.2.1.0	**Engineering works for construction**			
1.3.2.1.1	Providing the erection drawings for all the equipments covered under this scope	Yes		
1.3.2.1.2	Drawings for construction methods		Yes	In consultation with BHEL
1.3.2.1.3	As-built drawings – wherever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes	Yes	Yes	,,
1.3.2.1.4	Shipping lists etc for reference and planning the activities	Yes		”
1.3.2.1.5	Preparation of site erection schedules and other input requirements		Yes	”
1.3.2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	**Yes**	Yes	
1.3.2.1.7	Weekly erection schedules based on Sl No 2.1.5		Yes	
1.3.2.1.8	Daily erection / work plan based on Sl No 2.1.7		Yes	For daily monitoring meeting at site
1.3.2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
1.3.2.1.10	Preparation of preassembly bay		Yes	
1.3.2.1.11	Laying of racks for gantry crane if provided by BHEL or brought by the			Not applicable

Sl.No	Description PART II	Scope to be taken care by		Remarks
		BHEL	Bidder	
	contractor/bidder himself			

1.3.3 **OPEN SPACE:**

Open space for building of temporary office shed, contractor's stores shed(s) will be provided free of hire charges. Contractor has to make his own arrangements for labour colony.

1.3.4 **ELECTRICITY:**

1.3.4.1 The contractor shall be provided with free supply of Electricity for the purpose of execution of work at single point only at work site. For further distribution contractor shall make his own arrangements. Electricity for all other services if required will be provided on **chargeable basis**as per NTPC norms.

a) Consumption charges as per NTPC norms

b) Any dispute regarding consumption, BHEL engineer's decision is final.

1.3.4.2 Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards contractor's office shed also all such expenditure shall be borne by the contractor.

1.3.4.3 Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

1.3.4.4 BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage / frequency or interruptions in power supply.

1.3.5 **WATER:**

Contractor has to make his own arrangements for his water requirement for Construction purpose and his labor colony.

The following minimum major Tools & Plants shall be deployed by the contractor:

Sl. No	DESCRIPTION OF EQUIPMENT	CAPACITY	MINIMUM QUANTITY	REMARKS
01	CRAWLER CRANE	150 T	01	TO BE DEPLOYED FROM BEGINNING FOR START OF ERECTION TILL COMPLETION
02	PICK AND CARRY CRANE	12 T	02	TO BE DEPLOYED FROM BEGINNING FOR START OF ERECTION TILL COMPLETION
03	SELF DRILLING CUM TAPPING MACHINE FOR SCREWS OF FLOOR GRILL & ROOF SHEETING	AS REQUIRED	02	TO BE DEPLOYED AT APPROPRIATE STAGE OF WORK AS PER INSTRUCTION OF BHEL ENGINEER
04	3 ph DISTRIBUTION BOARD WITH COMPLETE SET UP FOR DRAWING CONSTRUCTION POWER, FITTED WITH ENERGY METER	AS Required	As required	AS REQUIRED AND AS PER INSTRUCTION OF BHEL ENGINEER
05	WELDING GENERATOR (ELECTRIC & DIESEL)	300 AMPS	AS REQUIRED	TO BE DEPLOYED PROGRESSIVELY AS PER INSTRUCTION OF BHEL ENGINEER
06	ELECTRIC WINCH	1 TON / 2 TON / 3 Tons / 5TON	08 (TOTAL)	TO BE DEPLOYED PROGRESSIVELY AS PER INSTRUCTION OF BHEL ENGINEER
07	ELECTRIC CABLE FOR DRAWAL & DISTRIBUTION OF CONSTRUCTION POWER	AS REQUIRED	AS REQUIRED	TO BE DEPLOYED FROM BEGINNING OF START OF MATERIAL HANDLING TILL COMPLETION
08	BAKING OVEN AND HOLDING OVEN WITH THERMOSTAT AND TEMPERATURE GAUGE FOR BAKING COATED WELDING ELECTRODES	AS REQUIRED	01 SET EACH	TO BE DEPLOYED AT APPROPRIATE STAGE OF WORK AS PER INSTRUCTION OF BHEL ENGINEER
09	PORTABLE OVEN FOR COATED WELDING ELECTRODES	AS REQUIRED	05 SET	TO BE DEPLOYED PROGRESSIVELY AS PER INSTRUCTION OF BHEL ENGINEER
10	TRAILER WITH PRIME MOVER	ADEQUATE CAPACITY	AS REQUIRED	WHILE FURNISHING THE DEPLOYMENT PLANS FOR THESE ITEMS, THE NEED FOR TRANSPORT OF MATERIAL RECD ON GODOWN DELIVERY BASIS IS TO BE KEPT IN VIEW. VEHICLES DEPLOYED SHOULD HAVE VALID STATUTORY DOCUMENTS AT ALL TIMES

11	TRUCK	9 MT	1 NO	
12	SLINGS, 'D'-SHACKLES, HYDRAULIC JACKS, ETC.	AS REQUIRED	AS REQUIRED	WITH TEST REPORTS

The above list is tentative. The contractor has to provide required type and capacity of cranes/lifting tools for satisfactory completion of work.

NOTE:

1. As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction site due to inherent power shortage in state; it shall be the responsibility of the contractor to have minimum numbers of diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by the bidders at their cost. No separate payment shall be made for this contingency.

2. Depending upon the nature of work and availability of facilities locally, contractor may have to arrange for a temporary workshop for facilitating uninterrupted progress of work

3. All the T&Ps required for this scope of work, except the T&Ps provided by BHEL are to be arranged by the contractor within the quoted rates.

4. Also refer relevant clauses in SCC

List of T&P's to be made available by BHEL to contractor free of hire charges on sharable basis.

1.One no. 75 T Crawler crane on sharing basis.
2. Huckbolting machine with required Gun sets &hoses.

Notes

1. THIS CRANES IS OWNED OR HIRED BY BHEL. OPERATOR FOR BHEL OWNED CRANE WILL BE PROVIDED BY BHEL.

2. CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS LIKE LYING OF SPECIAL SLEEPER BEDS AND STEEL PLATES (ALL ARRANGED BY CONTRACTOR), ASSEMBLY AND DISMANTLING OF HEAVY LIFT ATTACHMENT, BOOM, JIB ETC FOR MOVEMENT AND OPERATION OF THE CRANE

3. BHEL MAY OBTAIN THESE CRANES ON HIRING BASIS INCLUDING OPERATING AND MAINTENANCE CREW.

4. OPERATORS FOR HIRED CRANE WILL BE PROVIDED BY THE HIRING AGENCY.

5. CONTRACTOR SHALL PROVIDE THE FUEL FOR BHEL PROVIDED CRANES FOR HIS USE.

6. CRANES PROVIDED BY BHEL WILL BE ON SHARING BASIS WITH OTHER AGENCIES / CONTRACTORS OF BHEL. THE ALLOCATION OF CRANES SHALL BE THE DISCRETION OF BHEL ENGINEER, WHICH SHALL BE BINDING ON THE CONTRACTOR. CRANES WILL BE DEPLOYED AT APPROPRIATE TIME AS DECIDED BY BHEL FOR SUITABLE DURATION AND INTENDED PURPOSE.

1.6.1 TIME SCHEDULE

1.6.1.1 The entire work of Erection, Testing and Commissioning of Electrostatic Precipitator and ducts including Supply and Application of Final Painting for Units 1, 2 of200MW & Unit 4 of 500 MW sets at NTPC-Korba Super Thermal Power Station-Korba,Chhattisgarhas detailed in the Tender Specification shall be completed within 32 **(thirty two**) months from the date of commencement of work at site. .

1.6.1.2 During the total period of contract, the contractor has to carryouttheactivitiesin a phased manner as required by BHEL and the program of milestone events.

1.6.1.3 The erection work shall be commenced on the mutually agreed date between the bidder and BHEL engineer and shall be deemed as completed in all respect only when the unit is in operation. The decision of BHEL in this regard shall be final and binding of the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.

1.6.2 COMMENCEMENT OF CONTRACT PERIOD

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

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

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

Expected Erection start for Package-I:**January '2014**

1.6.4 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.

1.6.5 In case any requirement is there to compress the schedule of activities to achieve project
1.6.6 completion, then the additional expenses if any incurred will be discussed mutually and settled. BHEL decision in this regard is final and the issue is not arbitrable.

1.6.7 CONTRACT PERIOD

The contract period for completion of entire work of entire work of Package-I shall be 32 **(Thirty two)months**from the "COMMENCEMENT OF CONTRACT PERIOD" as specified earlier.

1.6.5 GUARANTEE PERIOD FOR EACH UNIT

The guarantee period of twelve months shall commence from the date of handing over of the Unit to Customer or six months from the date of first synchronization of the set, whichever is earlier (Provided all erection, testing, and commissioning works are completed in all respects).

1.7 Terms of payment :

1.7.1 Progressive Payment against monthly running bills will be made on Pro-rata basis and payments against stage / milestones events shall be as perthefollowing table.

AA: DISMANTLING WORK OF ESP:

Cl No:	Description	ESP Rate Schedule
	PRO RATA PAYMENTS (95%)	%
I.7.1.1	Satisfactory completion of Dismantling work in all respects	95
	STAGE/MILESTONE PAYMENTS (05%)	
1.7.2.6	Area cleaning, temporary structures cutting/removal and return of scrap	1
1.7.2.7	Punch List points/pending points liquidation	1
1.7.2.8	Material Reconciliation	2
1.7.2.9	Completion of Contractual Obligation	1
	TOTAL FOR STAGE/MILESTONE PAYMENTS (05%)	**5**
	TOTAL I + II	**100**

BB: ERECTION / RETROFITTING WORK OF ESP:

Cl No:	Description	ESP Rate Schedule
	PRO RATA PAYMENTS (85%)	**%**
I.7.1.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION)	15
I.7.1.2	PLACEMENT IN POSITION	20
I.7.1.3	ALIGNMENT	15
I.7.1.4	WELDING/BOLTING/FIXING	20
I.7.1.5	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG	--
I.7.1.6	COMPLETION OF HOPPERS ALONG WITH ALL DOORS, HEATING ELEMENTS, POKING DOORS, ETC	5
I.7.1.7	COMPLETION OF INNER, OUTER ROOF INSULATOR HOUSING, RECTIFIER TRANSFORMERS, PENT HOUSE MONO RAILS, HOISTS ETC	5
I.7.1.8	ERECTION OF EMITTING AND COLLECTING RAPPING SYSTEM WITH ALL DRIVES	5
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	**85**
	STAGE/MILESTONE PAYMENTS (15%)	
1.7.2.1	AIR & GAS TIGHTNESS TEST	3
1.7.2.2	GAS DISTRIBUTION TEST	2
1.7.2.3	CHARGING OF ESP FIELDS	2
1.7.2.4	PG Test completion	1
1.7.2.5	Trial Operation of Unit	1
1.7.2.6	Area cleaning, temporary structures cutting/removal and return of scrap	1
1.7.2.7	Punch List points/pending points liquidation	1
1.7.2.8	Material Reconciliation	1
1.7.2.9	Completion of Contractual Obligation	1
1.7.2.10	Final Painting	2

	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)	**15**
	TOTAL I + II	**100**

CC: APPLICATION OF INSULATION WORK:

Cl No:	Description	ESP Rate Schedule
	PRO RATA PAYMENTS (90%)	%
I.7.1.1	On application of insulation materials	90
	STAGE/MILESTONE PAYMENTS (10%)	
1.7.2.2	PG Test completion	1
1.7.2.3	Trial Operation of Unit	1
1.7.2.4	Area cleaning, temporary structures cutting/removal and return of scrap	3
1.7.2.5	Punch List points/pending points liquidation	2
1.7.2.6	Material Reconciliation	2
1.7.2.7	Completion of Contractual Obligation	1
	TOTAL FOR STAGE/MILESTONE PAYMENTS (10%)	10
	TOTAL I + II	100

DD: RETROFITTING FOR ELECTRICAL ITEMS

Cl No:	**Description**	**ESP Rate Schedule**
	PRO RATA PAYMENTS (85%)	**%**
I.7.1.1	Satisfactory completion of Dismantling work in all respects.	15
I.7.1.2	Placement in Position	70

	STAGE/MILESTONE PAYMENTS (15%)	
1.7.2.1	AIR & GAS TIGHTNESS TEST	3
1.7.2.2	GAS DISTRIBUTION TEST	2
1.7.2.3	CHARGING OF ESP FIELDS	4
1.7.2.4	PG Test completion	1
1.7.2.5	Trial Operation of Unit	1
1.7.2.6	Area cleaning, temporary structures cutting/removal and return of scrap	1
1.7.2.7	Punch List points/pending points liquidation	1
1.7.2.8	Material Reconciliation	1
1.7.2.9	Completion of Contractual Obligation	1
	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)	15
	TOTAL I + II	100

Note:

1. In case any requirement is there to compress the schedule of activities to achieve project completion, then the additional expenses if any incurred will be discussed mutually and settled. BHEL decision in this regard is final and the issue is not arbitral.
2. Recovery of Retention amount as per Cl. 2.22 of GCC.
3. RA bill payments as per Chapter-X of SCC
4. Payment for the first running bill will be released only on production of the following.
   i. PF Regn. No.
   ii. Labour License No.
   iii. Workmen Insurance Policy No.
   iv. Unqualified Acceptance for Detailed L.O.I.
   v. Initial 50%/100 % Security Deposit.
   vi. **SIGNING OF CONTRACT AGREEMENT.**

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

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

8.1.1

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

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

8.1.2 Service Tax & Cess on Service Tax

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

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

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

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

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

8.1.3 VAT (Sales Tax /WCT)

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

In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. Contractor will submit all the details of VAT/CST paid for the contract in the prescribed format of the respective state VAT laws. Also, the contractor will issue the tax Invoices to BHEL as per the Tax laws of respective state on monthly basis. Contractor shall also be required to furnish to BHEL necessary proof of VAT remittance on monthly basis.

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

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

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

~~**8.2 'Enabling Works'**~~

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

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

8.3 New Taxes/Levies

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

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

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

1.9.1 **WEIGHT SCHEDULE**

PGMA LIST OF MATERIALS AS SUPPLIED BT BHEL RANIPET
TOTAL WT. OF ESP MATERIALS TO BE ERECTED: 10143 M Tons

Unit -1, 200 MW

Cust	NS	PGMA	DPN	Description	Design wt-kg
R4B6	1	57460	450	GATE-ESP INLET	4,233
R4B6	1	57466	580	PLATFORMS AND LADDERS	2,882
R4B6	1	57470	355	GATE-ESP OUTLET	4,246
R4B6	1	57473	360	DAMPER-ESP OUTLET	10,694
R4B6	1	57577	585	ELECT ACTUATOR FOR GAT	600
R4B6	1	78201	30	ROLL/SLIDE SUPPORTS	1,206
R4B6	1	78205	435	ESP-SUB-DELIVERY COMPO	260
R4B6	1	78206	330	INSULATOR HOUSING AS	24,299
R4B6	1	78208	180	GAS DIST. ASSY	38,464
R4B6	1	78209	380	GD-RAPPING MECHANISM	7,242
R4B6	1	78210	390	GD_DRIVE ARRANGEMENT	426
R4B6	1	78211	240	GAS SCREEN-EP	4,486
R4B6	1	78213	110	EMIT SYST SUSPENSION	7,704
R4B6	1	78214	160	SUPPORT INSULATORS	5,936
R4B6	1	78215	250	EMITTING ELECTRODES	8,264
R4B6	1	78216	310	EMIT ELECT RAPP MECH	17,446
R4B6	1	78217	320	DRIVE ARGT. FOR EMIT.	14,426
R4B6	1	78219	100	COL ELEC SUSPENSION	39,367
R4B6	1	78220	170	COLLECTING ELECTRODE	3,87,170
R4B6	1	78221	130	EMIT SYS FRAME-TOP	65,166
R4B6	1	78222	150	EMIT SYS FRAME BOTOM	66,537
R4B6	1	78223	400	INSPECTION DOORS	1,488
R4B6	1	78224	220	SHOCK BARS	39,625
R4B6	1	78225	230	COLL ELECT RAPP MECH	46,718
R4B6	1	78226	370	COLL ELEC RAPP DRIVE	3,410
R4B6	1	78228	90	ESP ROOF PANELS	1,33,696
R4B6	1	78230	470	ELECTRICAL SD COMPTS	8,022
R4B6	1	78231	425	GEARED MOTORS FOR RAPP	10,800
R4B6	1	78232	140	EMIT SYS FRAME-MIDLE	65,916
R4B6	1	78237	480	JUNCTION BOX & PUSH BU	983
R4B6	1	78241	530	ELECTRICAL MISCELLANEO	6,000
R4B6	1	78242	260	OUTER ROOF-EP	63,574
R4B6	1	78243	50	HOPPER RIDGES	3,506
R4B6	1	78244	270	HOPPER UPPER PART	13,728
R4B6	1	78245	280	HOP MLD&LOWER PART	16,697
R4B6	1	78246	120	INSULATOR SUPP PANEL	41,938

R4B6	1	78247	190	ROOF PANEL ASSY	14,718
R4B6	1	78248	40	CASING STRUCTURE	93,148
R4B6	1	78249	60	CASING SHELL/PANEL	1,10,554
R4B6	1	78250	200	INLET-OUTLET FUNNEL	73,711
R4B6	1	78251	410	EXPANSION JOINTS	5,581
R4B6	1	78256	340	RECTIFIER HANDL SYST	18,880
R4B6	1	78257	210	SPLITTER&GUIDE VANES	9,225
R4B6	1	78261	630	EP PERF TEST EQUIPT	7,887
R4B6	1	78262	495	EARTHING,CABLE TRAYS,S	24,000
R4B6	1	78263	620	ASH LEVEL INDICATOR	1,000
R4B6	1	78264	635	MISCELLANEOUS ITEMS	5,000
R4B6	1	78265	290	APP PLATFORM-HOPPER	16,625
R4B6	1	78266	515	WATER WASHING SYSTEM	650
R4B6	1	78267	525	MIN WOOL FOR ESP INSUL	75,516
R4B6	1	78268	505	FIXING COMP. FOR ESP I	20,002
R4B6	1	78272	540	INTERLOCKS-EP	1,100
R4B6	1	78273	595	ELECTRICALLY OPERTD HO	3,372
R4B6	1	78276	556	RECTIFIRS&CONTRLS-EP	50,400
R4B6	1	78277	555	LT SWITCH BOARD/ESP SW	4,000
R4B6	1	78278	565	BAPCON & ACCESSORIES	147
R4B6	1	78281	20	SUPPOTING STRUCTURES F	34,885
R4B6	1	78290	445	HEATING ELEMENTS	1,300
R4B6	1	78292	545	AUXILIARY CONTROL PANE	4,000
R4B6	1	78293	575	RAPPER CONTROL PANEL	600
R4B6	1	78294	605	STATCON PANEL	600
R4B6	1	78301	25	ROLL/SLIDE SUPPORTS	3,104
R4B6	1	78305	430	ESP-SUB-DELIVERY COMPO	73
R4B6	1	78306	325	INSULATOR HOUSING AS	7,192
R4B6	1	78308	175	GAS DIST. ASSY	10,535
R4B6	1	78309	375	GD-RAPPING MECHANISM	1,647
R4B6	1	78310	385	GD_DRIVE ARRANGEMENT	117
R4B6	1	78311	235	GAS SCREEN-EP	1,176
R4B6	1	78313	105	EMIT SYST SUSPENSION	1,931
R4B6	1	78314	155	SUPPORT INSULATORS	1,484
R4B6	1	78315	245	EMITTING ELECTRODES	2,402
R4B6	1	78316	305	EMIT ELECT RAPP MECH	3,780
R4B6	1	78317	315	DRIVE ARGT. FOR EMIT.	3,710
R4B6	1	78319	95	COL ELEC SUSPENSION	11,568
R4B6	1	78320	165	COLLECTING ELECTRODE	1,13,448
R4B6	1	78321	125	EMIT SYS FRAME-TOP	13,610
R4B6	1	78322	145	EMIT SYS FRAME BOTOM	16,800
R4B6	1	78323	395	INSPECTION DOORS	2,139
R4B6	1	78324	215	SHOCK BARS	8,752
R4B6	1	78325	225	COLL ELECT RAPP MECH	9,808

R4B6	1	78326	365	COLL ELEC RAPP DRIVE	816
R4B6	1	78328	85	ESP ROOF PANELS	14,039
R4B6	1	78330	465	ELECTRICAL SD COMPTS	2,006
R4B6	1	78331	420	GEARED MOTORS FOR RAPP	2,500
R4B6	1	78332	135	EMIT SYS FRAME-MIDLE	15,535
R4B6	1	78337	475	JUNCTION BOX & PUSH BU	230
R4B6	1	78342	255	OUTER ROOF-EP	25,297
R4B6	1	78343	45	HOPPER RIDGES	5,614
R4B6	1	78344	265	HOPPER UPPER PART	26,905
R4B6	1	78345	275	HOP MLD&LOWER PART	37,238
R4B6	1	78346	115	INSULATOR SUPP PANEL	10,183
R4B6	1	78347	185	ROOF PANEL ASSY	11,936
R4B6	1	78348	35	CASING STRUCTURE	40,073
R4B6	1	78349	55	CASING SHELL/PANEL	89,337
R4B6	1	78350	195	INLET-OUTLET FUNNEL	21,126
R4B6	1	78351	405	EXPANSION JOINTS	990
R4B6	1	78356	335	RECTIFIER HANDL SYST	10,587
R4B6	1	78357	205	SPLITTER&GUIDE VANES	3,048
R4B6	1	78359	415	CONTROL ROOM-INSERTS	4,300
R4B6	1	78360	485	CABLE-CABLE RACKS	17,450
R4B6	1	78361	625	EP PERF TEST EQUIPT	1,839
R4B6	1	78362	490	EARTHING,CABLE TRAYS,S	22,200
R4B6	1	78363	615	ASH LEVEL INDICATOR	542
R4B6	1	78365	285	APP PLATFORM-HOPPER	14,897
R4B6	1	78366	510	WATER WASHING SYSTEM	855
R4B6	1	78367	520	MIN WOOL FOR ESP INSUL	35,670
R4B6	1	78368	500	FIXING COMP. FOR ESP I	8,948
R4B6	1	78372	535	INTERLOCKS-EP	217
R4B6	1	78373	590	ELECTRICALLY OPERTD HO	1,500
R4B6	1	78374	610	OPACITY MONITOR & ACCE	100
R4B6	1	78376	551	RECTIFIRS&CONTRLS-EP	12,600
R4B6	1	78377	550	LT SWITCH BOARD/ESP SW	6,000
R4B6	1	78378	560	BAPCON & ACCESSORIES	146
R4B6	1	78380	5	FOUNDATION MATLS FOR E	2,068
R4B6	1	78381	15	SUPPOTING STRUCTURES F	64,529
R4B6	1	78390	440	HEATING ELEMENTS	960
R4B6	1	78393	570	RAPPER CONTROL PANEL	300
R4B6	1	78394	600	STATCON PANEL	300
R4B6	1	78451	646	EXPANSION JOINTS	7,585
R4B6	1	78452	647	DUCTS BETWEEN APH & ES	5,122
R4B6	1	78469	649	MINERAL WOOL FOR DUCT	8,700
R4B6	1	78470	650	FIXING COMP FOR DUCT I	3,500
R4B6	1	78485	651	DUCT SUPPORTS	2,400
R4B6	1	78552	653	DUCTS BETWEEN APH & ES	29,377

R4B6	1	78553	654	DUCTS BET ESP & ID FAN	30,284
R4B6	1	78569	655	MINERAL WOOL FOR DUCT	7,395
R4B6	1	78570	656	FIXING COMP FOR DUCT I	4,838
R4B6	1	78579	657	FOUNDATION MATLS. FOR	579
R4B6	1	78582	658	SUPP STRU FOR DUCTS AP	9,000
R4B6	1	78583	659	SUPP STRU FOR DUCT ESP	11,500
R4B6	1	78585	660	DUCT SUPPORTS	13,286
R4B6	1	78586	661	ACCESS DOOR AND PLATFO	6,000
R4B6	8	78888	641	E-SHOP COMMISSIONING S	8
R4B6	8	78988	640	COMMISSIONING SPARES	223
R4B6	1	78996	645	TOOLS & TACKLES	220
R4B6	1	89610	70	EP GALLERIES&STAIRS	8,610
R4B6	1	89610	65	EP GALLERIES&STAIRS	13,325
R4B6	1	89611	350	ESP ROOF HANDRAILS	3,448
R4B6	1	89611	345	ESP ROOF HANDRAILS	1,394
R4B6	1	89612	80	FLOOR GRILL AND STEP T	2,798
R4B6	1	89612	75	FLOOR GRILL AND STEP T	3,285
R4B6	1	89613	300	FLOOR GRILL AND MOBILE	2,868
R4B6	1	89613	295	FLOOR GRILL AND MOBILE	7,562
R4B6	1	89615	455	INSULATION CLADDING SH	7,872
R4B6	1	89615	460	INSULATION CLADDING SH	16,666
					26,78,054

UNIT -2, 200 MW

Cust	NS	PGMA	DPN	Description	Design wt-kg
R4B7	1	57460	450	GATE-ESP INLET	4,233
R4B7	1	57466	580	PLATFORMS AND LADDERS	2,882
R4B7	1	57470	355	GATE-ESP OUTLET	4,246
R4B7	1	57473	360	DAMPER-ESP OUTLET	10,694
R4B7	1	57577	585	ELECT ACTUATOR FOR GAT	600
R4B7	1	78201	30	ROLL/SLIDE SUPPORTS	1,206
R4B7	1	78205	435	ESP-SUB-DELIVERY COMPO	260
R4B7	1	78206	330	INSULATOR HOUSING AS	24,299
R4B7	1	78208	180	GAS DIST. ASSY	38,217
R4B7	1	78209	380	GD-RAPPING MECHANISM	7,242
R4B7	1	78210	390	GD_DRIVE ARRANGEMENT	426
R4B7	1	78211	240	GAS SCREEN-EP	4,486
R4B7	1	78213	110	EMIT SYST SUSPENSION	7,704
R4B7	1	78214	160	SUPPORT INSULATORS	5,936
R4B7	1	78215	250	EMITTING ELECTRODES	8,264
R4B7	1	78216	310	EMIT ELECT RAPP MECH	17,446
R4B7	1	78217	320	DRIVE ARGT. FOR EMIT.	14,434
R4B7	1	78219	100	COL ELEC SUSPENSION	39,367

R4B7	1	78220	170	COLLECTING ELECTRODE	3,87,081
R4B7	1	78221	130	EMIT SYS FRAME-TOP	65,166
R4B7	1	78222	150	EMIT SYS FRAME BOTOM	66,537
R4B7	1	78223	400	INSPECTION DOORS	1,488
R4B7	1	78224	220	SHOCK BARS	39,896
R4B7	1	78225	230	COLL ELECT RAPP MECH	46,718
R4B7	1	78226	370	COLL ELEC RAPP DRIVE	3,410
R4B7	1	78228	90	ESP ROOF PANELS	1,33,696
R4B7	1	78230	470	ELECTRICAL SD COMPTS	8,022
R4B7	1	78231	425	GEARED MOTORS FOR RAPP	10,800
R4B7	1	78232	140	EMIT SYS FRAME-MIDLE	65,916
R4B7	1	78237	480	JUNCTION BOX & PUSH BU	983
R4B7	1	78241	530	ELECTRICAL MISCELLANEO	6,000
R4B7	1	78242	260	OUTER ROOF-EP	63,574
R4B7	1	78243	50	HOPPER RIDGES	3,506
R4B7	1	78244	270	HOPPER UPPER PART	13,728
R4B7	1	78245	280	HOP MLD&LOWER PART	16,697
R4B7	1	78246	120	INSULATOR SUPP PANEL	41,938
R4B7	1	78247	190	ROOF PANEL ASSY	14,718
R4B7	1	78248	40	CASING STRUCTURE	93,083
R4B7	1	78249	60	CASING SHELL/PANEL	1,10,554
R4B7	1	78250	200	INLET-OUTLET FUNNEL	73,711
R4B7	1	78251	410	EXPANSION JOINTS	5,581
R4B7	1	78256	340	RECTIFIER HANDL SYST	18,880
R4B7	1	78257	210	SPLITTER&GUIDE VANES	9,225
R4B7	1	78261	630	EP PERF TEST EQUIPT	7,887
R4B7	1	78262	495	EARTHING,CABLE TRAYS,S	24,000
R4B7	1	78263	620	ASH LEVEL INDICATOR	1,000
R4B7	1	78264	635	MISCELLANEOUS ITEMS	5,000
R4B7	1	78265	290	APP PLATFORM-HOPPER	16,625
R4B7	1	78266	515	WATER WASHING SYSTEM	650
R4B7	1	78267	525	MIN WOOL FOR ESP INSUL	75,516
R4B7	1	78268	505	FIXING COMP. FOR ESP I	20,002
R4B7	1	78272	540	INTERLOCKS-EP	1,100
R4B7	1	78273	595	ELECTRICALLY OPERTD HO	3,372
R4B7	1	78276	556	RECTIFIRS&CONTRLS-EP	50,400
R4B7	1	78277	555	LT SWITCH BOARD/ESP SW	4,000
R4B7	1	78278	565	BAPCON & ACCESSORIES	147
R4B7	1	78281	20	SUPPOTING STRUCTURES F	34,885
R4B7	1	78290	445	HEATING ELEMENTS	1,300
R4B7	1	78292	545	AUXILIARY CONTROL PANE	4,000
R4B7	1	78293	575	RAPPER CONTROL PANEL	600
R4B7	1	78294	605	STATCON PANEL	600
R4B7	1	78301	25	ROLL/SLIDE SUPPORTS	3,104

R4B7	1	78305	430	ESP-SUB-DELIVERY COMPO	73
R4B7	1	78306	325	INSULATOR HOUSING AS	7,192
R4B7	1	78308	175	GAS DIST. ASSY	10,536
R4B7	1	78309	375	GD-RAPPING MECHANISM	1,647
R4B7	1	78310	385	GD_DRIVE ARRANGEMENT	117
R4B7	1	78311	235	GAS SCREEN-EP	1,176
R4B7	1	78313	105	EMIT SYST SUSPENSION	1,931
R4B7	1	78314	155	SUPPORT INSULATORS	1,484
R4B7	1	78315	245	EMITTING ELECTRODES	2,402
R4B7	1	78316	305	EMIT ELECT RAPP MECH	3,780
R4B7	1	78317	315	DRIVE ARGT. FOR EMIT.	3,710
R4B7	1	78319	95	COL ELEC SUSPENSION	11,568
R4B7	1	78320	165	COLLECTING ELECTRODE	1,13,448
R4B7	1	78321	125	EMIT SYS FRAME-TOP	13,610
R4B7	1	78322	145	EMIT SYS FRAME BOTOM	16,800
R4B7	1	78323	395	INSPECTION DOORS	2,139
R4B7	1	78324	215	SHOCK BARS	8,752
R4B7	1	78325	225	COLL ELECT RAPP MECH	9,808
R4B7	1	78326	365	COLL ELEC RAPP DRIVE	816
R4B7	1	78328	85	ESP ROOF PANELS	14,003
R4B7	1	78330	465	ELECTRICAL SD COMPTS	2,006
R4B7	1	78331	420	GEARED MOTORS FOR RAPP	2,500
R4B7	1	78332	135	EMIT SYS FRAME-MIDLE	15,535
R4B7	1	78337	475	JUNCTION BOX & PUSH BU	230
R4B7	1	78342	255	OUTER ROOF-EP	25,297
R4B7	1	78343	45	HOPPER RIDGES	5,614
R4B7	1	78344	265	HOPPER UPPER PART	26,905
R4B7	1	78345	275	HOP MLD&LOWER PART	37,238
R4B7	1	78346	115	INSULATOR SUPP PANEL	10,183
R4B7	1	78347	185	ROOF PANEL ASSY	11,936
R4B7	1	78348	35	CASING STRUCTURE	40,073
R4B7	1	78349	55	CASING SHELL/PANEL	89,337
R4B7	1	78350	195	INLET-OUTLET FUNNEL	21,126
R4B7	1	78351	405	EXPANSION JOINTS	990
R4B7	1	78356	335	RECTIFIER HANDL SYST	10,587
R4B7	1	78357	205	SPLITTER&GUIDE VANES	3,048
R4B7	1	78359	415	CONTROL ROOM-INSERTS	4,300
R4B7	1	78360	485	CABLE-CABLE RACKS	17,450
R4B7	1	78361	625	EP PERF TEST EQUIPT	1,839
R4B7	1	78362	490	EARTHING,CABLE TRAYS,S	22,200
R4B7	1	78363	615	ASH LEVEL INDICATOR	542
R4B7	1	78365	285	APP PLATFORM-HOPPER	14,897
R4B7	1	78366	510	WATER WASHING SYSTEM	855
R4B7	1	78367	520	MIN WOOL FOR ESP INSUL	35,670

R4B7	1	78368	500	FIXING COMP. FOR ESP I	8,948
R4B7	1	78372	535	INTERLOCKS-EP	217
R4B7	1	78373	590	ELECTRICALLY OPERTD HO	1,500
R4B7	1	78374	610	OPACITY MONITOR & ACCE	100
R4B7	1	78376	551	RECTIFIRS&CONTRLS-EP	12,600
R4B7	1	78377	550	LT SWITCH BOARD/ESP SW	6,000
R4B7	1	78378	560	BAPCON & ACCESSORIES	146
R4B7	1	78380	5	FOUNDATION MATLS FOR E	2,068
R4B7	1	78381	15	SUPPOTING STRUCTURES F	64,529
R4B7	1	78390	440	HEATING ELEMENTS	960
R4B7	1	78393	570	RAPPER CONTROL PANEL	300
R4B7	1	78394	600	STATCON PANEL	300
R4B7	1	78451	646	EXPANSION JOINTS	7,585
R4B7	1	78452	647	DUCTS BETWEEN APH & ES	5,122
R4B7	1	78469	649	MINERAL WOOL FOR DUCT	8,700
R4B7	1	78470	650	FIXING COMP FOR DUCT I	3,500
R4B7	1	78485	651	DUCT SUPPORTS	2,400
R4B7	1	78552	653	DUCTS BETWEEN APH & ES	29,377
R4B7	1	78553	654	DUCTS BET ESP & ID FAN	30,284
R4B7	1	78569	655	MINERAL WOOL FOR DUCT	7,395
R4B7	1	78570	656	FIXING COMP FOR DUCT I	4,838
R4B7	1	78579	657	FOUNDATION MATLS. FOR	579
R4B7	1	78582	658	SUPP STRU FOR DUCTS AP	9,000
R4B7	1	78583	659	SUPP STRU FOR DUCT ESP	11,500
R4B7	1	78585	660	DUCT SUPPORTS	13,286
R4B7	1	78586	661	ACCESS DOOR AND PLATFO	6,000
R4B7	8	78888	641	E-SHOP COMMISSIONING S	8
R4B7	8	78988	640	COMMISSIONING SPARES	223
R4B7	1	89610	65	EP GALLERIES&STAIRS	13,325
R4B7	1	89610	70	EP GALLERIES&STAIRS	8,610
R4B7	1	89611	350	ESP ROOF HANDRAILS	3,448
R4B7	1	89611	345	ESP ROOF HANDRAILS	1,394
R4B7	1	89612	75	FLOOR GRILL AND STEP T	3,285
R4B7	1	89612	80	FLOOR GRILL AND STEP T	2,798
R4B7	1	89613	295	FLOOR GRILL AND MOBILE	7,562
R4B7	1	89613	300	FLOOR GRILL AND MOBILE	2,868
R4B7	1	89615	460	INSULATION CLADDING SH	16,666
R4B7	1	89615	455	INSULATION CLADDING SH	7,872
					26,77,679

UNIT 4 -500 MW

R4B9	1	79701	15	ROLL/SLIDE SUPPORTS	4,600
R4B9	1	79705	205	ESP-SUB-DELIVERY COMPO	568
R4B9	1	79706	155	INSULATOR HOUSING AS	53,625
R4B9	1	79708	85	GAS DIST. ASSY	76,694
R4B9	1	79709	175	GD-RAPPING MECHANISM	13,570
R4B9	1	79710	180	GD_DRIVE ARRANGEMENT	458
R4B9	1	79711	115	GAS SCREEN-EP	7,189
R4B9	1	79713	50	EMIT SYST SUSPENSION	17,604
R4B9	1	79714	75	SUPPORT INSULATORS	7,680
R4B9	1	79715	120	EMITTING ELECTRODES	25,212
R4B9	1	79716	145	EMIT ELECT RAPP MECH	37,241
R4B9	1	79717	150	DRIVE ARGT. FOR EMIT.	33,775
R4B9	1	79719	45	COL ELEC SUSPENSION	1,15,420
R4B9	1	79720	80	COLLECTING ELECTRODE	11,53,571
R4B9	1	79721	60	EMIT SYS FRAME-TOP	1,09,100
R4B9	1	79722	70	EMIT SYS FRAME BOTOM	1,58,462
R4B9	1	79723	185	INSPECTION DOORS	4,464
R4B9	1	79724	105	SHOCK BARS	91,681
R4B9	1	79725	110	COLL ELECT RAPP MECH	92,162
R4B9	1	79726	170	COLL ELEC RAPP DRIVE	3,662
R4B9	1	79728	40	ESP ROOF PANELS	1,21,665
R4B9	1	79730	215	ELECTRICAL SD COMPTS	14,720
R4B9	1	79731	200	GEARED MOTORS FOR RAPP	24,400
R4B9	1	79732	65	EMIT SYS FRAME-MIDLE	1,89,012
R4B9	1	79737	220	JUNCTION BOX & PUSH BU	1,670
R4B9	1	79742	125	OUTER ROOF-EP	1,43,425
R4B9	1	79743	25	HOPPER RIDGES	15,703
R4B9	1	79744	130	HOPPER UPPER PART	76,367
R4B9	1	79745	135	HOP MLD&LOWER PART	70,800
R4B9	1	79746	55	INSULATOR SUPP PANEL	95,291
R4B9	1	79747	90	ROOF PANEL ASSY	21,498
R4B9	1	79748	20	CASING STRUCTURE	1,25,555
R4B9	1	79749	30	CASING SHELL/PANEL	1,68,460
R4B9	1	79750	95	INLET-OUTLET FUNNEL	1,52,344
R4B9	1	79751	190	EXPANSION JOINTS	40,724
R4B9	1	79753	296	DUCTS BET ESP & ID FAN	24,224
R4B9	1	79756	160	RECTIFIER HANDL SYST	4,018
R4B9	1	79757	100	SPLITTER&GUIDE VANES	19,924
R4B9	1	79759	195	CONTROL ROOM-INSERTS	17,000
R4B9	1	79760	225	CABLE-CABLE RACKS	1,01,604
R4B9	1	79761	280	EP PERF TEST EQUIPT	16,104

R4B9	1	79762	230	EARTHING,CABLE TRAYS,S	90,000
R4B9	1	79763	275	ASH LEVEL INDICATOR	3,000
R4B9	1	79765	140	APP PLATFORM-HOPPER	14,836
R4B9	1	79766	240	WATER WASHING SYSTEM	1,225
R4B9	1	79767	245	MIN WOOL FOR ESP INSUL	1,79,655
R4B9	1	79768	235	FIXING COMP. FOR ESP I	33,817
R4B9	1	79769	297	MINERAL WOOL FOR DUCT	70,470
R4B9	1	79770	298	FIXING COMP FOR DUCT I	30,000
R4B9	1	79772	250	INTERLOCKS-EP	2,021
R4B9	1	79773	270	ELECTRICALLY OPERTD HO	3,000
R4B9	1	79776	285	RECTIFIRS&CONTRLS-EP	1,15,200
R4B9	1	79777	260	LT SWITCH BOARD/ESP SW	8,000
R4B9	1	79778	265	BAPCON & ACCESSORIES	439
R4B9	1	79780	5	FOUNDATION MATLS FOR E	4,568
R4B9	1	79781	10	SUPPOTING STRUCTURES F	1,19,945
R4B9	1	79783	299	SUPP STRU FOR DUCT ESP	16,000
R4B9	1	79785	300	DUCT SUPPORTS	2,000
R4B9	1	79786	301	ACCESS DOOR AND PLATFO	6,000
R4B9	1	79790	210	HEATING ELEMENTS	2,000
R4B9	1	79792	255	AUXILIARY CONTROL PANE	8,000
R4B9	8	79988	290	COMMISSIONING SPARES	600
R4B9	1	79996	295	TOOLS & TACKLES	182
R4B9	1	89610	35	EP GALLERIES&STAIRS	11,919
R4B9	1	89611	165	ESP ROOF HANDRAILS	9,723
R4B9	1	89612	36	FLOOR GRILL AND STEP T	9,061
R4B9	1	89613	141	FLOOR GRILL AND MOBILE	7,562
R4B9	1	89615	236	INSULATION CLADDING SH	40,320
					42,40,790

BOQ FOR ELECTRICAL ITEMS AT KORBA STAGE -I & II

Sl.no	Discription of items	UOM	Quantity STAGE -I 3X200MW	ERECTION WEIGHT/BOILER STAGE-I	TOTAL ERECTION WEIGHT STAGE-I IN KG	Quantity STAGE -II 3X500 MW	ERECTION WEIGHT/BOILER STAGE-II	TOTAL ERECTION WEIGHT STAGE-II IN KG
SECTION-E5 : MCC & ACP Panel								
E5A.1	LTMSB Erection, Testing and commissioning.8500L X 1500 W X 2450 H (Tentative) for New ESP	Nos	3	5000	15000	**24**	**600**	**14400**
E5A.2	Auxilary Control Panel (for New ESP)	Nos	3	1000	3000	**0**	**o**	
SECTION-E5 B : STARTER PANEL/BOXES/POWER DISTRIBUTION BOX/MARSHALLING BOXES								
E5B.1	Electronic Control Panel, Overall dimensions approx.700X650X2000mm, approx.Weight of each panel 0.3MT. ARECA CONTROLLER approx .dimension280x210x210mm, rotary switches, etc along with cables and connectors, shall be supplied loose for mounting in the panel at site.Erection ,Testing and commissioning. (Including existing and New ESP)	Nos	105	300	31500	192	300	57600

E5B.2	RAPPER CONTROL PANEL Overall dimension approx.1000X650X2000 mm, approx.Weight of each panel 0.30 MT. 04 Nos. RAPCON Electronic modules for each panel (along with cables connectors) size 280 x210x210 mm shall be supplied loose for mounting in the panel at site.Erection ,Testing and commissioning. (New ESP)	Nos	3	500	1500	0		0
E5B.3	IOS PANEL overall dimension approx.1000x500x2050 mm,approx. Weight of panel 0.2 MT along with loose accessories such as IOS PC, Computer Furniture, Data Logger PC, Printer -4 Nos. PC termination box, peripheral cables etc.Erection ,Testing and commissioning.(Including existing and New ESP)	set	6	30	180	0		0
SECTION- E 5F: MISCELLANEOUS EQUIPMENTS								
E5F.1	Ash Level Indicator comprising of level probe with extension lagging pipe, Electronic Unit, Interconnecting Cabling , Conduiting& termination, etc up to JB.(Including existing and New ESP)	Set.	**630**	**15**	**9450**	1152	15	17280

E5F.2	Opacity Monitor Consisting of Transmitter & Receiver, Electronic Unit, Air Blower unit, Weather Proof housings, Junction boxes, flexible hoses, mounting flanges with pipe for Transmitter, Receiver & Air blower, interconnec-ted cables etc. for mounting on ESP outlet duct.(Including existing and New ESP)	Set.	9	50	450	12	50	600
E5F.3	Electrically Operated hoist erection ,testing and commissionig. 3Ton Capacity(Including existing and New ESP)	Nos	9	1200	10800	12	1200	14400
SECTION-E1A: CABLE TRAYS AND ACCESSORIES								
E1A.1	Ladder type 600(W) x 120 (H) mm	Mtrs.	1170	3500	10500	2700	8070	24210
E1A.2	Ladder type 450(W) x 120 (H) mm	Mtrs.	2250	4875	14625	1350	3000	9000
E1A.3	Ladder type 300(W) x 120 (H) mm	Mtrs.	900	1750	5250	2250	4369	13107
E1A.4	Ladder type 150(W) x 120 (H) mm	Mtrs.	9000	15500	46500	900	1462	4386
E1A.5	Ladder type 150(W) x 120 (H) mm	Mtrs.	2700	4950	14850			
E1A.6	SUPPORT CHANEL (Single)Along with cantilever,clams base plate,anglefitting,fasteener,spring nut etc. for above tray	Mtrs.	393	7202	21606			
E1A.7	SUPPORT CHANEL(DOUBLE)Along with cantilever,clams base plate,anglefitting,fasteener,spring nut etc.for above tray	Mtrs.	308					
SECTION-E2A : HT POWER CABLES 6.6 KV AL.PE (Generally Unarmoured)								
EA2A.1	3X150 SQ MM.AL,XL,PE,UNARMOURED	Mtrs	3000					
EA2A.2	3X150 SQ MM.AL,XL,PE,CABLE	No	6					

	TERMINATION AT TRANSFORMER AND BREAKER END.HT JOINT							
SECTION-E2B : LT POWER CABLES (Generally Unarmoured)								
E2B.1	2C X 120 sqmm Aluminium	Mtrs.	34800	19488	58464	111000	62160	186480
E2B.2	3C X 16 sqmm Aluminium	Mtrs.	1200	960	2880	3000	2400	7200
E2B.3	3C X 25 sqmm Aluminium	Mtrs.	2100	622	1866	64500	18920	56760
E2B.4	3C X 2.5sqmm cu.	Mtrs.	33300	2550	7650	106500	16401	49203
E2B.5	2Cx 2.5 sqmm,Cu	Mtrs.	21600	3600	10800	39000	6500	19500
E2B.6	3Cx 10 sqmm Aluminium	Mtrs.	1800	450	1350	6000	1500	4500
E2B.7	3.5 Cx 120 Sq mm Al					6000	4032	12096
SECTION-E2C : LT CONTROL CABLES (Generally Unarmoured, Screened or Unscreened)								0
E2C.1	4C ,1.5 sqmm Copper(Screened)	Mtrs.	9000	3400	10200	76500	28851	86553
E2C.2	3C ,1.5 sqmm Copper (PVC)	Mtrs.	19500	2750	8250	27000	3780	11340
E2C.3	7C, 1.5 sqmm Copper (PVC)	Mtrs.	3000	2220	6660			0
E2C.4	12C ,1.5 sqmm Copper (Unarmoured)	Mtrs.	34500	3000	9000	132000	1144	3432
E2C.5	14C ,1.5 sqmm Copper (Unarmoured)	Mtrs.	4200	1400	4200			
SECTION-E3 : JUCTION BOXES AND PUSH BUTTON								
E3.1	Junction Boxes (Control) 485x150x360 mm approx.	Nos.	180	15	2700	132	15	1980
E3.2	Start Stop Push Button Station 180X100X250 mm approx.	Nos.	225	2	450	438	2	876
E3.3	Junction box for Hoper ,Support& Shaft heaters 500X178X315 mm approx.	Nos.	183	50	9150	264	50	13200
SECTION-E 6 :EQUIPMENT EARTHING MATERIALS (ESP)								
E6.1	50 x 6 mm GI earthing flat	Mtrs.	3000	2355	7065	3000	5500	16500
E6.2	30 X 5 mm GI earthing flat	Mtrs.	2700	1060	3180	2550	1123	3369
E6.3	GI earthing wire 3.15mm Dia.	Mtrs.	5400	1800	5400	2550	44	132

E6.4	Earth Pit for Neutral Grounding along with connecting link as per Drg	No	6					
SECTION- E8 :SERVICE TRANSFORMER OIL FILLED TRANSFORMERS								
E8.1	Three-phase2000KVA, 6.6 KV /415V Tran**sformer** including all accessories, Erection,Testing,Oil Filtration , Oil Testing and cabling etc. as described in Tender Specification.	No	3	5000	15000			
SECTION-E 9 : ONLY TESTING & COMMISSIONING								
E9.1	Heating elements for Hopper Heater of ESP Tubler type testing,commissioning	sets	2808	1	2808	4608		
E9.2	Heating elements for Support Insulator Heater, Shaft Insulator Heaters of ESP	Nos.	468	4	1872	960		
E9.3	High Voltage Rectifier Transformers (i.95 KV peak, 600 mA ii.95 KV peak, 800 mA) including oil filtration if required.(Including existing and New ESP)	Nos.	105	1500	157500	192		
E9.4	Testing & Commissioning of Collecting, Emitting, GD Screen Motor including dry out.(Including existing and New ESP)	Nos.	225			408		
E9.5	Testing and commissioning of 415 V LT motors including dry out.	Nos.						
E9.7	Thermostats including Calibration.(Including existing and New ESP)	Nos.	204	1	204	432		

E9.8	Electrically (LT) Dampers and Gates with Actuators, Limit Switches etc. (Regulating & ON/OFF Type). (Including existing and New ESP)	Nos.	30			25		
E9.9	Existing LTMSB Erection,testing and commissioning.8500L X 1500 W X 2450 H (Tentative)	Nos	1			3		
E9.10	Existing Auxilary Control Panel	Nos	4			12		
E9.11	RAPPER CONTROL PANEL Testing and commissioning existing panel.	Nos	2			12		
SECTION-E 10 : FIRE PROOF SEALING WORK								
E10.1	Fireproof Sealing in cables Below PCC/MCC/EC cables	Sq. Mtr	SET			SET		
E10.2	Fireproof Sealing in cables Cut Out RISERS/Wall Crossing.	Sq. Mtr	SET			SET		
WORK SECTION-E 11: ILLUMINATION								
E11.1	Illumination work at the ESP Top,Stair case, New ESParea,New MCC room and service Transformer area,		SET			SET		
CABLE REMOVAL AND REROUTING OF ID FAN & ACCESSARIES								
A	**POWER CABLE REMOVAL/RELAYING (DE TERMINATION AND RETERMINATION)**							
1	3CX185 SQ MM AND ABOVE 6.6 /11 KV XLPE (ARMOURED/UN ARMOURED) PVC CABLE	MTR	600			1200		
B	**LT POWER CABLE REMOVAL / RELAYING(DE TERMINATION AND RETERMINATION)**							

1	3CX2.5/6/10/25 SQ MM LT(ARMOURED/UNARMOURED) PVC CABLE	MTR	1000			1500		
C	**LT CONTROL CABLE REMOVAL/RELAYING (DE TERMINATION AND RETERMINATION)**							
1	3C/4C/7CX1.5/2.5 SQ MM CONTROL (ARMOURED/UNARMOURED) PVC CABLE	MTR	3000			5000		
2	10C/12C/7CX1.5/2.5 SQ MM CONTROL (ARMOURED/UNARMOURED) PVC CABLE	MTR	3000			5000		
D	**SCREENED,PAIR CABLE REMOVAL/RELAYING (DE TERMINATION AND RETERMINATION)**							
1	2P,4P,8P SCREENED CABLE	MTR	5000			8000		
2	16P,24P,SCREENED CABLE	MTR	5000			8000		

	511860		628104
	511.86	**MT**	**628.104**

Total weight of Electrical Items **1139.964 MT**

Total Wt. of Electrical components for Package – 1 i.e. this Package : 551.00 M Tons

NOTE FOR WEIGHT SCHEDULE:

1. The weights given are only approximate and for general guidance and they are subject to variation as per site requirement for dismantling &design consideration for erection.
2. The information furnished is only a description regarding the items to be erected by the contractor. BHEL reserves the right to add or exclude any components / items / system according to the site requirements / customer requirements to complete the systems in all respects.
3. Any other systems / Components which are integraltoESP& auxiliaries, supplied by BHEL manufacturing units are also to be erected and commissioned by the contractor within the quoted / accepted tonnage rate / lump sum value.
4. Insulation: Removal of existing insulation from Complete ESP and ducts limited to scope of work
5. Erection & dismantling of air blowers and connecting pipes , ducts and cables, providing blanks/ dummies at the required locations and conducting gas-tightness test is in the scope contract and shall be carried out within the quoted price.

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

1.10.1 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the workwithin the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

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

1.10.3 Contractor shall execute the work as per sequence and procedure prescribed by BHEL atsite. The applicable erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any rework on this failure to comply with will be to account contractor only. BHEL engineer, depending upon the availability of materials, fronts etc, will decide thesequence of erection and methodology. No claims for extra payment from the contractor willbe entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.

1.10.4 Contractor has to work in close co-ordination with other erection agency at site. BHELengineer will co-ordinate area clearance. In a project of such magnitude, it is possible thatthe area clearance may be less/more at a particular given time. Activities and erectionprogram have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange &augment the resources accordingly.

1.10.5 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe/tubes, and handrails etc for any temporary supporting or scaffolding works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined

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

1.10.6 The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.

1.10.7 No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

1.10.8 Contractors shall ensure that all their Staff/Employees are exposed to periodical training program conducted by qualified agencies/ personnel on ISO 9001 – 2000 Standards.

1.10.9 For other agencies, such as piping, cabling, instrumentation, insulation etc., to commence their work from/on the equipments coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence/continue the work so as to keep the overall project schedule.

1.10.10 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

1.10.11 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.12 On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.13 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.14 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the sit premises. Without the EntryGatePass these materials will not be allowed to be taken outside.

1.10.15 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.16 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.17 **SITE INSPECTION**

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

1.10.18 **UTILITY POINTS**

1.10.18.1 Number of utility points (Service / plant air, service / plant water, service / washing steam, inert gas (N2) etc., shall be indicated in the P & I diagram. The utility points shall be located at convenient point to handle. Contractor to locate the utility points as advised by site engineer.

Safety

Adherences to safety are upper most during execution of work. 100% safety norms to be strictly followed.Tenderer should appoint qualified safety officer tom implement safety. He should interact with BHEL and customer for day to day activities. As the work is to be executed in the running plant, all work force to undergo for a safety classes and obtain the certificate from customer. No person will be allowed with out safety training.

Trained and certified safety supervisors to be appointed for every 50 work men. The safety officer, supervisors are not allowed to assigning any work other than safety. Heavy penalty will be levied if any un -safe practices are found during execution of work.

Penalty

a) Fatal injury or accident causing death:
Penalty @ Rs.5,00,000 per person .
b)Major injuries of permanent disablement
Penalty @ Rs.1,00,000 per person.

Insurance

In addition to the conditions covered under the GCC &SCC , following provisions will also apply:

1. Comprehensive Automobile Insurance

Insurance shall be in such a form to protect the Contractor against all claims for injuries ,disability , disease and death to members of public including the Owner's men and damage to the property of others arising from the use of motor vehicles during on or off the site operations ,, irrespective of the ownership of such vehicles ..
The liability covered shall be as herein indicated.

Fatal Injury
Rs. *1,00;000/-* each person
Rs. *2,00,000/-* each occurrence
Property Damage
Rs.1,00,000/- each occurrence.

2. Comprehensive General Liability Insurance

The insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act of omission on the part of the Contractor, his agents, his employees, his representatives and Sub-contractors or from_ riots, strikes and civil connation. This insurance shall also cover all the liabilities of the Contractor arising out of the Clause entitled "Defence of Suits" in Section GCC, Conditions of Contract.

Quality:
Qualified and certified quality engineer to be posted at site for quality assurance. The quality person should maintain all records and reports to be generated as per BHEL quality standards. He should interact with customer and BHEL and all the stage wise protocols to be prepared after joint inspection and get is signed by BHEL and customer. All the record to be maintained and he is responsible for quality audit carried out by BHEL and customer.

1.11.1 Foundation for the equipments to be erected shall be provided by BHEL/ clients of BHEL. The dimension of the foundation and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipments plants shall be carried out by the contractor.

1.11.2 Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., de-watering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form/shuttering work are within the scope this work.

1.11.3 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 30 mm for obtaining proper face for packer plates/shims, and may be required for the erection of the equipment/plants will have to be carried out by the contractor without extra cost.

1.11.4 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments

1.11.5 Foundation pockets are to be cleaned thoroughly before placing the columns/equipments. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement., if required cleaning of the threads to be done with proper dies.

1.11.6 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineers instructions.

1.11.7 The certificates of the grout is to be submitted BHEL. If necessary test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards. In case grouting with Portland cement is approved, necessary cement, sand etc to be arranged by the contractor including the fine aggregates.

1.11.8 All the materials required for grouting including special cements like Conbextra GPI,GP2, ACC- Shrinkkomb-N20, SikaAnckor, NSG/ NSG -1, CICO Excem GP, or its equivalent as approved by BHEL and other materials like Portland cement, sand etc., are to be arranged by the contractor at his cost.It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.

1.11.9 Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates/sheets at site by the contractor to meet site requirement. However machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.

1.11.10 PROCEDURE FOR GROUTING **:**

Contractor has to carry out the grouting as per the work instructions for grouting available at site (As per FQP).

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

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

1.13.2 All the dampers, valves, lifting equipments, power cylinders, etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre commissioning. The bearings of dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning in the equipments, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract.

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

1.13.4 Any other systems / Components which are integral to ESP & auxiliaries, supplied by BHEL manufacturing units are also to be erected and commissioned by the contractor within the quoted / accepted tonnage rate / lumpsum value.

1.13.5 **Insulation& cladding:** With respect to insulation and cladding it shall be for the complete ESP including inner roof of ESP .

1.13.6 The Erection &Alignment of HV Rectifier transformer are in the scope of contractor. However, dry out, testing and commissioning is not in the scope of this contract.

1.13.7 Erection & dismantling of air blowers and connecting pipes & ducts, providing blanks/ dummies at the required locations and conducting gas-tightness test is in the scope contract and shall be carried out within the quoted rate.

1.13.8 Fine fittings and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.

1.13.9 All welded joints should be painted with anti corrosive paint, once NDE works are over.

1.13.10 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.

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

1.13.12 Certain extra lengths of various tubes/pipes and fabricated ducts are provided as erection allowance and the same have to be cut/adjusted to suit the site conditions and layouts or certain small lengths may have to be added for adjustments to suit the site conditions. For any mismatch while matching the joints in tubes, the cutting, adjusting, re welding, addition spool pieces should be done by the contractor to match site conditions without any extra payment.

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

1.13.14 HSFG Bolts are to be tightened by turn of nut method/Torque Wrench, as per the instruction of BHEL Engineer. The bolted joints shall be jointly checked by BHEL/Customer and contractors personnel for the required tightness and retightened wherever necessary. The tightened bolts shall be identified by color paints. Facility for random checking with calibrated Torque Wrench shall also be provided by contractor.

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

1.13.16 D.S.L / equivalent system for hoisting equipments are also to be erected and commissioned including load testing by the contractor within the quoted rates.

Required manpower including electricians is to be arranged by the contractor for carrying out commissioning of electrical hoist and load testing of the above electrical hoist. Required loads will be provided by BHEL free of cost.

1.13.17 The temporary structures/items welded to permanent members/pipes are to be cut and removed without any damage. Any damage so to be made good by the contractor at his cost.

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

1.13.19 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be removed/attended as per BHEL engineer. Fixing, welding of necessary instrumentation tapping points, to be provided on auxiliaries covered within the scope of this specification will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The fixing / welding of all the above items will be contractor's responsibility even if the

i) Product groups under which these items are not specifically indicated in the Tender Specification.

ii) Items are supplied by an agency other than BHEL

1.13.20 For skid mounted equipment, the checking and re-alignment required at site is in the scope of work.

1.13.21 All the shafts of rotating equipment shall have to be properly aligned to those of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment.

1.13.22 All the equipments /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joints assemble and other components as per instruction of BHEL Engineer during erection at the quoted rate.

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

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

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

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

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

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

1.13.29 ESP collecting Electrodes may require straightening and repair due to minor transport damages before erection and spot heating in position to get correct alignment which shall be done by contractor within the quoted price.

1.13.30 Additional platforms of permanent nature for approaching different equipments, as per site requirement which may not be indicated in drawings shall be fabricated and installed by the contractor. However the contractor will be paid

for this work on accepted tonnage rate for erection. The material required for platform will be supplied by BHEL free of cost.

1.13.31 One layer of insulation mattress on roof top of E.S.P roof (inner) shall be applied before outer roof is placed. The scope shall also include the above work even though the materials are supplied under some other product group and the erected materials shall be paid at the accepted tonnage rate for ESP.

1.13.32 Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.

1.13.33 In case of piping connected to equipment, matching of flanges for achieving the parallelism and alignment at equipment end by suitably resorting to heat correction or other method as instructed by BHEL Engineer is within scope of work.

1.13.34 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.

1.13.35 Wherever elbows of 45 deg or any other angle are required, the same shall be cut from 90 deg. elbow supplied and used. No extra cost shall be paid.

1.13.36 Erection of flow switches, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL/Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

1.13.37 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles/orifices/ metering elements fixed on piping as per the instructions of BHEL Engineer.

1.13.38 Welding of all thermo wells, draft, pressure and temperature instrumentation points and all other instrumentation points on piping and auxiliaries and welding of thermocouple pads arein the scope of work.

1.13.39 Plate / Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc.,

shall be supplied by BHEL duly bent and threaded. Assembly and necessary cutting work etc., shall be carried out at site by contractor within the quoted rate.

1.13.40 Wherever hanger and support materials are not received from manufacturing unit in time to suit the erection schedule, contractor shall erect the system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap/spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports.

1.13.41 No separate payment will be made for the edge preparation of pipes, Standard fittings such as bends, Tees etc.,

1.13.42 Contractors has to carryout fabrication works such as welding of stubs / nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

1.13.43 Adjustments like removal of ovalities in pipes and opening or closing the fabricated bends piping to suit the layout shall be considered part of work and the contractor is required to carry out such work free of cost, as per instructions of BHEL.

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

1.14.1 Refer forms F -14 to F-18 of volume I D of volume -I book-II. Plan and review will be done as per the formats.

1.14.2 Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additionalresources considered necessary at no extra cost to BHEL.

1.14.3 Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.

1.14.4 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer as per the format enclosed with this tender document.

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

1.14.6 The monthly report ending on 24th of every month shall be submitted as a booklet and shall contain the following details :-

a) Colour Progress photographs to accompany the report should be submitted.

b) Erection progress in terms of tonnage, welding joints, radiography, stress relieving, etc., completed as relevant to the respective work areas against planned.

c) Site Organization chart of engineers & supervisors as on 24th of the month with further mobilization plan

d) Category- wise man hours engaged during the previous month under the categories of fitters, welders, riggers, khalasis, grinder-men, gas-cutters, electricians, crane operations and helpers. Data will be spilt up under the work area of Boiler

e) Consumables report giving consumption of all types of gases and electrodes during the previous month.

f) Availability report of cranes

g) Safety implementation report in the format

h) Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

1.14.7 The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

1.14.8 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

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

1.15.1 All welders including tack welders, structural and high pressure welder shall be tested and approved by BHELEngineer before they are actually engaged on work even though they may possess a valid certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification AND performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

1.15.2 Engineer may stop any welder from the work if his performance isunsatisfactoryfor any technical reason or if there is a high percentage ofrejection in the joints welded by him. The welders having passed qualificationtests does not absolve the contractor of contractual obligationto continuously check the welder's performance.

1.15.3 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The Engineer prior to any repair being madeshallapprove the procedure for the repair of defective welds. After therepair has been carried out, the compliance shall be submitted to thequality engineer.

1.15.4 All expenses for testing of contractor's welders including destructive andNon-destructive tests conducted by BHEL at site or at laboratory shall havetobe borne by the contractor only. Limited quantity of tube and pipematerial required for making test pieces will be supplied by BHEL free ofcost.

1.15.5 Only BHEL approved electrodes and filler wire will be used. All electrodesshall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot.

1.15.6 The contractor shall also be equipped for carrying out other NDT like LPI /MPI / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates.

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

1.16 TESTING , PRE – COMMISSIONING & COMMISSIONING AND POST COMMISSIONING

(All the works mentioned hereunder shall be carried out within the quoted and accepted rate)

1.16.1 Contractor to provide necessary commissioning assistance from pre-commissioning state onwards and up to continuous operation of the unit & handing over to customer.

1.16.2 The contractor shall carry out all the required tests on the equipments erected such as gas tightness test for ESPs &ducts, kerosene leak test, air flow test, etc., using contractor's own consumables, labour and scaffoldings.

1.16.3 It is the responsibility of the contractor to provide necessary manpower, tools, tackles and consumable within the quoted price to carry out the Gas Distribution test of ESP.

1.16.4 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications. All the tests should be repeated till all the equipments satisfy the requirement / obligation of BHEL to their customer. All the repairs (shop welded or site welded) arising out of the failures during testing shall be done by the contractor as part of the work.

1.16.5 For conducting gas tightness test, it may be required to erect the blowers and connecting ducts and commission the same for tightness test. It is the responsibility of the contractor to erect the blowers & dismantle once the test is over. Contractor shall carry out the work within the quoted rate and BHEL will provide only the required materials, like Blowers venture meter and dummies free of hire charges for conducting the test. Agency to arrange required cable for power supply for the Blowers.

1.16.6 Fixing dummy plates at required locations for conducting tightness test and normalizing after the test is over, is also covered in the scope of contract and shall be carried out within the quoted rate. BHEL will provide raw materials for the dummy plates.

1.16.7 The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.

1.16.8 The ESP rectifier transformers are to be only erected by the contractor. Testing, commissioning and oil filtering is not in the scope of this contract.

1.16.9 In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part are required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.

1.16.10 During commissioning, opening / closing of valves, changing of gaskets, Re-alignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price /rates shall also include all such work.

1.16.11 Commissioning of the equipments will involve, trial runs of all the equipments erected, blowing through the lines, flushing of all the lines by air, oil or steam as the case may be, trial run of the equipment and any other works incidental to commissioning.

1.16.12 The valves will have to be checked, cleaned or overhauled in full or in part before erection, after acid cleaning, steam blowing and during commissioning as may be necessary.

1.16.13 In case any erection defect is detected during various tests / operations trial runs such as loose components undue noises or vibration strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. If any readjustment and realignments are necessary the same shall be done as per BHEL Engineer's instructions. If any part needs repairs rectification and replacement the same shall be done by the contractor at no extra cost. The parts to be replaced shall be provided by BHEL free of cost ifinsulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

1.16.14 The contractor shall carry out cleaning and servicing of valves and dampers / gates actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and actuators are left un-serviced.

1.16.15 Replacing / Cleaning and servicing of all the filters of the erected equipments during pre-commissioning / commissioning stages shall be done by the contractor within the accepted price.

1.16.16 Contractor may have to replace old/damaged gaskets / packing etc. in the erectedequipments and the same shall be carried out by contractor as per requirement. Materials will be given by BHEL.

1.16.17 In case any erection defect is detected during various tests / operations trial runs, such as loose components undue noises or vibration strain on connected equipment steam or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. The parts to be replaced shall be provided by BHEL free of cost. If the insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

1.16.18 Contractor shall cut / open works if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning opening of valves, changing of gaskets, attending to leakages, minor modification / rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.

1.16.19 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance.

1.16.20 It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during pre commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.

1.16.21 It shall be specifically noted that the contractor and employees of the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers / customer officials. Hence contractor's quoted rate shall take into consideration

of all expenses that will be incurred for such arrangement of personnel including engineers/supervisors.

1.16.22 During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.

1.16.23 Contractor shall lay all necessary electric cables and switches etc. required for the tests and maintain the system till the tests are completed satisfactorily.

1.16.24 All lubricants and chemicals required for pre-commissioning, commissioning, testing and lubricants for trial runs of the equipment shall be supplied by BHEL / BHEL's client **at free of charges**. All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling etc. The consumption of lubricants / chemicals shall be properly accounted for. Surplus material if any shall be properly stacked / tagged and returned to BHEL / Customer stores at no extra cost to BHEL. BHEL reserves the right to recover costs for wastage by the contractor**.**

1.16.25 Transportation of oil drums from customer's / BHEL's stores. Filling of lubricants and filling of oil for flushing and first filling and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer/BHEL stores. Similarly transport of chemicals for various pre-commissioning, commissioning activities and related processes and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of the contractor.

1.16.26 The contractor shall carry out the trial run of motors including checking the direction of rotation in the uncoupled condition checking aligning and coupling the motor to the respective driven equipment. Before starting the motor, IR values of insulation shall be recorded and if found necessary the contractor shall dry out to improve the IR value at no extra cost.

1.16.27 Necessary scaffolding and approaches for conducting the tests shall also be within the scope of the contract.

1.16.28 Assistance for calibrating / testing the power cylinders / actuators / valves, gauges, instruments, etc. and setting to actuators shall be provided by contractor within the quoted rates.

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

1.17.0 FINAL PAINTING

1.17.1 The scope of work shall also include supply and application of final painting of all the erected equipmentsas required and specified for the components of boiler and its auxiliaries.

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

1.17.3 All the exposed metal parts of the equipments including piping, structures, hangers etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer and required number of finish coats as indicated in the Painting Specification in TCC which matches the shop primer paint used, after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and chemical cleaning and the same being inspected and approved by BHEL engineers for painting. Afterwards the above parts shall be finished with as per the instructions of BHEL/Customer official.

1.17.4 Paint shall be applied by brushing or by spray painting as per the instruction of BHEL Engineer. Spray painting gun and compressed air arrangement has to be made by the contractor himself. It shall be ensured that brush marks are minimum.

1.17.5 Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL / Customer.

1.17.6 Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of the ready mix type in original sealed containers as packed by the paint manufacturer. No thinners shall be permitted. Paint manufacturer's instructions shall be followed in method of application, handling, drying time etc.,

1.17.7 The scope of painting includes application of color bands, lettering the names of the systems equipments; tag Nos. of valves, marking the directions of flow and other data required by BHEL within the quoted rate.

1.17.8 All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots. Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and

theDFT of finish paint shall not be less than the specified. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.

1.17.9 Finish coat paint, No of coat and DFT shall be as indicated in the painting specification enclosed in this tender / relevant BHEL document/ customer's specifications. The painting specification which is forming part of this tender as in TCC shall be used as guidelines to be followed.

1.17.10 The actual colour to be applied shall be approved by the customer before starting of actual painting work.

1.17.11 Primer & finish paint shall be of reputed paint supplier approved by BHEL / Customer. Contractor has to procure paints from the **BHEL / Customer approved agencies** only, and the paints should be as per the customer painting specification. The quality of the finish paint shall be as per the standards of IS or equivalent as approved by BHEL / Customer. Before procurement of paint the contractor has to obtain the clearance from BHEL authorities.

1.17.12 No paint shall be applied when the surface temp is above 55 deg. Centigrade or below 10 deg. Centigrade, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather.

1.17.13 If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates.

1.17.14 Before commencement of final painting, contractor has to obtain written clearance from BHEL / Customerfor effective completion of surface preparation.

1.17.15 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL/ Customer.

1.17.16 PRESERVATION / TOUCH UP PAINTING

1.17.16.1 Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification right from pre-assembly stage to till the equipment is cleared for final painting.

1.17.16.2 Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of red oxide primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.

1.17.16.3 Mostly the equipment / items/ components will be supplied with one coat of primer paint and one coat of finish paint. However during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to

be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final color.

Painting Scheme for ESP and Gates & Dampers

Manufacturing Painting Scheme:

1) Painting Scheme for ESP Components:
Surface Preparation: Power Tool Cleaning to St3

a. Surface exposed to atmosphere:
Primer: One coat of red oxide Zinc phosphate primer to IS: 12744 to DFT of 30 µm (min)
Finish Paint: Two coats of synthetic of enamel to IS 2932 smoke grey (shade No. 692 of IS 5)
DFT of 2X20 = 40 µm (min)
Total DFT = 70 µm (min)

Surfaces (Insulated & Flue Gas Path)

Primer: Two coat of rod oxide Zinc phosphate primer to IS: 12744 to DFT of 2X30 = 60 µm (min)
Emitting Electrode Hook, Machined components and foundation bolts are applied with rust preventive fluid and min DFT = 20 µm.

Stainless Steel, Aluminium and Galvanized Items are not painted.

2) Painting Scheme for Gates and Damper:

Surface exposed to atmosphere
Surface Preparation: Power Tool Cleaning
Primer: One coat of red oxide Zinc Phosphate primer to IS 12744, DFT = 30 µm (min)
Finish Paint: Two coat synthetic of enamel to IS 2932 smoke gray shade no 692 IS 5 to a DFT of 40 µm

Total DFT – 70 µm (min)

Surface under insulation and flue gas path (including Gate frame)
Primer: Two coat red oxide Zinc Phosphate primer to IS 12744, DFT = 60 µm (min)

Machined components and gate blades are protected with temporary rust preventive application.