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NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

TENDER NO. BHEL/NR/SCT/DADRI FGD/MECHANICAL/1100

Bharat Heavy Electricals Limited

Ref: BHEL/NR/SCT/DADRI FGD/MECHANICAL/1100 **Date: 25/04/2018**

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NOTICE INVITING E-TENDER (NIT)
BIDDER TO SUBMIT OFFERS ON PORTAL
https://bhel.abcprocure.com

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To

Dear Sir/Madam

Sub : NOTICE INVITING E-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. **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	BHEL/NR/SCT/DADRI FGD/MECHANICAL/1100	
ii	Broad Scope of job	MATERIAL HANDLING AND ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) AT NCTPP, DADRI STAGE-II (2X490 MW), GAUTAM BUDH NAGAR, U.P.	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	Issue of Tender Documents	**From BHEL website (www.bhel.com) and *https://bhel.abcprocure.com*** Tender documents will be available at website till due date of submission	*Applicable*
v	DUE DATE & TIME OF OFFER SUBMISSION	***Date : 07/05/2018 , Time : 1500 HRS*** ***Place : on https://bhel.abcprocure.com***	*Applicable*
vi	OPENING OF TENDER	***At due date / time*** ***Date : 07/05/2018 , Time : 1530 HRS*** *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.* ***However it being an e-tender it shall be opened online.***	*Applicable*

vii	**EMD AMOUNT**	***Rs. 28,90,000/-***	**Applicable for all Bidders (including MSE Bidders)**
viii	**COST OF TENDER**	***Rs 2,000/-***	**Applicable for all Bidders (including MSE Bidders)**
ix	**LAST DATE FOR SEEKING CLARIFICATION**	***Five days before bid submission due date.*** *Along with soft version also, addressing to contact address given below* *1) Name: **SUSMITA BASU*** *Designation: SR. DGM* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline/Mobile) 0120-2416262* *Email : susmitabasu@bhel.in* *2) Name: **CHITTARANJAN SWAIN*** *Designation: DY. MANAGER* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline/Mobile) 0120 - 2416500* *Email : cs@bhel.in*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*Shri D.R.S. Chaudhary* *E-1/164 Arera Colony* *Bhopal 462016* *dilip.chaudhary@icloud.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) & portal **https://bhel.abcprocure.com** **and not in the newspapers**. Bidders to keep themselves updated with all such information	
xiii	**Tender submission**	On portal **https://bhel.abcprocure.com**	

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

   As this tender is an E-Tender and no paper bids will be accepted therefore the scanned copy of the Demand Draft or the Cash Receipt issued by BHEL PSNR should be uploaded in the E procurement portal. Hard Copy

of the demand draft should reach BHEL PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.

4. Unless specifically stated otherwise, bidder shall deposit EMD through Cash Deposit (as permissible under the extant Income Tax Act) (before tender opening), Electronic Fund Transfer credited in BHEL account (before Tender Opening) or Banker's Cheque/ Demand Draft/ Pay Order **in favour of Bharat Heavy Electricals Ltd, payable at Noida** (along with offer).

'One Time EMD' will not be considered for this tender. All the bidders who have 'One Time EMD' with BHEL and want to participate in this tender, would also submit the requisite amount of EMD as mentioned in Clause No. 1, Salient Features of NIT, Sl. No. (vii) above.
However, the One Time EMD can be adjusted against the EMD applicable against this tender on specific request of bidder.

For Electronic Fund Transfer the details are as below-:

a) Name of the Beneficiary -: Bharat Heavy Electricals Limited

b) Bank Particulars

i).	Bank Name -:	STATE BANK OF INDIA
ii).	Bank Telephone No.(with STD code)-:	011-23352180
iii).	Branch Address-:	CAG BRANCH, NEW DELHI
iv).	Bank Fax No. (with STD code) -:	011-23353101
v).	Branch Code -:	SBIN0009996
vi).	9 Digit MICR Code of the Bank Branch -:	110002201
vii).	Bank Account Number -:	10813608647
viii).	Bank Account Type -:	CASH CREDIT
ix).	11 Digit IFSC Code of Beneficiary Branch-:	SBIN0009996

(Note-: In case of E-Tenders, no paper bids shall be accepted, therefore, the scanned copy of the Banker's Cheque/ Demand Draft/ Pay Order/ Details of payment made through Electronic Fund Transfer should be uploaded in the E-Procurement Portal and hard copy of the same should reach BHEL-PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.)

For other details please refer General Conditions of Contract.

5. **Procedure for Submission of Tenders**: This is an E-tender floated online through our E-Procurement Site ***https://bhel.abcprocure.com***. The bidder should respond by submitting their offer online only in our e-Procurement platform at ***https://bhel.abcprocure.com.*** Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online ONLY, EXCEPT TENDER FEE & EMD (in physical form), as mentioned below:

a. Technical Tender (UN priced Tender)

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

- **i.** Tender Cost and Earnest money Deposit (EMD) furnished in accordance with NIT Clause 3.0 & 4.0.
- **ii.** Technical Bid (without indicating any prices).

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.

iii. Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.

iv. A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.

v. A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

vi. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, same shall not be considered.

DO NOT"S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered. **Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender**.

Digital Signing of e-Tender

Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

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The Requirement:

1. A PC with Internet connectivity &
2. DSC (Digital Signature Certificate)(**Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION**)

BHEL has finalized the e-procurement service Provider-:

M/s AbcProcure, Ahmedabad

A-202/208, Wall Street-II, Opp. Orient Club, Nr. Gujarat College,

Ellis Bridge, Ahmedabad-380006

The contact details of the service provider are given below:

Name	Contact Nos.	e-mail ID	Role	Location
Swapnil Hamilton	+91 79 40270549	swapnil.h@eptl.in	Support Executive	HO – Ahmedabad
Hardik Oza	+91 79 40270560	Hardik.oza@eptl.in	Support Executive	HO – Ahmedabad
Ankur Bhatt	+91 79 40270590	ankur.bhatt@eptl.in	Support Executive	HO – Ahmedabad
Prashant Rajyaguru	+91 79 40270545 / 9016859416	prashant@eptl.in	Ast. Manager – Implementation & Support	HO – Ahmedabad
Dharam Rathod	+91 79 40270596 / 9374519754	dharam@eptl.in	Manager – Implementation & Support	HO – Ahmedabad
Pradip Parmar	+91 79 40270532 / 9328657215	pradip@eptl.in	Sr Manager – Implementation & Support	HO – Ahmedabad
Devang Patel	+91 79 40270576 / 99983 05442	devang@eptl.in	Sr Manager – Implementation & Support	HO – Ahmedabad

The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)** and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

1. The contact details of the DSC Certifying Authority as given below

1	**GNFC**	www.ncodesolutions.com
2	**e-Mudhra**	http://www.e-Mudhra.com
3	**Safescrypt**	www.safescrypt.com

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

6. **Not Used**

7. 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. 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. **Assessment of Capacity of Bidders:**

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

I. **LOAD**: Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -

(**Note:** For example, if latest bid submission is in Jan 2017, then the 'load' shall be calculated up to and inclusive of Oct 2016)

Total number of Packages in hand = Load (P)

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

II. **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(**Note**: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table -1))

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 of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = $\mathbf{P_T}$ (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \ldots P_N$)

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 ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$…. $S_{1\text{-}T1}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $\mathbf{S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}}$). Similarly, $\mathbf{S_2}$ for package P_2 for period T_2, $\mathbf{S_3}$ 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_{BHEL}' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

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

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

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

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

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No. of similar packages for all Regions = $\mathbf{P_T}$ i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	$S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, … $S_{1\text{-}T1}$	$S_{2\text{-}1}$, $S_{2\text{-}2}$, $S_{2\text{-}3}$, $S_{2\text{-}4}$, … $S_{2\text{-}T2}$	$S_{3\text{-}1}$, $S_{3\text{-}2}$, $S_{3\text{-}3}$, $S_{3\text{-}4}$, … $S_{3\text{-}T3}$	$S_{4\text{-}1}$, $S_{4\text{-}2}$, $S_{4\text{-}3}$, $S_{4\text{-}4}$, … $S_{4\text{-}T4}$	$S_{5\text{-}1}$, $S_{5\text{-}2}$, $S_{5\text{-}3}$, $S_{5\text{-}4}$, … $S_{5\text{-}T5}$	.. … … … …	$S_{N\text{-}1}$, $S_{N\text{-}2}$, $S_{N\text{-}3}$, $S_{N\text{-}4}$, … $S_{N\text{-}TN}$	--------
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 at least 6 evaluation scores for 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for ALL the packages, divided by the total number of Package months for which

evaluation should have been done. 'R_{BHEL}' shall be calculated subject to availability of 'performance scores' for at least 6 'package months' in the order of precedence below:

a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
b) 12 months preceding and including the cut-off month
c) 24 months preceding and including the cut-off month
d) 36 months preceding and including the cut-off month

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

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

IV. **Explanatory note**:

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

ii). Identified Packages (Unit wise)

Table-1

Civil	Electrical and C&I	Mechanical
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). C&I iii). Others (Elect. and C&I)	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). ESP iv). LP Piping 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 Management x). Others (Mechanical)

iii). Bidders who have not been evaluated for at least six package months in the last 36 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

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

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

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendors has been tagged as First Timer or availability of 6 evaluation scores within last 36 months preceding and including the cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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

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

iv). 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.

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

a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages

b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages

c. Up to Synchronization in all Balance Packages

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

vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.

vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 25th of Evaluation Month or 3 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.

viii). Project on Hold due to reasons not attributable to bidder -

a. **Short hold:** Evaluation shall not be applicable for this period, however Loading will be considered.

b. **Long hold:** Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

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

10. 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. For any clarification on the tender document, the bidder may seek the same over e-procurement portal 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. 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. 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. Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15. 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 Clause No. 1, Salient Features of NIT, Sl. No. (xi) above.**

15a. **Integrity Pact (IP)**

i) IP is a tool to ensure that activities and transactions between the Company and its Bidders / Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification. Details of IEM for this tender is given at point 1 (xi) above.

ii) Please refer Section-8 of the IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

No routine correspondence shall be addressed to the IEM (phone / post / email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification / issues shall be addressed directly to the tender issuing (procurement) department.

For all clarifications/issues related to the tender, contact details are as per **Clause No. 1, Salient Features of NIT, Sl. No. (ix) above.**

16. 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. In case BHEL decides on a `Public Opening', the date & time of opening of the 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. 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. (a) BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

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

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

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

(e) If reverse auction process is unsuccessful, sealed envelope price bids of all the techno-commercially qualified bidders shall be opened and the tender shall be processed accordingly. However, the envelope sealed bid(s) of techno-commercially acceptable bidder(s) who had agreed to participate in the RA and had failed to submit the online sealed bid shall not be opened.

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

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

23. **Consortium Bidding** (or Technical Tie up): **NOT APPLICABLE**

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

26. It may please be noted that guidelines/rules in respect of Suspension of Business dealings', 'Vendor evaluation format', 'Quality, Safety & HSE guidelines', milestone/ completion certificate, etc may undergo change from time

to time and the latest one shall be followed. The abridge version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page**".

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

27.1 Integrity commitment, performance of the contract and punitive action thereof:

27.1.1 **Commitment by BHEL:**

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

27.1.2 **Commitment by Bidder/ Supplier/ Contractor:**

(i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

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

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

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

28.0 **NOT APPLICABLE**

29.0 The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

30.0 **Order of Precedence**:

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

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

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure:-

(i) Annexure-1: Pre Qualifying criteria.
(ii) Annexure-2: Check List.
(iii) Annexure-3: Authorization of representative who will participate in the online Reverse Auction Process
(iv) Annexure-4: Feedback form
(v) Annexure-5: Integrity Pact
(vi) Other Tender documents as per this NIT.

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**MATERIAL HANDLING AND ERECTION, TESTING, COMMISSIONING ,TRIAL OPERATION AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) AT NCTPP, DADRI STAGE-II (2X490 MW), GAUTAM BUDH NAGAR, U.P.**
TENDER NO	**BHEL/NR/SCT/ DADRI FGD/MECHANICAL/1100**

Sl. No.	Name and Description of Pre-Qualification criteria	Bidder's claim in respect of fulfilling the PQR Criteria
A	Submission of Integrity Pact	**Applicable**
B	Assessment of Capacity of bidder to execute the work as per clause 9.0 of NIT	**Applicable – by BHEL**
C	**Technical** Bidder who wish to participate should have **'Executed'** any one of the following works during the last seven (7) years, ending on the 'latest date of bid submission' of tender: One Flue Gas Desulphurization (FGD) system in power plant rating of not less than 190 MW. **OR** One Boiler & Auxiliaries (consists of Structure, Pressure Parts, Rotating machines of the same unit) in power plant rating of not less than 190 MW.	**Applicable**
D D-1 D-2	**Financial** **TURNOVER:** Bidders must have achieved an average annual financial turnover (Audited) of **Rs. 567 Lakhs or more** over last three Financial Years (FY) i.e. (2014-2015, 2015-2016, 2016-2017). Bidder shall submit audited accounts (balance sheets and profit & loss account) in support of this. In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant. **Net worth**: Net Worth (Only in case of companies) of the bidder should be positive. Net worth of the Bidder based on the latest Audited Accounts as furnished for 'D-1' above should be positive. Net worth = Paid up share capital* + Reserves (* : Share Capital OR Partnership Capital OR Proprietor Capital as the case may be)	**Applicable**

D-3	**Profit:** Bidder should have earned profit in any one of the three financial years as applicable in the last three financial years defined in 'D-1' above based on latest Audited accounts. PROFIT shall be PBT earned during any one year of last three financial years as in 'D-1' above	
E	**Approval of Customer**	Not Applicable
F	**Consortium Criteria**	Not Applicable

Explanatory Notes:

1. For Sl. No. (C), '**Executed**' means;
   i. Commissioned in respect of Flue Gas Desulphurization (FGD) system.
   ii. Boiler light up in respect of Boiler & Auxiliaries.

2. For Sl. No. (C), experience of Oil/Gas Fired Boilers shall also be considered.

3. For evaluation of PQR, the credentials of the bidder alone, and not that of the Group Company shall be considered.

4. Relevant documents, meeting above requirements at sl. no. (C) & (D) shall be submitted by bidders.

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

ANNEXURE - 2

CHECK LIST

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount:	
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	YES/NO
8	Copy of PAN Card	Applicable	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	YES/NO
10	Integrity Pact	Applicable	YES/NO
11	Declaration by Authorised Signatory	Applicable	YES/NO
12	No Deviation Certificate	Applicable	YES/NO
13	Declaration confirming knowledge about Site Conditions	Applicable	YES/NO
14	Declaration for relation in BHEL	Applicable	YES/NO
15	Non-Disclosure Certificate	Applicable	YES/NO
16	Bank Account Details for E-Payment	Applicable	YES/NO
17	Capacity Evaluation of Bidder for current Tender	Applicable	BY BHEL
18	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable	YES/NO
20	Analysis of Unit rates	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

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

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

ANNEXURE – 4

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

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

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 or 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 self 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)/ Contractor(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 Bidder(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 exclusion 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 the separate "Guidelines on Banning 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 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 this 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 all subcontractors 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 Subcontractor, 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)/ Contractor(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) / Sub-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 meetings 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 remainder 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

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place----------

Date----------

Witness: _____

(Name & Address) _____

_____

Witness: _____

(Name & Address)_____

_____

Rev 01
1st June
2012

TECHNICAL CONDITIONS OF CONTRACT (TCC)

(Document No PS:MSX:TCC)

TENDER NO. BHEL/NR/SCT/DADRI FGD/MECHANICAL/1100

BHARAT HEAVY ELECTRICALS LIMITED

TECHINICAL CONDITIONS OF CONTRACT

of

WORK OF MATERIAL HANDLING AND ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF THE FLUE GAS DESULPHURZATION SYSTEM (FGD) AT 2X490 MW, NTPC DADRI, STAGE-II

Part-I OF TCC

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

Sl No	DESCRIPTION	Chapter	PAGE NO.
	Contract specific details		
1	Project Information	Chapter-I	4
2	Scope of Works	Chapter-II	5-24
3	Facilities in the Scope of BHEL/Contractor	Chapter-III	25-28
4	T&Ps and MMEs to be deployed by Contractor	Chapter-IV	29-31
5	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V	32
6	Time Schedule	Chapter-VI	33-34
7	Terms of Payment	Chapter-VII	35-38
8	Taxes and other Duties	Chapter-VIII	39-40
9	Other Requirements	Chapter-IX	41
10	Annexures	Chapter-X	42-53
11	Rate Schedule	Chapter-XI	54-56

S.No.	Title	Description
1	Name of the Project	**NATIONAL CAPITAL THERMAL POWER PROJECT(NCTPP) STAGE-II**
2	Owner	M/s NTPC
3.	Address	Dadri, District– Gautam Buddh Nagar,Uttar Pradesh
4.	Installed Capacity	2 x 490 MW
5.	Nearest Railway station	Dadri (Approx. 8.5 KM)
6.	Nearest Road	National Highway- 3 & 24
7.	Nearest City	Dadri (Approx. 7 KM)
8.	Nearest Airport	Delhi (Approx. 70 KM)

2.0	**SCOPE OF WORK**
2.1	BHEL has been awarded the work of Design, Engineering, Supply, Erection, Testing, Commissioning, Trial run and Handing over of complete mechanical, electrical, C&I and associated civil and structural works for the Flue Gas Desulphurization(FGD) system and its auxiliaries for NCTPP Dadri Stage II(2x490 MW) of M/s NTPC Ltd.
2.2	**The scope of work under this tender specification broadly consists of following packages:**
2.2.1	Materials handling and Materials management services for Flue gas desulphurization (FGD) system/ equipment's. The system mainly including Mechanical , Electrical and C&I packages supplied by various BHEL MUs under this specifications
2.2.2	Erection, testing, commissioning, trial run and handing over of the FGD system (Mechanical) as per the tender specifications. FGD system mainly consists of Absorber tower along with oxidation blowers , booster fans, Lime stone grinding and slurry preparation system consist of wet ball mills , lime stone silos , slurry pumps, Gypsum dewatering system, associated piping. Other auxiliaries i.e Fire protection system, Equipment cooling water system (ACW and ECW pumps) etc.
2.3	**The scope of work under these specifications for Erection, testing, commissioning, trial operation & handing over of FGD system(Mechanical),fire protection and ECW system broadly consists of but not limited to following:**
2.3.1	Taking delivery of the materials from the project storage yard /stores /sheds to erection site.
2.3.2	Their preservation, safe keeping, watch and ward.
2.3.3	Checking, dressing, chipping and levelling of foundations.
2.3.4	Pre-assembly, erection, alignment of various equipment's, machining and grouting.
2.3.5	Welding, heat treatment, radiography, UT and other non-destructive tests wherever required as per approved quality plan/drawings/ documents.
2.3.6	Hydraulic testing, air/gas leak test, air tightness test, other pre commissioning tests as per approved quality plan/drawings/ documents
2.3.7	Insulation and finish painting including supply of paints etc.
2.3.8	Erection and dismantling of all temporary system etc. required for above operations and other commissioning activities including post commissioning operations and stabilisation of the unit,
2.3.9	FGD system trial run, resolving any deficiencies observed and handing over the FGD system to customer M/s NTPC.

2.4	**BRIEF DESCRIPTION OF THE FGD SYSTEM**
2.4.1	The FGD system shall be based on Wet Limestone Forced Oxidation process. Each unit shall be provided with an independent absorber.
2.4.2	Gas from terminal point on ID fan discharge duct shall be taken directly to the absorber through Booster Fans. In the absorber, SO_2 in flue gas shall be removed by a spray of recirculating slurry, pumped by slurry recirculation pumps.
2.4.3	Compressed oxidation air shall be blown through the slurry in the oxidation tank, to oxidize the Calcium sulphite to gypsum.
2.4.4	Clean gas from the absorber shall be taken to the Wet Chimney through three stage mist eliminators.
2.4.5	Limestone to the absorbers of the units shall be supplied by a wet limestone grinding system, common for the units. Limestone shall be fed to the Limestone day silos which in turn will feed the Limestone to wet ball mill through a gravimetric feeder.
2.4.6	The gypsum from the absorber(s) shall be pumped by dedicated gypsum bleed pumps to a common Gypsum Dewatering system consisting of two streams (2x100%) of primary and secondary hydrocyclone and vaccum belt filters for gypsum dewatering. The water removed from the absorber shall be recycled to the absorbers. The waste water from the system shall be collected and neutralized using lime and neutralized effluent shall be pumped at required pressure to waste water terminal point.
2.5	**The brief list of the major equipment to be erected under the FGD system but not limited to following:**
2.5.1	Absorber System along with supporting structures
2.5.2	Booster Fans & isolation gates
2.5.3	Tanks of various sizes
2.5.4	Lime stone grinding and slurry preparation system consist of lime stone silos, bunker, gravimetric feeder, wet ball mills, hydrocyclones
2.5.5	Slurry pumps (Absorber Slurry recirculation pumps, Gypsum Bleed pumps , limestone Slurry feed pumps)
2.5.6	Gypsum Dewatering system consists of Vacuum belt filter, hydrocylones
2.5.7	Process water and cooling water storage system
2.5.8	Thermal Insulation and cladding sheets
2.5.9	Sump Pumps
2.5.10	Piping system
2.5.11	Equipment Cooling water System (PHEs, DMCW pumps)
2.5.12	Misc platforms, galleries, handrails
2.5.13	Fire Protection System including hydrant , MVWS,HVWS
2.5.14	Equipment Handling System

2.6	**Tentative weight to be erected for the FGD System shall be 11496 MT and detailed break up indicated in Annexure-II.**
2.6.1	The contractor is required to erect actual tonnage (irrespective of any variation plus or minus) which may be necessary to complete their work and commission above system and complete the work in all respects as detailed in tender specifications, for which payments shall be released on finally accepted tonnage rates. The contractor undertakes to erect / commission actual quantities as per instruction of the BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments shall also be regulated for the same.
2.6.2	The customer M/s. NTPC and / or their Consultant may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
2.7	**SITE VISIT**
2.7.1	Contractor should visit site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint themselves with the conditions prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
2.8	**DEWATERING**
2.8.1	Contractor shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL.
2.9	**Contractor shall ensure the following:**
2.9.1	Contractor has to maintain contact with local hospital having ambulance facility, scanning and other ultramodern medical facilities required during emergency.
2.9.2	Contractor has to ensure pre-employment medical check for all staff & workers
2.9.3	Contractor has to ensure that adequate First Aid facilities with trained nurse are available at work site for emergency purpose. This emergency set-up should include, but not limited to, following
2.9.4	Male nurse (in shifts) Oxygen set up Breathing apparatus Eye wash facility Stretcher Trauma blanket Medicines.
2.9.5	The contractor against this contract is required to arrange and maintain ambulance at site for entire contract period. The above emergency facility set up including ambulance, male nurse etc. will be shared by BHEL and its other contractors working at this project at no extra cost to BHEL and its sub-contractors. In case, under unavoidable circumstances, if the ambulance is not

	available / being used elsewhere, the contractor will have to arrange for the same as under clause Sl. No. 2.9.1
2.10	**The contractor shall comply with following towards Social Accountability;**
2.10.1	The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
2.10.2	The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.
2.10.3	The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.
2.10.4	The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimation / Corporal punishment for failure in meeting with relevant requirements.
2.10.5	The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.
2.10.6	The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
2.10.7	The Contractor shall arrange potable drinking water to its employees & workers.
2.11	**SITE ORGANISATION**
2.11.1	The contractor shall provide adequate staffing in the following areas in addition to the staffing requirements of execution as instructed/informed by BHEL: 1. Overall planning, monitoring & control. 2. Quality control and quality assurance. 3. Materials management. 4. Safety, fire & security. 5. Industrial relations and fulfilment of labour laws and other statutory obligations.
2.11.2	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.
2.11.3	On award of contract, the contractor shall submit to BHEL site organization chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. The persons, whose bio-data have been approved by BHEL, will have to be posted at site and deviations in this regard will not generally be permitted.

2.11.4	The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL
2.11.5	The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields in erection, commissioning etc as applicable. For proper supervision of the work, the contractor shall ensure providing one qualified supervisor against deployment of 15 workmen.
2.12	**ERECTION SCHEDULE**
2.12.1	Contractor shall submit within 07 days of LOI date, detailed program (L2 schedule) of construction / erection / commissioning along with matching resources T&P Deployment and manpower deployment schedule for approval to Site In-Charge/Project Manager-Noida. L2 schedule shall be the working level document demonstrating contractor's ability and methods of completing the work within the key milestones identified in the tender specification These program would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detailed monitoring, The three monthly rolling program with the first month's program being tentative based on the site conditions would be prepared based on these program. The Contractor shall also be involved along with the Customer/BHEL to tie up detailed resource mobilisation plan over the period of time of the contract matching with the performance targets.
2.12.2	The program would be jointly finalised by the site in-charge of the contractor with BHEL/Customer's project coordinator as well as the site planning representative. The erection program will also identify the sequential erectable tonnages
2.12.3	Contractor shall submit daily work program based on above schedule. Deferment of above schedule is not acceptable. Contractor will adhere to schedule & augment resources to ensure completion as per schedule.

2.13	**Detailed description of major equipment (per unit & common) to be Installed, Tested and Commissioned under this specification is given below:**
	Below mentioned details are to give only general idea of FGD system/ equipment's to the bidder. Any equipment's/system's not mentioned in this specification but which are required for the completion and smooth running of the FGD system contractor shall do the erection and commissioning of that system within the finally accepted rates / prices.
2.13.1	**Absorber System:**
2.13.1.1	An independent Limestone Forced Oxidation (LSFO) type absorber system shall be provided for each unit. Each absorber system shall be complete with:
2.13.1.2	Absorber tower complete with re-circulating slurry spray header(s) and nozzles, three stage mist eliminators, wash water nozzles, oxidation tank integral to tower, oxidation headers and nozzles, and agitators and all internal systems integral to the working of the absorber.
2.13.1.3	2x100% re-circulating slurry pump for each level of spray.
2.13.1.4	Complete Ducting System from ID fan common outlet duct to absorber tower & from absorber outlet to wet stack chimney.
2.13.1.5	2x100% Centrifugal/ positive displacement type oxidation blowers / compressors
2.13.1.6	1 No. Emergency water tank for spraying water at inlet of Absorber for upset condition.
2.13.1.7	2x100% gypsum bleed pumps.
2.13.1.8	Auxiliary Absorbent tank
2.13.1.9	Passenger cum Goods elevator for each Absorber of minimum capacity of 1000 kgs.
2.13.2	**LIMESTONE GRINDING AND SLURRY PREPARATION SYSTEM(Common)**
2.13.2.1	Limestone grinding system for all the units and shall comprise of:
2.13.2.2	Two numbers Limestone storage silos shall be complete with supporting steel structure, platforms, staircase, air canons, power operated gates, gravimetric feeders etc.
2.13.2.3	Two numbers of wet horizontal ball mills
2.13.2.4	Two (2) limestone slurry tanks, complete with all accessories and Agitator(s).
2.13.2.5	2x100% limestone slurry pumps for each absorber connected to each of the limestone slurry tank. Each pump catering to slurry requirement of each unit's absorber.
2.13.2.6	Each mill shall be fed from an independent Limestone bunker. Each mill shall be complete with the following items, as a minimum requirement:

a)	A bunker outlet gate
b)	A gravimetric limestone feeder along with its drive and all other auxiliaries
c)	One no. separator tank with agitator(s).
d)	2x100% Mill circuit pump.
e)	One set of hydro-cyclone
f)	A peripheral/central drive system with motor, speed reducer gearbox and other auxiliaries.
g)	An auxiliary motor for inching operation with speed reducer.
h)	Complete lubricating system
i)	Lube oil pumps, coolers, duplex oil filters, connecting piping
2.13.3	**GYPSUM DEWATERING SYSTEM(COMMON)**
	Each set of dewatering equipment (01 working set + 01 standby set) shall comprise of the following items as a minimum requirement:
2.13.3.1	One set of primary hydro-cyclones
2.13.3.2	One vacuum belt filter
2.13.3.3	Vacuum receiver tank
2.13.3.4	Vacuum pump
2.13.3.5	One set of secondary hydro-cyclones
2.13.3.6	Filtrate tank along with filtrate water pump
2.13.3.7	Cake washing Pumps for Vacuum Belt Filter.
2.13.3.8	Cloth washing Pumps for Vacuum Belt Filter.
2.13.3.9	Waste water tank along with agitator and centrifugal pumps
2.13.3.10	Lime neutralization tanks
2.13.4	**PROCESS WATER STORAGE TANKS AND PUMPS**
2.13.4.1	Two (2) Process water Storage tanks along with two numbers of 2x100 % Booster water pumps, if required,
2.13.4.2	2x100% Process Water Pumps for each unit connected to each of the Process water Storage tanks along with all necessary piping, valves.

2.13.4.3	2x100% Mist Eliminator Wash Water Pump for each unit connected to each of the Process water Storage tanks along with all necessary piping, valves.
2.13.4.4	Two (2) clarified water Storage tanks (each tank catering to the clarified water requirement for one vacuum Belt Filter) along with two numbers of 2x100 % clarified Booster water pumps, if required, from terminal point.
2.13.4.5	Emergency water storage tanks
2.13.5	**Booster Fan & Isolation Gates**
2.13.5.1	For each unit, two (2) nos. Booster Fans of axial type, Constant speed, variable pitch controlled each with drive motor, base plates, foundation bolts and nuts, inlet box, discharge case, coupling, coupling guard and suitable arrangement to prevent rain water entry to fan motor.
2.13.5.2	Each Booster Fan shall be provided with bearing lubrication and hydraulic blade pitch control unit(s) consisting of;
a)	2x100% oil pumps each with motor, coupling and coupling guard.
b)	2x100% oil coolers.
c)	2x100% filters, differential pressure switches, etc.
d)	One (1) oil storage tank.
2.13.5.3	Motorized Guillotine type gates with 2x100% seal air fans shall also be provided at suction & discharge of each Booster Fan.
2.13.5.4	Inter connected piping, valves and fittings .Electrical actuator with accessories.
2.13.6	**PIPING**
2.13.6.1	**Slurry Piping**
2.13.6.1.1	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and control valves.
2.13.6.1.2	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves.
2.13.6.1.3	All connecting pipes / chutes along with necessary valves between various systems of the mill and from hydro-cyclone to common slurry storage.
2.13.6.1.4	All slurry pipes having Material of construction carbon steel and rubber lined. End connections are bolted flanged connections.
2.13.6.2	Oxidation Air piping
2.13.6.3	Service Water

2.13.6.4	Service Air & Instrument Air
2.13.6.5	Process water piping
2.13.6.6	Equipment Cooling water system piping
2.13.6.7	Piping and equipment, as per requirement / drawings are to be thermally. insulated with bonded / unbounded mineral wool /LRB mineral wool and to be covered with aluminum cladding.
2.13.6.8	All the above systems of piping include the erection of pipes, bends, elbows, valves, fittings, impulse piping and including root valves, sampling lines, drains, hangers and supports & other accessories so as to make the systems complete in all respect.
2.13.7	**Fire Protection system (Common)**
2.13.7.1	**Hydrant System**
2.13.7.1.1	Hydrant system consists of (pipe, hydrant valves, landing valves, water monitors, hoses, branch pipes and nozzles etc)
2.13.7.2	**HVW & MVW Spray System(High Velocity and Medium Velocity)**
2.13.7.2.1	It shall consists of water mains network, deluge valves, isolation valves, Y type strainers, spray nozzles/ projectors, spray nozzles piping network.
2.13.7.3	**Fire Extinguishers**
2.13.7.3.1	The contractor shall install the following fire extinguishers at various locations of FGD system as per TAC requirement.
2.13.7.3.2	Pressurized water type (9lit. capacity as per IS 15683)
2.13.7.3.3	CO2 type (4.5 kg Cap IS:15683)
2.13.7.3.4	Dry chemical type (6 kg Cap IS:15683)
2.13.7.4	Necessary civil works for the fire protection system includes (trenches/ pedestals/ foundations /sheds/sandfilling) excluded from the scope of this contract and shall be done by the civil agency of the BHEL. Fire detection package and associated C&I/cabling work is excluded from scope of this contract and shall be done by another agency. However the wrapping and protective coating of the buried piping shall be in the scope of contractor.
2.13.7.5	The complete Fire Detection and Protection Systems shall be as per the guidelines/ codes/standards / rules of TAC/ NFPA / IS: 3034 / OISD etc. and all the systems, equipment's and installation shall be got approved from TAC accredited professional(s)-India. Customer M/s NTPC will make arrangement of TAC approved agency for accreditation of work. The contractor has to facilitate TAC for getting approval. As per TAC any modification or any rerouting of the lines, re erection of equipment should be done and same should be carried by contractor with in quoted rates. There is no extra payment will be paid.

	However contractor is responsible for availing the TAC approval for Fire protection system in total (for fire detection another agency of BHEL will be responsible). Contractor also responsible for getting any necessary approval from regulatory and statutory body of TAC if any needed. Obtaining the all reports from concerned statutory departments is the responsibility of the contractor. All these activities should be carried within the quoted rates.
2.13.8	**Equipment Cooling Water System (Common)**
2.13.8.1	Equipment Cooling water system for all two units with a closed circuit cooling system for cooling of the various auxiliaries of FGD system. The equipment cooling system shall include the following and as
2.13.8.2	2x100% capacity selfcleaning strainers on the secondary side.
2.13.8.3	3 x 50% (2 working + 1 standby) capacity of plate type heat exchangers.
2.13.8.4	4 x 50% (2 Working + 2 standby) capacity FGD Auxiliary (Secondary) Cooling water pumps, along with drives.
2.13.8.5	3 x 50% (2 Working + 1 standby) capacity FGD DM (Primary) cooling water pumps along with drives.
2.13.8.6	One Overhead DM water tank (ECW O/H tank).
2.13.8.7	Alkali (Sodium Hydroxide) preparation tank, agitator and motor, piping, valves etc
Notes:	
1.	Weight schedule /BOQ of the FGD system given under the Annexure-II, III IV, V VI, VII and VIII.
2.	The equipment /piping systems indicated above are only major items and does not cover all the equipment / piping system to be erected / commissioned. Contractors are however, required to erect / commission within the price quoted by them, all connected equipment / system shown in manufacturer‟s drawings / other documents which may be necessary for erection completion and overall commissioning of FGD system.
3.	The contractor undertakes to erect/ commission actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments will also be regulated for the same.

2.14	**Important information for the Erection Work of FGD system under this tender specifications:**			
2.14.1	Absorber tower have top elevation of approx. 47 mtr with 7 tier structure and average casing panels have size (6 mx4m x0.5 m).			
2.14.2	Absorber System W/D(wet dry) interface having lining of C276 material .Site welding of liner is in the contractor scope. BHEL supplied the liner with plug welding and special electrode for the welding of liner shall be supplied by BHEL Ranipet. Welding to be done as per approved procedure of BHEL/NTPC.			
2.14.3	Tanks shall be supplied by the units in more than one segment (rolled sections) having height of each segment approx. 2500 mm. Contractor have to complete the assembly at site with necessary welding/NDT/testing as per the approved FQP. **Rubber lining of the tanks (along with surface preparation by blasting or any other approved method and necessary testing i.e spark test/ pin hole test of the rubber lining)excluded from the scope of work and shall be done by rubber lining vendor of BHEL Ranipet.** However necessary assistance to be provided by the contractor. Sizes of the tank mentioned below to give general idea to the bidders regarding the extent of work.			
	Description	**Diameter in mm**	**Height in mm**	**Qty**
1.	Primary Hydrocyclone Tank	5500	6800	1
2.	Belt filter washing tank	3000	3100	2
3.	Filtrate Water Tank	4600	5300	1
4.	Secondary Hydrocyclone Tank	4600	5800	1
5.	Waster Water Tank	6100	7500	1
6.	Neutralisation Tank	2200	2800	2
7.	Mill Separator Tank	3000	3000	2
8.	Lime stone Slurry Storage Tank	10700	12800	2
9.	Auxiliary absorbent tank	12000	12000	1
10.	Process Water tank	4900	6100	2
11.	Clarified Water Tank(cake washing)	3000	3800	2
12.	Emergency quench tank	4600	5500	2
2.14.4	Lime stone silos shall be supplied by the units in more than one segment (3 to 4 segment) and height of each segment shall be 2500 mm. Contractor shall have to complete the assembly, final welding,/NDT/testing as per the approved drawings/ documents/ FQP. Sizes of the silos mentioned below to give general idea to the bidders regarding the extent of work.			

	Description	Diameter in mm	Height in mm	Qty
1.	Lime stone Storage Silo	8100	12400 (5400 mm straight ht)	2
2.	Lime stone silo	1200	2000(1000 mm straight ht)	2
2.14.5	Erection and commissioning of the below mentioned equipment's/system under FGD system excluded from the scope of work under this contract. Erection and commissioning shall done by the BHEL Ranipet vendor /system supplier/OEM of the system.			
a)	Absorber Elevator			
b)	Rubber lining of tanks and absorber			
c)	Glass flake lining of ducts (absorber outlet to wet stack chimney portion)			
2.14.5.1	However, contractor scope limited to extend the necessary assistance along with T&Ps, scaffolding to the vendor during the erection and commissioning of the above system.			
2.14.6	BHEL shall provide the technical support for commissioning of below mentioned equipment's on need basis. If support required during the erection same shall be provided free of charges by BHEL.			
a)	Slurry Recirculation Pump System			
b)	Mist Eliminator & Accessories			
c)	Air Oxidation System			
d)	Slurry Pumps & Accessories			
e)	Agitators			
f)	Limestone Mill			
g)	Primary Hydroclone And Accessories			
h)	Secondary Hydroclone And Accessories			
i)	Gypsum Belt Filter And Accessories			
Notes:				
1.	**Quantities and dimensions mentioned above for tanks, silos, absorber are indicative and to give general idea regarding the extent of work for estimation purpose. Quantity and dimension detail based on the engineering /drawings /documents available as on date of NIT and liable for variation.**			

2.15	**TERMINAL POINTS**	
2.15.1	**Flue Gas Duct**	One tapping from the common Flue Gas Duct going towards the existing Chimney
2.15.2	**Equipment Cooling Water Normal make up to ECW tank**	Contractor shall take a tap off suitably from the existing DM normal make up header(DM normal make up pump discharge) available along C-row at CD bay rack formeeting the makeup water requirement of ECW system. The pressure available atTP will be 4Ksc (gauge) wrt FGL (approx.).
2.15.3	**Emergency make up to ECW tank**	Contractor shall take a tap off suitably from the existing DM Emergency make up header (condensate transfer pump discharge) available along C-row at CD bay rack for meeting the emergency make up water requirement of ECW system. The pressure available at TP will be 4Ksc (gauge) wrt FGL (approx.).
2.15.4	**Process Water**	For FGD system, Contractor shall take a tap off suitably from the existing CW blowdown header available near the CW pump house. The pressure available at TP will be 1.9 Ksc (gauge) wrt FGL (approx.).
2.15.5	**Gypsum Wash Water (Clarified Water)**	For Gypsum washing, Contractor shall take a tap off suitably from the existing HVAC header (HVAC make up pump discharge) available along C-row at CD bay rack for meeting the water requirement of Gypsum washing. The pressure available at TP will be 4Ksc (gauge) wrt FGL (approx.).
2.15.6	**Potable water**	Contractor shall take a tap off suitably from the existing potable water supply header (potable water pump discharge) available along C-row at CD bay rack for meeting the potable water requirement The pressure available at TP will be 3Ksc (gauge)wrt FGL (approx.).
2.15.7	**Waste Water**	Neutralized waste water pipes shall be taken up to the Ash mound located near the plant
2.15.8	All interconnections of matching flanges/expansion joints/piping/ducting etc, at terminal points specified above shall, however, be in the scope of Contractor.	

2.16	**SCOPE OF MATERIAL HANDLING WORKS**
2.16.1	The scope of work under this tender consists of taking delivery of plant materials and equipment's dispatched directly to the site, their unloading, handling , shifting to storage yards, verification, stacking, restacking, reshifting ,preservation, watch & ward, record-keeping and issue to erection agencies.
2.16.2	Plant materials/ equipment's of FGD system consists of Mechanical equipment's i.e absorber, wet ball mills, pumps, fans, piping along with the associated auxiliaries. Electrical, Control and Instrumentation System equipment's and mandatory spares. These materials shall be supplied from BHEL's manufacturing units located all over the country as well as BHEL's vendors located both in the country and abroad.
2.16.3	Construction equipment's of BHEL including high capacity cranes sent in dismantled condition and other items received from other sites/locations.
2.16.4	The delivery of these materials will mostly be inside the project site by road transport. Delivery of some items may also have to be taken from godown of transporters nearby Dadri.
2.16.5	Approx. weight to be handled as indicated in Annexure-I is of the order of **14,000 MT.**
2.16.6	Most of these material required for erection shall arrive at site well in time for which the contractor shall be required to carry out proper handling, verification, storage and issue as per the scope mentioned in this NIT.
2.16.7	However depending on site requirements, some of delayed items may need to be delivered directly at site, which may be got done by BHEL through its respective erection agency. In such cases where material is received, unloaded and verified by erection agency other than this contract, the contractor will not be eligible for any payment for such works.
2.16.8	Annexure-I attached with this NIT gives the general idea about the weights and dimensions of some major components / equipment's to be handled by the contractor.
2.16.9	The weights and dimensions shown are approximate and are liable to vary. No increase in quoted / accepted rates /prices shall be allowed due to change in weights and dimensions of the equipment / materials
2.16.10	Quantities mentioned in the rate schedules are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. The contractor has to handle whatever actual materials are dispatched for the project irrespective of any variations and payments shall be released for the actual gross tonnage handled. The quantities indicated against each item may vary to any extent and no compensation will be payable in variation of Individual quantity.
2.16.11	Variation in overall Qty shall be as per clause 'Quantity Variation' given in GCC.
2.16.12	Tenderers are required to take above into account while quoting the unit rates quoted as per Rate Schedule so as to take care of such variation during execution stage.

2.16.13	The contractor is to use his own equipment like suitable cranes / trucks / tractor trailers and other material handling equipment including all necessary small / major T&Ps required for the above work for 2 x 490 MW, Dadri except those specifically provided elsewhere in the tender.
2.16.14	It will be responsibility of the contractor to keep in touch with M/s NTPC and BHEL at site to find out the arrival of consignments, and release of truck/trailers after unloading.
2.16.15	**The contractor under this contract shall also provide free of cost services of following manpower exclusively for use by BHEL:**
2.16.15.1	Computer operator for office work -19 man months
2.16.15.2	Skilled Manpower for working in store ,office and colony -30 man months
2.16.15.3	Unskilled Manpower for working in store ,office and colony-35 man months
2.16.15.4	Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.
2.16.15.5	**In case contractor fails to provide above-mentioned man-power as desired by BHEL, the latter shall have right to hire such services from other agencies at the risk and cost of the contractor. However, if BHEL does not utilize the man-months as per above provision, fully or partly, recovery at the rate of the prevailing minimum wages plus 25.08% (for statutory payments or as applicable) at DADRI for the respective categories stated above plus 10% will be made from the final bill of the contractor. For Computer operator if the minimum wage is not available in schedule it shall be taken as minimum wage for skilled worker plus 10 %.**
2.16.16	Unloading of heavy or OD consignments directly from trailers by suitable crane or by jack and sleeper method at the location decided by BHEL Engineer shall be carried out by the contractor within the quoted rate. All T&Ps including hydraulic jacks and wooden sleepers required for sleeper/jack method of unloading shall be arranged by the contractor.
2.16.17	Detailed verification of materials with reference to packing list / Loading advise slip / etc., after unpacking of boxes & crates; repacking where called for, after detailed verification; preparation of receipt inspection reports etc shall be carried out within the quoted rate within 30 days of the unloading**. If the verification is not carried out within 30 days for reasons attributable to the contractor, then BHEL is having right to carryout the verification at the risk and cost of the contractor.**
2.16.18	BHEL will provide free of cost all necessary preservatives, paints, thinners, rust preventives, grease, lubricants and end caps to contractor for preservation of components. All tools & tackles and other consumables required for preservation of components including supervision shall however be provided by contractor at his own cost. Preservation of components includes applying preservatives, paints, rust preventives, greasing of threaded portions, fixing of end caps in position for pressure parts, repainting of work order / DU numbers, component codes etc. After preservation wherever necessary, components will be stacked properly as per original stacking for which no additional payment shall be made.
2.16.19	As per the site requirement, material may have to be shifted from originally unloaded /stacked locations to other locations within the project premises as per the instructions of the BHEL Engineer. This may involve loading of such material onto a trailer, shifted to a new location and unloading/stacking including proper inscription of identification marks if needed. Restacking and re-shifting shall be payable on submission of list of items shifted, updated in the stock records about

	change in location etc along with the monthly bills. Re-shifting /restacking of material shall be payable as per the item no. 1.2 of the rate schedule. No re-shifting/restacking of the material shall be allowed without prior approval of the BHEL Engineer.
2.16.20	It shall be the responsibility of the contractor to keep in touch with Engineer at site and find out arrival of road consignments. The Contractor shall collect all the parcel way bills / lorry waybills from BHEL site office either personally or through an authorized representative. The contractor or his authorized representative shall, for the purpose, visit the said office every day and collect available GR, RR, LWB, and PWB etc. While collecting the GR, RR. LWB, PWB, contractor or his authorized representative will sign the register maintained for the purpose indicating date and time of collection. The contractor shall keep in touch with carriers and arrange to effect delivery of consignments immediately on their receipts. Delay may cause deterioration of goods apart from attracting demurrage charges. Contractor shall also maintain a register indicating date of RR, LWB, PWB, date of collection of the materials from road transport agencies / lorries and date of stacking them at storage yard of BHEL.
2.16.21	It is possible that in certain cases, dispatch documents may not be received in time but BHEL may receive Photostat copies of the same. It is, therefore, the responsibility of the contractor to collect these Photostat copies & indemnity bond from BHEL authorities at site.
2.16.22	Payment of all demurrage / wharfages that are due to contractor's fault, would be the responsibility of contractor and to his account. If BHEL has to make payment of demurrage / wharfages along with freight, the amount so paid as demurrage / wharfages, for the reasons stated above, shall be paid by the contractor forthwith or would be recovered from bills of the contractor.
2.16.23	In any case contractor will pursue with concerned Carrier authorities at all level (local/HQ etc.) for waiver / reduction to the minimum of such demurrage charges. Whenever such demurrages become payables due to reasons not attributable to contractor, contractor will immediately bring it to the notice of BHEL with specific request to bear such charges. The decision of the Engineer in such case will be final and binding on the contractor.
2.16.24	Any discrepancy / shortage / damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the contractor and the amount liable to be lost by BHEL on such accounts is recoverable from the contractor.
2.16.25	In case of apparent damages / shortages in consignments /packing noticed by the contractor, such cases shall be brought to the notice of BHEL and cleared only with their consent/approval.
2.16.26	It would be the responsibility of the contractor to examine the packages, consignments, etc. on arrival and bring to the notice of carriers and BHEL Authorities regarding loss / damages, if any, observed in the consignments proposed to be taken delivery. Before taking delivery, particularly of consignments in 'smalls', the weight of the package shall be checked with the invoiced weight / contents of the packages and any discrepancy shall be reported immediately to BHEL/ carriers. In all the cases of loss / damages the contractor will take open delivery from the carriers. They shall forward such Open Delivery Certificates (ODC) to the Engineer within 7 days of retiring such consignments. All expenses connected therewith shall be to the account of contractor. BHEL reserves right to claim losses, if any, accrued to BHEL in the event of contractor's non-compliance to above.
2.16.27	BHEL reserves the right to recover from the contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other cause during transit

	and stacking (between the Road / carriers godowns / weigh bridges and BHEL storage yards / store sheds / project site), when the custody of the equipment is with the contractor.
2.16.28	Unloading from trailer at storage area / work site stacking and re-stacking of heavy sophisticated equipment like casing panels, motors, transformers, rotors, C&I panels, pumps, etc. shall be done in the presence of or as per the directions of BHEL representative.
2.16.29	Certain items may be dispatched with tie rods/ strips welded with frame carrying items and with trailer. These tie rods / strips are required to cut by using Gas flame or by other method as directed by Engineer for unloading of materials.
2.16.30	Since, the trucks / trailers are expected to arrive during any time of the day / night, the contractor shall have his workmen round the clock at site as well as other places as required to unload the materials.
2.16.31	Consignments coming on Sundays and Holidays are also required to be handled by the contractor promptly. It will be the responsibility of the contractor to contact the site Engineer / his authorized representative of BHEL at their residence, if required, and obtain instructions to make suitable arrangements. The detention charges, if any, in the event of delay in unloading from the carrier due to contractor's fault, will be to contractor's account.
2.16.32	It shall be the responsibility of the contractor, to provide all necessary facilities and tools to open the packages, in the presence of the Engineer, verifying their contents, re-packing wherever and whenever necessary, properly stacking them as may be directed by the Engineer. These works should be so done so as to facilitate proper handling, periodical verification of materials, receipt position, stock taking etc.
2.16.33	The contractor shall have experienced persons at site who can maintain the records of dispatch / receipt/ stacking / verification / shortage / damage / missing items etc.
2.16.34	All materials shall be stored at least 6" above ground level by use of concrete sleepers. No material shall be left to remain on ground at any time. Materials shall not be stacked in low-lying areas, where they are likely to get flooded during rains. Concrete/wooden sleepers shall be arranged by contractor with in the quoted rate. However these items shall be stacked / stored properly at a location(s) specified by BHEL when not in use. The contractor is expected to use these most judiciously. In case it is observed that the contractor is not utilizing these optimally, he could be asked to re-stack the same at his cost.
2.16.35	It is possible that certain heavy items / consignments will require fabrication of a suitable shed over it. These sheds will be covered with suitable sheets or tarpaulin. The contractor will be required to fabricate such sheds. All materials required for this will be provided by BHEL. However all expenses towards manpower, T&P, consumables etc will be borne by the contractor. After the completion of the work the contractor will dismantle the same and return these materials back to the stores. The contractor will be paid @ Rs. 9500/- per MT for such works.
2.16.36	NO ADDITIONAL PAYMENT SHALL BE MADE IN CASE THE STRUCTURE IS FABRICATED OF SCAFFOLDING PIPES, CLAMPS & GI SHEETS. IN SUCH CASES THE MATERIAL SHALL BE ISSUED BY BHEL FREE OF CHARGE TO THE CONTRACTOR. CONTRACTOR SHALL ENSURE THAT THE SAME ARE RETURNED TO THE STORE AFTER THE EQUIPMENT HAS BEEN ISSUED.
2.16.37	The material / equipment requiring indoor storage will be handled and stacked inside the storage shed (provided by BHEL) by the contractor using own material handling equipment's.

2.16.38	For checking / verification of the components / packages with packing slips GR/ LWB etc., sufficient experienced persons and other facilities shall be provided by the contractor as and when required by the Engineer.
2.16.39	Stacking of the material shall be done as per the instructions and to the satisfaction of the Engineer. The materials shall be so stacked that the same should facilitate easy handling. In the event of any improper stacking by contractor BHEL may ask the contractor to re-stack the material properly or failing which BHEL may get the job done by any other agency at the risk and cost of the Contractor. In that case no payment shall be made for restacking of the material.
2.16.40	The contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence. Any loss to BHEL due to contractor's lapse / negligence shall have to be made good by the contractor.
2.16.41	In case contractor is not able to unload, transport, stack the material at a pre-determined area, as per direction of the Engineer for any reason whatsoever (including non-availability of crane, tractor trailer and other T&P etc.), BHEL shall be at liberty to get the work done by engaging other agency / equipment / T&P etc. at the risk and cost of the contractor.
2.16.42	If the contractor or his workmen shall break, deface injure or destroy any part of a building, road, Serbs, fenced enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees, stored components or any other property or to any part of erected equipment etc., the contractor shall make the same good at his cost or in default the Engineer may cause the same to be made good by other workmen/agency or by other means and deduct the expense (of which the BHEL Engineer's decision is final) from any sum that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.
2.16.43	**It shall be the responsibility of the contractor to keep the storage areas (closed / semi-closed / open) in neat and tidy conditions. Any vegetation like grass, bushes, Sarkandas etc. shall be cut periodically in open storage area & removed as per requirement &instructions of BHEL Engineer within the contractual value.** All surplus / unusable packing materials shall be removed and deposited at location(s) specified by BHEL within the project premises (including weighing of the same within the project premises if required).
2.16.44	Normally the consignments from BHEL's manufacturing units / their sub-suppliers are sent on freight paid basis. In case any consignment is received at any place on freight to pay basis, it will be the responsibility of the contractor to pay the freight and take delivery of such consignments. The amount of freight paid by the contractor at any point of time in such cases will be limited to Rs. 5,000/-. However, the freight paid by the Contractor will be reimbursed by BHEL within a week's time on production of relevant receipts. In case of freight amounts exceeds Rs. 5,000/- contractor may request BHEL well in time to issue cheque / draft for such amounts in favor of carriers towards freight charges.
2.16.45	Normally the consignments are expected to be received inside the Project area. But in case any consignment is booked to any other place in and around DADRI, it will be the responsibility of the contractor, if necessary and desired by BHEL, takes delivery as desired by BHEL Engineer. The reimbursement of freight paid, as envisaged in clause 2.16.47 will be made to the contractor.
2.16.46	In case some materials are required to be dispatched from DADRI to manufacturing units, other sites or any other place, the contractor may be asked by the Engineer to get the same packed, transport it to nearest Railway Station / Carrier's godowns and get the same booked with in the quoted rate.

2.16.47	In case of material is required to be booked as freight paid, the freight for the consignment limited to **Rs.5,000/-** shall be paid by the contractor. However, it shall be reimbursed by BHEL on submission of receipt within a week's time. The funds for freight charges exceeding Rs. 5,000/- shall be arranged by BHEL. Packing material required shall be provided by BHEL free of cost.
2.16.48	In case some of consignments are to be dispatched on full truck /trailer load basis, where the carriers will place their fleet inside the plant for loading, the contractor shall collect them from different locations of store sheds/yard and load by using his/BHEL crane and labour.
2.16.49	The contractor will arrange for gate passes and any other permits required for carrying out his work from the respective agencies at his own cost. He will also comply with regulations of the customer within the project area, any of the State Government and other Government agencies.
2.16.50	NTPC or his authorized agents may inspect stores, storage yard, etc during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner/employer without any extra cost to the owner / employer. No cost whatsoever for such duplication of inspection of work will be entertained.
2.16.51	For any exigencies during execution of the contract, the contractor shall have to depute his personnel for collection/delivery of any material meant for site from/to out station if desired and instructed by the Engineer. The contractor will however be reimbursed expenses incurred for such work for person deputed, as below:-
a)	Second class train fare with reservation / supplementary charges/bus fare subject to furnishing details regarding ticket numbers, journey details, amount of fare etc.
b)	Local conveyance charges (Actual bus / cycle rickshaw/ auto rickshaw fare for local journeys at out station) as permitted by the Engineer.
c)	Daily allowances @ Rs.200/- per day and @ Rs.500/- per day for lodging.
d)	Postal / telegraphic / telephones charges, if any, subject to production of proof of having incurred such expenditure.
e)	Freight and other charges, if any, paid on production of actual receipts.
2.16.52	Payment for the above will be made by BHEL within a month from the date of submission of bill along with details / desired documents by the contractor subject to completion of work assigned to contractor personnel and to the entire satisfaction of the Engineer.
2.16.53	Contractor shall prepare, maintain and update various MM records, associated with materials management operation of BHEL at project site. Two systems of record keeping/capturing information & data at various stages are in vogue viz.
	I. Manual ledgers & records
	II. Computerized database application
2.16.54	BHEL has developed a software application named site operations management system (SOMS) that Captures all the data in the entire chain of transactions starting with Master list of project materials, records of dispatch, receipt, Inspection, issue, return, consumption etc.

2.16.55	Some of these records are master shipping/packing list, LR/RR register, Daybook register, stock register, records of issues to & return of materials in respect of various erection subcontractors, insurance claim records, periodical status reports in various formats covering desired aspects and output information as per BHEL/Client's requirement.
2.16.56	Contractor will provide necessary hardware, software & stationary etc. and shall take utmost care to ensure that these properties and records are protected from any Damage or loss. BHEL will recover the cost of such property / expenses of restoration from the contractor in case of any loss/damage attributable to negligence/failure on contractor's part.
2.16.57	Contractor shall engage skilled & qualified personnel for material management in the area of material receipt & its unloading, verification of materials, preservation of materials, record keeping of materials & for dealing with insurance claims.
2.16.58	**O&M SPARES**
2.16.58.1	O&M spares shall be supplied by the various MUs along with the main supply. Contractor shall unload/ store the spares at the designated location provided and maintain the separate inventory record and identification of the spares consignment. In case of spares consignment received as damaged necessary MDR/SAR /insurance claim shall be raise within one month of receiving the damaged consignment by the contractor.

3.0	**FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR**			
S.No.	**Description**	**Scope /to be taken care by**		**Remarks**
		BHEL	**Contractor**	
1.1.0	**ESTABLISHMENT**			
1.1.1	**FOR CONSTRUCTION PURPOSE**			
A.	Open space for office	**YES**		Limited space (free of charge). As and where made available by customer M/s NTPC
B.	Open space for storage	**YES**		Limited space (free of charge). As and where made available by customer M/s NTPC
1.1.2	**FOR LABOUR COLONY**			
A	Open space		**YES**	Contractor have to make their own arrangement
1.2.0	**ELECTRICITY**			
1.2.1.	Electricity for construction purposes (chargeable/free)			
1.2.1.1	Single point source	**YES**		Chargeable basis as per the prevailing rate of DISCOM.
1.2.1.2	Further distribution for the work to be done which include supply of materials & execution		**YES**	
1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:			
1.2.2.1	Distribution from single point including supply of materials & service		**YES**	
1.2.2.2	Supply, Installation & connection of material of energy meter including operation maintenance		**YES**	

1.2.2.3	Duties & deposits including statutory clearances for above		**YES**	
1.2.2.4	Demobilization of the facilities after completion of works		**YES**	
1.2.2.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above Lines		**YES**	**Chargeable** As per prevailing rates Contractor shall install calibrated energy meter for metering electricity consumption.
1.3.0	**WATER SUPPLY**			
1.3.1	**FOR CONSTRUCTION**			
1.3.1.1	Making the water available at single point		**YES**	Contractor have to make bore wells it self. Wherever approved by M/s NTPC / BHEL
1.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
	FOR LABOUR COLONY			
	Making the water available at single point		YES	Contractor has to arrange on his own.
	Further distribution as per the requirement of work including supply of materials & execution		YES	
1.4.0	**LIGHTING**			

1.4.1	For Material Handling work (supply of all materials) 1. At office storage area 2. At Yard or any other places where material is unloaded/stored		**YES**	
1.4.2	For material handling work (execution of lighting work/arrangements) 1.At office storage area 2. At Yard or any other places where material is unloaded/stored		**YES**	
1.4.3	Providing the necessary consumables like bulbs, tube lights, Switches, etc. fo maintaining the lighting system		**YES**	
1.5.0	**Communications facilities for site operations of the bidder**			
	Telephone/mobile, fax, internet, email etc.		**YES**	
3.1	BHEL will not be responsible for any loss or damage to the contractor's equipment as a result of variation in voltage or frequency or interruptions in power supply.			
3.2	The Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.			
3.3	Provision of distribution lines of both electrical power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS/ Copper / Brass clamps, copper conductor, change over switches pipes etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shifts / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.			

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

4.0	**T&P DEPLOYED BY CONTRACTOR**		
4.1	**FOR MATERIAL HANDLING WORKS**		
S.No.	**EQUIPMENT**	**Capacity**	**Qty.**
1.	Trailer along with pulling unit	20 T	01 No.
2.	Hydra Crane	12T/14T/18T	02 No.
3.	Mini Truck – Common for both package	APR	APR
4.	Fork Lift	APR	APR
5.	Hydraulic jacks	APR	APR
4.2	**E/T/C OF FGD (Mechanical works)**		
S.No.	**EQUIPMENT**	**Capacity**	**Qty.**
1.	Trailer along with pulling unit	20 T	02 No.
2.	Crawler crane	50 T	01 No.
3.	Tyre mounted Mobile crane with telescopic boom	40 T	01 No.
4.	Hydra Crane	12T/14T/18T	03 No.
5.	Trailer along with pulling unit	40 T	APR
6.	Electric Winches	2/5/8/10 T	APR
7.	Welding sets with accessories and ovens for welding electrodes backing and holding	APR	APR
8.	Heat treatment and Stress relieving sets	APR	APR
9.	Hydraulic Pipe Bending Machine (Manual and Motorised) of various sizes	APR	APR
10.	Workshop equipment's and drilling machine	APR	APR
11.	Pipe chamfering machine	APR	APR
12.	Pipe cutting & beveling machines	APR	APR
13.	Chain pulley blocks of various & suitable capacities	APR	APR
14.	Three phase distribution board with complete setup for drawl & distribution of construction power	APR	APR

15.	Electric cables for drawl & distribution of construction power, heating machines	APR	APR
16.	Sleepers of suitable sizes	APR	APR
17.	Various sizes of clamps/ fixtures for assembling	APR	APR
18.	Dewatering pumps	APR	APR
19.	Scaffolding along with clamps and Pipes	APR	APR
20.	Hardness tester	APR	APR
21.	Recordable UT test Equipment suitable to meet the requirements (KRAUTKRAMMER MODEL USN 50 or EQUIVLENT)	APR	APR
22.	Stress relieving equipment	APR	APR
23.	Radiography arrangement	APR	APR
24.	Magnetic particle testing equipment-DRY & WET Type and NDT kit	APR	APR
25.	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable	APR	APR
26.	Spectrometer for metal testing	APR	APR
27.	Elco meter	APR	APR
28.	Holiday detector	APR	APR
29.	Hand Operated Megger /Motor operated Megger	APR	APR
30.	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy	APR	APR
31.	Digital and Analogue Millimeters	APR	APR
32.	U Tube Manometer 0-2000 mm Water Column	APR	APR
33.	Inclined Manometer 0-50 mm Water Column	APR	APR
34.	Calibrated Pneumatic Torque wrench	APR	APR
35.	Bolt Tension Calibrator	APR	APR
36.	Air compressor	APR	APR
NOTES:			

4.1	The above list is only indicative and these T&Ps may not be required for entire contract period but contractor shall ensure the availability of the T&Ps as per work requirement and T&P Deployment schedule. T&P Deployment schedule shall be finalized at site in consultation with BHEL Engineer based on the work fronts/work requirement. BHEL decision shall be final and binding regarding the T&P deployment schedule. Contractor shall mobilize / maintain the T&P's as per the deployment schedule notified time to time by BHEL Engineer.
4.2	APR- Contractor has to deploy T&P, MMD, IMTE as per requirement of site and as decided by BHEL Engineer.
4.3	If any one of T&P mentioned above is not needed for proper execution of scope of work, provided contractor has not utilized BHEL free issued T&P for completing such work, no recovery from contractor shall be applicable.
4.4	Any additional item required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.
4.5	i.)In case deployment of T&P w.r.t requirement/schedule, is delayed or deployed for a shorter period or abnormal down time of T&P or ii) in case T&P w.r.t requirement was not deployed by the contractor as per instruction of BHEL and BHEL had to deploy either its own T&P or iii.)BHEL had to deploy the T&P from outside agency, then recovery shall be done from the contractor as under:
4.5.1	In case the contractor does not deploy or delays deployment or major T&P with reference to schedule specified or T&P deployed is out of service for continuous more than 5 days, BHEL will recover non-refundable penalty per day in the following manner- In respect of each 40MT/50MT crane- @ Rs 5000/- per day In respect of each hydra 12T/14T/18MT- @ Rs 3000/- per day In respect of each trailer 20MT- @ Rs 2000/- per day For the daily recovery rate for other T&P/IMTEs BHEL Engineer decision shall be final and binding on the contractor
4.5.2	In case BHEL had to deploy its own T&P, hire charges of T&P applicable for outside agencies as per extant guidelines for "Hire Charges on issue of Capital Tools & Plants" shall be recovered.
4.5.3	In case BHEL had to deploy the T&P from outside agency, actual hiring cost plus applicable overheads shall be recovered
4.6	All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to BHEL site in-charge before the start of work.
4.7	T&P's mentioned above shall be specifically deploy as per the respective packages. However, as per work requirement and availability of T&Ps the inter use in Material Handling and Mechanical works may be permitted as per the instruction of the BHEL Engineer.
4.8	If the work related to T & Ps mentioned above is completed then, BHEL can release that T & P during contract period / extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager for releasing the T&P.

5.0	**LIST OF T&P BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS**		
Sl. No.	**Equipment**	**Capacity**	**Qty.**
1	CRAWLER CRANE	135MT	1 No
2	CRAWLER CRANE	100 MT	1 No.
3	Hydraulic Test Pump	600 KG	1 No.
4	Industrial Air Blower	20,000 m^3/hr	1 No.
NOTES:			
5.1	Cl.4.2.2.16 c.) of SCC shall read as day-today upkeep and running maintenance like filling topping up of lubricants, changing filters, etc. including repair of self-starter, batteries and dynamo of these cranes shall be excluded from the scope of the contractor. In case of breakdown of crane, contractor shall provide the necessary manpower for maintenance of the crane to maintenance agency, failing to do so BHEL will get the job done at the risk and cost of contractor. BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance shall be excluded from scope of contractor.		
5.2	**Cl.4.2.2.16 e.) of SCC. The operator, helper & maintenance personal for BHEL's cranes 100 MT & above capacity being provided by BHEL free of cost. Further fuel for operation of all BHEL cranes shall be provided by contractor without any extra cost.**		
5.3	The Cranes at Sl No. 1&2 will be provided as per requirement and availability at the sole discretion of the BHEL Engineer		
5.4	The contractor shall make necessary arrangement like laying of special sleeper beds, assembly & dismantling of heavy lift attachment, boom, jib etc. for movement and operation of crane.		
5.5	Other T&P mention above contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.		

6.0	**TIME SCHEDULE**	
6.1	The contractor is required to commence the work within 15 days from the date of issue of letter of intent (LOI) unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilization of manpower and T&Ps by the contractor.	
6.2	Entire work as detailed in the tender specifications shall be completed within **19 months** from the Zero date as per programme / milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL‟s commitments to their customer as indicated from time to time.	
6.3	Entire work shall be carried out in accordance with the broad schedule for FGD system as furnished below, within the stipulated completion period. This schedule will undergo review and based on progress vis-à-vis project requirement, contractor shall submit revised schedule for approval of BHEL/Customer M/s NTPC.	
6.4	Schedule of FGD Unit #1:	
	Milestone	Schedule
6.4.1	Start of Material Handling (Unit #1&2)	Zero date(Jun’18)
6.4.2	Start of FGD Erection Work#1	01-08-2018
6.4.3	Air tightness test of complete ducting -(**M1)**	01-05-2019
6.4.4	Completion of Erection work of FGD system	01-06-2019
6.4.5	Commissioning of FGD#1 **-(M2)**	01-08-2019
6.4.6	Completion of Facilities FGD#1	01-10-2019
6.5	Unit # 2 milestones will have an approximate phase lag of 3 (three) months with Unit# 1.	
6.6	**Provision of Penalty in case of slippage of Intermediate Milestones:**	
6.6.1	**M1& M2 are the intermediate LD milestone.** Milestones LD shall be applicable if the delay in achieving the milestone solely attributable to the contractor.	
6.6.2	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones	
6.6.3	In case delay in achieving M1 Milestone is solely attributable to the contractor,0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.	
6.6.4	In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 3% of executable contract value , will be withheld.	
6.6.5	Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.	

6.6.6	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
6.6.7	Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.
6.6.8	In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery
6.6.9	**** Executable Contract Value - Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.***
6.7	Contractor shall plan their work in such a manner so as to meet the above project schedule, in consultation with BHEL/ customer. To achieve the above schedule contractor shall work in the all the available fronts concurrently and be prepare for working in the shift operation as per the instruction of BHEL Engineer.
6.8	Completion of facilities shall be completed in all respects only when on successful erection, trial run of individual equipment's and successful commissioning, trial operation, attending punch points ,handing over of the FGD system to the customer.
6.9	The work under the scope of this contract shall be deemed to have been completed in all respects only when so certified by BHEL. The decision of BHEL shall be final and binding on the contractor.
6.10	If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the contract as per the GCC clause 2.11
6.11	Commencement of performance guarantee shall be as per clause no.2.24 (Performance Guarantee for Workmanship) of General Conditions of Contract. The commencement of guarantee period for the quality of the workmanship shall start from the date of trial operational acceptance of facilities/handing over to the customer for the respective unit.

7.0	**TERMS OF PAYMENT**	
7.1	The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.	
7.2	Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices and payment shall be released within 30 days of receipt of Bill complete in all respect.	
7.3	Shortage / damage reports on BHEL's standard materials management forms and no payment shall be released till the contractor submits these reports and are verified by the Engineer.	
7.4	Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder	
7.5	**PROGRESSIVE PAYMENT ON PRORATA BASIS For Material handling Works:**	
7.5.1	**Unloading from Truck/Trailers (Applicable for Item no. 1.1 of Rate Schedule)**	
S. No.	**Description of Activity**	**% of Payment**
1.	Unloading, Shifting to open/ covered stores	30%
2.	Updation of receipt details, in store material registers/BHEL MM package system	15%
3.	Stacking and Verification	15%
4.	Updation of verification details in material stock registers, submission of reports as per specified formats for shortage/open delivery, lodging of police reports if required, documents for insurance claims etc, and preparation of material receipt certificates in prescribed formats where ever applicable	25%
5.	identification of material in ready to lift position for issue to erection agency/handing over the spares to BHEL/NTPC(whichever applicable) and updation of issue details in stores records	12%
6.	Completion of Contractual obligations	3%
	Total	100%

7.5.2	**Re-shifting of the Material with in (Applicable for Item no.1.2 of Rate Schedule)**	
SL NO	Description of Activity	% of Payment
1.	Material re-shifting/ restacking	85%
2.	Updation of stock register/ Material Registers/BHEL MM PACKAGE SYSTEM	12%
3.	Completion of contractual obligations	3%
	Total	100%
	% from every RA Bill to be paid only after satisfactory completion otherwise Forfeited:	
SL NO	Description of Activity	% of Payment
1.	REMOVAL OF GRASS/WEEDS AND OTHER PLANT GROWTH IN THE STORE AREA	1%
2.	Safety+Illumination	1%
3.	Preservation planned for month	1%

7.6	**FGD Erection Works**						
7.6.1	**85 % of Unit Rate** **(Applicable for ITEM. No. 2.1,2.2,2.3,2.4,2.5.1,2.5.2,2.5.3 and 3.0 of Rate Schedule)**						
SL. No.		**FOR ITEM NO.2.1 (Str.& Duct /dampers)**	**FOR ITEM NO.2.2 (Tanks)**	**FOR ITEM NO.2.3 (Rotating M/c)**	**FOR ITEM NO.2.4 (Insulation)**	**FOR ITEM NO.2.5.1, 2.5.2 & 2.5.3 (Piping)**	**FOR ITEM NO.3.0 (Misc Eqpt/str steel)**
1.	Completion of pre-assembly, (if not applicable this portion shall be clubbed with Placement in position)	20%	20%	20%		20%	20%
2.	Placement in position	25 %	20 %	20%	50 %	20 %	25 %
3.	Alignment	20 %	10%	20%		10 %	20 %
4.	Welding /bolting/fixing as required	15%	20%	20%	35%	15%	15%
5.	Completion of non destructive examination & stress relieving/ heat treatment, **(if not applicable, then this portion to be paid along with welding)**	5 %	10%	5%		10%	5 %
6.	H&S wherever applicable as per drawing					5%	
7.	Hydro test of piping/ water fill test /Vaccum box test of tanks/Holiday test(as applicable)		5%			5%	
	TOTAL FOR PRO RATA PAYMENTS	85%	85%	85%	85%	85%	85%

7.7	**STAGE/MILESTONE PAYMENTS (15%)**		
1.	Completion of air & gas tightness test for Ducts	2x1%	2%
2.	Completion of Trial run of Slurry pumps		1%
3.	Trial run of Wet ball mills	2x1%	2%
4.	Trial run of Booster Fans	4x0.25%	1%
5.	Trial run of Oxidation Blower	4x0.25%	1%
6.	Trial run of FGD System	2x1%	2%
7.	Completion of Painting		3%
10.	Area cleaning, temporary structures cutting/removal and return of scrap		1%
11.	Liquidation of pending points		1%
12.	Completion of all contractual obligation and de mobilization of site office.		1%
13.	Total		15%
7.8	**Notes:**		
7.8.1	If the commissioning activities could not be carried out due to no fault of contractor, BHEL Site in-charge, at his discretion, after recording reasons for exercising such option, can split and release payment up to 50% of milestone payment on completion of work, to the extent possible, required for carrying out that particular milestone/ commissioning activity.		
7.8.2	In line with GCC clause 2.23.1 .v to facilitate part payment, BHEL Site Engineer at his discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work.		
7.8.3	Retention amount as per GCC clause 2.22.1.		

8.0	**TAXES AND DUTIES**
8.1.1	Price quoted should be inclusive of all applicable Taxes/charges but **Excluding GST.** The Contractor shall pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit. **GST Shall be payable extra as per following :**
8.1.2.	Contractor/Vendor has to issue invoice indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder. With the implementation of e way bill provisions, contractor shall comply with same as applicable.
8.1.3	Vendor has to submit GST compliant invoice within seven days from the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts. Special care should be taken in case of month end transactions.
8.1.4.	GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor : - a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor.
8.1.5	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder
8.1.6	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altered/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.
8.1.7	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.1.8	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract is limited to direct transactions between BHEL & its Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its Contractor.
8.1.9	**Variation in Taxes & Duties**: Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this

	clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
8.1.10	**Modalities of Tax Incidence on BHEL:** Where GST law permits more than one option or methodology for discharging liability of tax/ levy/ duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.
8.2	**BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**
	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-
8.2.1	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.
8.2.2	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
8.2.3	It shall be the responsibility of the sub-contractor to furnish the receipts /challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.
8.2.4	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
8.2.5	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
8.2.6	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
8.2.7	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/Rules shall be deducted from the contractor.

9.0 In order to give phillip to Pradhan Mantri Kaushal Vlkas Yojna:

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

ANNEXURE – I

GENERAL IDEA OF WEIGHTS TO BE HANDLED FOR MM WORKS

S.no.	Unit	Description of Supplies	Tonnage (MT)
i	Ranipet	FGD System (Mechanical & Electrical components)	12000 MT
ii	EDN	Control and Instrumentation /Panels	38 MT
iii	PC, Chennai	Piping System	93 MT
iv	IS	Motors	64 MT
v	PEM	Mechanical BOIs and Electrical BOIs	400 MT
vi	Rudarapur	Busduct	60 MT
vii	EPD	LV switchgear	130 MT
viii	Bhopal	HT Switchgear	93 MT
ix	PESD	Fire Protection System	185 MT
x	Jhansi	Transformers	50 MT
xi		O&M Spares	300 MT
		Re-shifting /Restacking of the material	500 MT
		Approximate Weight to be handled	**14000 MT**

General idea of some major components (Single Piece) to be handled under this package.

S.No.	Item Description	Approx. Gross Wt./Piece (MT)
1	Empty Ball mill	30
2.	Booster Fan rotor	14
3.	Vibratory Screener	12
4.	Hydrocyclones	7.5

Notes:

1.	The product list and the manufacturing units mentioned above are indicative for estimation purpose only. The weight mentioned above is approximate and liable to vary as per design consideration of the manufacturing unit.
2.	The payment will be made at the quoted / accepted rates for the tonnage actually handled.

Annexure-II

Weight Summary for the E/T/C of the FGD System				
S.no.	**Unit**	**Description of Supplies**	**Tonnage (MT)**	**Remarks**
i	Ranipet	FGD System(Mechanical)	11137 MT	Annexure-III,IV
ii	PEM	Mechanical BOIs	17 MT	Annexure-V
iii	PC Chennai	Piping System	93 MT	Annexure-VI
iv	IS	Motors	64 MT	Annexure-VII
v	PESD	Fire Protection System	185 MT	Annexure-VIII
		Total Tonnage	**11496 MT**	
Notes:				
1.	Weight mentioned in the annexures II,III, IV ,V ,VI ,VII and VIII are tentative only and based on the engineering /drawings /documents/ inputs from MUs available as on date of NIT and liable for variation.			
2.	The contractor is required to erect actual tonnage (irrespective of any variation plus or minus) which may be necessary to complete their work and commissioning the FGD system in all respects as detailed in tender specifications and as per the drawings/ documents for which payments shall be released on finally accepted tonnage rates.			
3.	The contractor undertakes to erect / commission actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually erected at site and payments will also be regulated for the same.			

Annexure -III

A.	**Product Group (PG) Wise Weight Schedule For FGD system (BHEL Ranipet Supply)**				
	Total Weight under the FGD system including common system :		**11137 MT**		
I.	Structure, Duct/Dampers		8981 MT		Rate Sch. Item no. 2.1
II.	Tanks		225 MT		Rate Sch item no. 2.2
III.	Rotating Machines		1158 MT		Rate Sch item no. 2.3
IV.	Insulation		287 MT		Rate Sch item no. 2.4
V.	Piping & valves		486 MT		Rate Sch item no. 2.5.2
S.NO.	**PGMA**	**PGMA DESCRIPTION**	**Per Unit Wt (in MT)**	**Both Unit Weight (MT)**	**Category/Sub group**
1	FW212	Slurry Recirculation Pump Syst	124	248	Rotating Machines
2	FW213	Absorber System Internals	25	50	Str, Duct/Dampers
3	FW215	Mist Eliminator & Accessories	25	50	Str, Duct/Dampers
4	FW219	Absorber System-Base	14	28	Str, Duct/Dampers
5	FW220	Absorber System-Structures	390	780	Str, Duct/Dampers
6	FW221	Absorber System-Casing Bottom	159	318	Str, Duct/Dampers
7	FW222	Absorber System-Casing Top	238	476	Str, Duct/Dampers
8	FW223	Absorber System Accessories	14	28	Str, Duct/Dampers
9	FW224	Absorber System-Lining-C276	3	6	Str, Duct/Dampers
10	FW226	Emergency Quench Water Tank	5	10	Tank
11	FW227	Emergency Quench System	8	16	Str, Duct/Dampers
12	FW228	Absorber-W/D Interface	11	22	Str, Duct/Dampers
13	FW230	Air Oxidation System	10	20	Rotating Machines

14	FW244	Oxidation Air Distribution Sys	8	16	Piping
15	FW251	Expansion Joint Between Bypass	25	50	Str, Duct/Dampers
16	FW253	Expansion Joint Between Scrubr	4	8	Str, Duct/Dampers
17	FW255	Duct Between Bypass Duct Inlet	982	1964	Str, Duct/Dampers
18	FW256	Duct Between Ggh And Scrubber	379	758	Str, Duct/Dampers
19	FW257	Duct Between Scrubber And Ggh	668	1336	Str, Duct/Dampers
20	FW260	Duct Structure Between Duct	274	548	Str, Duct/Dampers
21	FW261	Duct Structure Between Scruber	98	196	Str, Duct/Dampers
22	FW262	Duct Structure Between Scruber	272	544	Str, Duct/Dampers
23	FW267	Insulation Materials For Duct	93.5	187	Insulation
25	FW268	Fixing Components And Cladding	50	100	Insulation
26	FW280	Foundation Matl For Duct Struc	30	60	Str, Duct/Dampers
27	FW281	Foundation Matl For Scrubber	11	22	Str, Duct/Dampers
28	FW292	Structures For Elevator	23	46	Str, Duct/Dampers
30	FW310	Stru For Booster Fan Handling	12	24	Str, Duct/Dampers
31	FW311	Handling Equip- Booster Fan	10	20	Str, Duct/Dampers
32	FW314	Miscellaneous- Fgd System	10	20	Str, Duct/Dampers
33	FW610	Gallaries & Railings For Scrubbe	41	82	Str, Duct/Dampers
34		Booster Fans and aux.	130	260	Rotating Machines
		Gate and dampers and accessories	300	600	Str, Duct/Dampers
		Total Weight of Both the Unit (MT)		**8894**	

Annexure -IV

B.	FGD (Commom System)			
SL.NO.	**PGMA**	**PGMA DESCRIPTION**	**Common System (Wt in MT)**	**Category/Sub group**
1	FW701	Slurry Pumps & Accessories	100	RM
2	FW710	Monorail For Hoist & Cranes	60	RM
3	FW715	Handling Equipment In Fgd	100	Str, Duct/Dampers
4	FW720	Agitators	50	RM
5	FW721	Agitator Support	32	Str, Duct/Dampers
6	FW722	Galleries & Railings For Tank	32	Str, Duct/Dampers
7	FW729	Limestone Silo-Ss 304 Lining	6	Str, Duct/Dampers
8	FW730	Limestone Silo Structure	96	Str, Duct/Dampers
9	FW731	Limestone Silo	150	Tank
10	FW732	Limestone Silo Accessories	28	Str, Duct/Dampers
11	FW733	Limestone Silo Approach Platf	10	Str, Duct/Dampers
12	FW734	Limestone Mill	320	RM
13	FW736	Primary Hydroclone And Accesso	20	RM
14	FW737	Secondary Hydroclone And Acces	10	RM
15	FW738	Gypsum Belt Filter And Access	130	RM
16	FW740	Foundation Matl For Tanks	9	Str, Duct/Dampers
18	FW742	Limestone Slurry Storage Tank	75	Tank
19	FW743	Auxiliary Absorber Tank	66	Tank
20	FW744	Filtrate Tank	9	Tank
21	FW745	Wastage Water Tank	16	Tank
22	FW747	Hydroclone Waste Water Tank	9	Tank
23	FW748	Process Water Tank	20	Tank
24	FW751	Process Water Pipe Accessories	100	Piping
25	FW753	Slurry Pipe Accessories	200	Piping
26	FW754	Service Air Pipe Accessories	20	Piping
27	FW755	Instrument Air Pipe Accessorie	20	Piping

28	FW758	Valves And Fittings Common	130	Piping
29	FW761	Structure For Piperacks	114	Str, Duct/Dampers
30	FW763	Fndn:Matl For Pipe Rack Gyps	11	Str, Duct/Dampers
31	FW766	Platform For Pipe Rack-Left	19	Str, Duct/Dampers
32	FW769	Trestle For Pipe Racks	262	Str, Duct/Dampers
33	FW798	Air Receivers	7	Tank
34	FW800	Clarified Water Tank	10	Tank
35	FW802	Neutralisation Tank & Accessories	3	Tank
		Total Weight of Common system (MT)	**2244**	

ANNEXURE – V

C.	PEM Supplied BOIs Detail							
S. No.	**Item Description**	**UOM**	**Total Qty.**	**UOW**	**Wt./Unit**	**Total MT**	**Sub group**	**Remarks**
1	NaOH Dosing System	No.	1	kg	1500	1.50	Misc.Eqpt /Str steel	Rate Sch. Item no. 3
2	Valves & Traps	Lot	1	kg	195	0.20	Piping	Rate Sch. item no. 2.5.2
3	ACW PUMPS (Hor)	No.	4	MT	0.75	3.00	Rotating M/c	Rate Sch. item no. 2.3
4	ECW PUMPS (Hor)	No.	3	MT	0.75	2.25	Rotating M/c	Rate Sch. item no. 2.3
5	SCS	No.	2	MT	1.50	3.00	Misc.Eqpt/Str steel	Rate Sch. item no. 3
6	PHE	No.	3	MT	1.50	4.5	Misc Eqpt/Str steel	Rate Sch. item no. 3
7	Chain Pulley Block	No.	3	MT	0.20	0.60	Misc.Eqpt/Str steel	Rate Sch. item no. 3
8	ECW O/H tank	No.	1	MT	1.5	1.5	Tank	Rate Sch. item no. 2.2
	.**Total Weight of PEM Supplies(MT)**					17		

ANNEXURE – VI

D.	**Weight Schedule of Piping System (PC Chennai)**			
D.1	**Equipment Cooling Water system(including valves, flanges ,fittings , H&S etc.)**			
S. No.	**Item Description**	**UOM**	**Total Weight(MT)**	**Remarks**
1	SS Piping	MT	8	Rate schedule Item no. 2.5.1
2	CS Piping	MT	85	Rate schedule Item no. 2.5.2
	Total Weight of ECW Piping(MT)		**93**	

Annexure-VII

E.	**Weight Schedule of Motors (Industry Sector)**				
E.1	**HT Motors**				
S. No.	**Item Description**	**UOM**	**Wt / Motor(MT)**	**Total Weight(MT)**	**Remarks**
1	HT Motors-4 no.	MT	16	64	Rate Schedule Item no. 2.3
	Total Weight of IS Supplies (MT)			64	

ANNEXURE – VIII

F.	**BOQ of Fire Protection System (BHEL PESD ,Hyderabad Supply)**				
	Description			**Weight (MT)**	**Remarks**
F.1	CS Piping (A/G) along with valves, fittings, etc.			65	Rate schedule Item no.2.5.2
F.2	Buried CS Piping (Wrapping and Coating)			115	Rate schedule Item no.2.5.3
F.3	Misc. Equpt./Str. Steel			5	Rate schedule Item no.3.0
	Total weight under PSED supplies			**185**	
S. No.	**Description**	**Unit**	**Qty.**	**Total Wt. (MT)**	
	Hydrant System				
1	MS Pipe-1239 Heavy Grade ERW MS Black (erection with necessary welding , fittings and support)				
	150 mm dia	Mts	5236	115	CS piping
	100 mm dia	Mts	150	2.25	CS piping
	80 mm dia	Mts	268	2.68	CS piping
2	SS Hydrant Valve	No.	134	2.68	CS piping
3	Air Release Valve				
	25 mm dia	No.	5	0.025	CS piping
4	Gun Metal Valve				
	25 mm dia	No.	5	0.025	CS Piping
5	Drain Valve	No.	5	0.005	CS Piping
6	Hose Reel (15 M length)	No.	30	0.6	Misc Eqpt./Str steel
7	Hose Box				
	External + Internal	No.	70	1.05	Misc Eqpt./Str steel
8	Branch Pipe with Nozzle	No.	50	0.5	CS piping
	Gate Valve (CI -valve)				
9	150 mm dia	No.	50	3.8	CS piping

10	Structural Steel	MT		1	Misc Eqpt/Str steel
11	M.S Fittings	Lot		42	CS piping
12	Wrapping and coating of UG pipe (150NB Pipe)	sqmt	3320		
	HVWS System				
1	Deluge Valve along with Gate valve, Strainer, nozzles, GI Pipe, solenoid valve, etc. for OPU unit and Transformer				
	100 mm dia	No.	4	0.39	CS Piping
2	ERW G.I. Pipe as Per IS:1239 Heavy Class (erection with necessary welding , fittings and support)				
	100 NB	Mtrs	240	3.6	CS Piping
3	ERW, MS black pipe as Per IS:1239 Heavy Class (erection with necessary welding , fittings and support)				
	25 NB	Mtrs	140	0.42	CS piping
4	Cast iron Rising spindle Type Gate Valve				
	100 NB	No.	8	0.35	CS piping
5	Cast iron wafer Butterfly Valve				
	100 NB	No.	4	0.04	CS Piping
6	M.S Y- Type Strainer				
	100 NB	No.	2	0.05	CS piping
7	Spray Nozzle - Stainless Steel	No.	80	0.01	Misc Eqpt/Str steel
8	SS orifice plate				
	100 NB	No.	2	0.004	Misc Eqpt/Str steel
9	Structural Steel	Lot	1	0.7	Misc Eqpt/Str steel
10	Pipe Fittings	Lot	1	0.5	CS Piping
11	Flanges,nut bolt & gasket	Lot	1	0.5	CS Piping

12	Pipe clamps	Lot	1	0.1	CS Piping
C.	**MVWS SYSTEM**				
Sl. No.	**Description**	**Unit**			
1	Deluge Valve along with Gate valve, Strainer, nozzles, GI Pipe, solenoid valve, etc. for OPU unit and Transformer				
	100 mm dia	No.	3	0.29	CS piping
2	ERW G.I. Pipe as Per IS:1239 Heavy Class (erection with necessary welding , fittings and support)				
	25 NB pipe	Mtrs	362	1.09	CS piping
	32 NB pipe	Mtrs	81	0.24	CS piping
	40 NB pipe	Mtrs	77	0.31	CS piping
	50 NB pipe	Mtrs	80	0.48	CS piping
	65 NB pipe	Mtrs	25	0.2	CS piping
	80 NB pipe	Mtrs	27	0.27	CS piping
	100 NB pipe	Mtrs	56	0.84	CS piping
3	ERW, MS black pipe as Per IS:1239 Heavy Class (erection with necessary welding , fittings and support)				
	80 NB pipe	Mtrs	6	0.06	CS piping
	100 NB pipe	Mtrs	16	0.24	CS piping
4	Cast iron Rising spindle Type Gate Valve				
	100 NB	No.	6	0.26	CS piping
5	Cast iron wafer Butterfly Valve				
	100 NB	No.	3	0.03	CS piping
6	M.S Y- Type Strainer				
	100 NB	No.	3	0.08	CS piping

7	Spray Nozzle - Stainless Steel	No.	300	0.04	Misc Eqpt/Str steel
8	Structural Steel	Lot	1	1	Misc Eqpt/Str steel
9	Pipe Fittings	Lot	1	0.5	CS Piping
10	Flanges,nut bolt & gasket	Lot	1	0.5	CS Piping
11	Pipe clamps	Lot	1	0.1	CS Piping
D.	**PORTABLE FIRE EXTINGUISHERS**				
Sl. No.	**Description**	**Unit**			
1	Hand held portable pressurized water CO2 - 9litres	No.	8	0.12	Misc Eqpt/Str steel
2	4.5 kg CO2	No.	11	0.154	Misc Eqpt/Str steel
3	6kg DCP	No.	11	0.11	Misc Eqpt/Str steel
4	9 kg Foam	No.	4	0.08	Misc Eqpt/Str steel

Notes:

1.	The erection work shall include necessary welding, fittings, clamps, fixtures, etc. including finishing work as may be required for completion of the work.
2.	Consumables like rawl plugs, screws, check nuts, nuts & bolts, saddles, saddle bars, cable (nylon) ties, washers, cable tags (strips), etc. which are not covered in the list but required for successful completion of above erection activity shall be supplied by the contractor with in the quoted rate.
3.	Erection activities like cutting/ threading/welding etc. of conduit/pipe/ISMC/ISA shall be carried out by the successful bidder as per requirement for installation of equipment's.
4.	Surface preparation and base coat of primer shall be carried and final painting shall be done after completion of structural steel erection.
5.	Contractor shall arrange all the tools and facilities required for calibration, erection and testing required for Erection & Commissioning activities of fire protection system.

Annexure – "A"

UNPRICE RATE SCHEDULE

ITEM NO.	DESCRIPTION OF WORK	TOTAL PRICE ("A") IN INR (IN FIGURES AND WORDS)
1.0	TOTAL PRICE ("A") FOR THE TOTAL WORK AS PER TENDER SPECIFICATION FOR "MATERIAL HANDLING AND ERECTION, TESTING, COMMISSIONING ,TRIAL OPERATION AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) AT NCTPP, DADRI STAGE-II (2X490 MW), GAUTAM BUDH NAGAR, U.P."	
Notes:		
1.	The rates of individual item for the entire scope of work as define in BOQ (Chapter X) shall be arrived as per Calculation defined in Annexure – "B".	
2.	The derived item rate will remain firm throughout the contract period.	

Annexure – "B"

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

Sl. No	DESCRIPTION OF WORK	UOM	Qty.	Rate per MT (in Rs.)	Amount (Rs.) = Rate per MT X Quantity
1.	**Material Handling**				
1.1	**Rate in Rupees per MT** for entire scope of material handling work as defined in this tender specifications(as per Annexure-I)	MT	13500	A*0.221 / 100000	
1.2	**Rate in Rupees per MT** for Re-shifting/Restacking of material (as per Annexure-I)	MT	500	A*0.177 / 100000	
2.	**FGD System**				
2.1	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over **of Structure ,Duct and dampers etc** as per tender specifications (as per Annexure-II)	MT	8981	A*8.182 / 100000	
2.2	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Tanks** under FGD system **etc** as per tender specifications (as per Annexure-II,IV)	MT	227	A*11.099 / 100000	
2.3	Rate in **Rupees per MT** for erection, testing, commissioning, trial operation and handing over of **Rotating Machines etc** as per tender specifications (as per Annexure-II,IV)	MT	1227	A*5.132 / 100000	

Sl. No	DESCRIPTION OF WORK	UOM	Qty.	Rate per MT (in Rs.)	Amount (Rs.) = Rate per MT X Quantity
2.4	**RATE in Rupees per MT** for complete scope of work as per tender specification for **insulation and sheeting**, etc. for FGD system as per specifications.(as per Annexure-II)	MT	287	A*7.179 / 100000	
2.5	**Rate in Rupees per MT** for erection, testing, commissioning, trial operation and handing over of Piping systems(including valves, flanges ,fittings , H&S etc.) as per tender specifications (as per Annexure –II, VI,VII)				
2.5.1	SS piping	MT	8	A*33.273 / 100000	
2.5.2	Carbon steel piping including fire protection piping	MT	636	A*16.409 / 100000	
2.5.3	Carbon steel Buried piping (wrapping and coating)	MT	115	A*15.014 / 100000	
3.	Misc. Equpt./Str steel/ etc.(as per annexure-V,VIII)	MT	15	A*9.315 / 100000	
	TOTAL PRICE ("A") IN INR				
Notes:					
1.	The quantities indicated in above are tentative and are liable to vary depending upon the site requirement. The contractor has to handle / erect / commission all the items indicated by BHEL for achieving the milestones and completion of work.				
2.	Evaluation of bids shall be done on total price against this Rate Schedule / BOQ.				
3.	In case of any mismatch in Rate and amount on Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.				

TECHINICAL CONDITIONS OF CONTRACT (TCC)

FOR

WORK OF MATERIAL HANDLING AND ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF THE FLUE GAS DESULPHURZATION SYSTEM AT 2X490 MW, NCTPP DADRI, STAGE-II

PART- II OF TCC

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

S.NO.	DESCRIPTION	Chapter No.	PAGES
	Part-II: Technical Specifications		
1.	GENERAL	Chapter-I	59-60
2.	CIVIL WORKS, FOUNDATION, GROUTING	Chapter-II	61
3.	ERECTION	Chapter-III	62-69
4.	WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NDT	Chapter-IV	70-73
5.	APPLICATION OF INSULATION	Chapter-V	74-76
6.	PAINTING INCLUDING FINISH PAINTING	Chapter-VI	77
7.	TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING	Chapter-VII	78-80

1.0	**GENERAL**
1.1	The intent of this specification is to provide services for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lump sum price shall deem to be inclusive of all such contingencies.
1.2	The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents /specification/manuals supplied by BHEL from time to time.
1.3	The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during execution. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be affected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.
1.4	Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices.
1.4.1	Provision as required of all types of labour, supervisors, engineers, watch and ward, tools & tackles, calibrated inspection, measuring and test equipments as specified and otherwise required for the work, consumables for erection, testing and commissioning including material handling.
1.4.2	Proper out-turn as per BHEL’s plan and commitment
1.4.3	Completion of work as per BHEL Schedule.
1.4.4	Good quality and accurate workmanship for proper performances of equipment.
1.4.5	Repair and rectification
1.4.6	Preservation / Re-conservation of all components during storage / erection till handing over.
1.5	The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification/manuals supplied by BHEL from time to time.
1.6	Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. BHEL engineer, depending upon the availability of materials, fronts etc, will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.
1.7	All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory/ local authorities are to be arranged by the contractor at his cost in time to ensure smooth progress of work.
1.8	The quantities indicated in the tender specification are approximate and are liable for variation and alteration at the discretion of BHEL. The quoted unit rate shall be applicable for any additional product group also, if included at a later date integral to the main scope of work /package envisaged. The work executed shall be measured and priced as per the unit rate arrived at for each work area as mentioned in the relevant clauses

1.9	The terminal points as decided by BHEL shall be final and binding on the contractor
1.10	The work covered under this specification is of highly sophisticated nature requiring the best quality of workmanship, engineering and construction management. The contractor should ensure timely completion of the work. The contractor must have the adequate quantity of tools, construction aids, equipments, etc. in this possession. He must also on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.
1.11	Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less/more at a particular given time. Activities and erection program have to be planned in such a way that the milestone are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.
1.12	HOUSE KEEPING-The contractor is supposed to carryout housekeeping of the work area on regular basis to keep the work place neat and tidy and available for the SAFE Working. The scrap, generated daily during the Execution activities, is to be dumped at designated area as decided by BHEL/ NTPC on daily basis. The erection materials issued to the contractor and kept near the work area should also be staged properly at site. Compliance report on above shall be submitted by the contractor to BHEL on Daily basis. In case the contractor fails to do so, BHEL have rights to carryout the same from the other party at the Risk and cost of the contractor. The cost applicable with BHEL overheads shall also be recovered from the monthly running bills of contractor

2.0	**CIVIL WORKS, FOUNDATION, GROUTING**
2.1	BHEL/NTPC shall provide all equipment foundations. For the correctness of these foundations as per drawings, the contractor shall check the dimensions & locations of the foundations, pockets, anchor-bolt pitch. Further, top elevation of foundations shall be checked with respect to benchmark. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging the pockets in foundations etc., as may be required for the erection of equipment / plants shall be carried out by the contractor.
2.2	While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided BHEL Engineer allows it. When required by manufacturers, the embedded sub-sole plates shall be scraped and checked with Prussian blue to get the required contact with frames.
2.3	The contractor shall ensure perfect matching of packer plates including machining, scraping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of equipment to the satisfaction of BHEL Engineer. If required the packer plates may have to aligned and fixed on the foundations using special high strength, non-shrinking and quick-setting grouts. The minimum thickness below the packer plate should be 20 mm.
2.4	**Entire grouting work of foundation bolt grouting, base plate grouting, equipment grouting etc. including materials shall be carried out by the civil work agency of BHEL.** While grouting will be carried out by other agency, the contractor has to ensure that all the matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tape or any other alternative method approved by Engineer. All assistance required has to be provided by the contractor.If required, decoupling of equipment's has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.
2.6	The contractor shall check and verify the alignment of equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting check up and verifications. Such pre and post grout records of alignment details shall be maintained by the contractor in a manner acceptable to the Engineer.

3.0	**ERECTION**
3.1	All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. The omission of specific technique /method/process does not absolve the contractor of his responsibility for the particular operation. These would include,
3.1.1	Scaffolding and rigging operations,
3.1.2	Machine / flame / electric cutting, grinding, welding, radiography and stress relieving
3.1.3	Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, levelling, blue matching, aligning and assembly.
3.1.4	Machining, surface grinding, drilling, doweling, shaping
3.1.5	Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.
3.1.6	Insulation and painting
3.2	Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting, pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.
3.3	No members of any ladder / structure / platform should be cut without specific approval of BHEL. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / customer without any additional cost.
3.4	The contractor shall erect scaffolding / temporary platforms for erection. These should be of adequate capacity and shall never be over loaded. These should be replaced when not found suitable during erection work and dismantled on work completion and removed from work site.
3.5	It shall be the responsibility of the contractor to provide ladders on columns for initial work 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. In case it is absolutely necessary then the contractor shall cut the temporary structure and rectify the column as directed by the engineer.
3.6	The contractor is strictly prohibited in using the FGD/ Auxiliary Components for any temporary supporting or scaffolding works etc. In case of such misuse a sum of determined by Engineer will be recovered from contractor's bills.
3.7	**Below mentioned erection sequence is indicative only and give the general idea to the contractor for absorber erection. :**
1.	Marking and packer liner setting
2.	Bottom plate installation
3.	Ist stage casing panel installation
4.	Baffle panel installation
5.	Scaffolding and Structure up to 24.8 Mtr.
6.	2nd stage casing panel installation
7.	Scaffolding and Structure up to 28.5 Mtr.

8.	3rd stage casing panel installation
9.	Inlet duct panel installation
10.	Scaffolding and Structure up to 31.75 Mtr.
11.	4th stage casing panel installation
12.	Scaffolding and Structure up to 35.4 Mtr. and spary pipe installation
13.	5th stage casing panel installation
14.	Scaffolding and Structure up to 39 Mtr.
15.	6th stage casing panel installation
16.	Scaffolding and Structure up to 43 Mtr.
17.	7th stage casing panel installation
18.	Scaffolding and Structure up to 47 Mtr. and remaining structure erection
19.	Ceiling panel installation
20.	Rubber lining
21.	Dismantling of scaffolding up to mist eliminator level
22.	Absorber internals (Spray pipe and mist eliminator) installation
23.	Dismantling of scaffolding up to spray pipe level
24.	Absorber internals (Spray pipe and spray nozzle) installation
25.	All scaffolding dismantling
26.	Fiber grating installation
27.	Agitator installation
3.8	**Casing Panel Installation**
3.8.1	Splices of bottom plates at which casing panel are located shall be cleaned.
3.8.2	Location of casing shall be marked on the foundation. Then, according to the casing panel assembly drawings, the location of vertical splices between plates shall be marked
3.8.3	Temporary assembly of lower stage casing panel shall be done by Tack-weld the guide pieces to the bottom plate at prescribed intervals of inside and outside the circular marking.
3.8.4	Temporary assembly of upper stage casing panel shall be done As per Match marks which have been provided on the inside surface of the lower stage casing panel shall be matched to vertical splice line and assembled.
3.8.5	After that welding of the casing panel to be done The weld between lower stage casing panel and bottom plate shall be performed in a suitable time after the completion of vertical splice for lower stage casing panel.
3.8.6	Vertical splice shall be welded from side by back step method of 1/3 of wall plate width after the completion of assembly of upper wall plate. After the welding from outside, grinding from inside shall be performed with grinder. Welding of horizontal splices shall alternate across the 1st wall. 2nd wall weld's shall be laid simultaneously.
3.8.7	Spacers used for root gap of welds shall be removed.
3.8.8	Appurtenances such as manholes and nozzles shall be installed after marking on correct locations in accordance with the layout dwgs. The time to install then shall be decided in consideration of site construction progress. (2) The location of large diameter nozzles which will be connected to rubber lined pipes shall be determined in accordance with the final piping locations which shall be set at the site.
3.9	**Spray Pipe Installation**

3.9.1	Check all concerned absorber dimensions, ie. tolerance of absorber casing, support beam location, absorber nozzle location, flange face location, bolt hole location, size and spacing etc., before Spray Pipe installation.
3.9.2	Install the temporary support on absorber nozzles for inserting Spray Pipe into absorber. The temporary support shall be installed at almost the same height of bottom of Spray Pipe 3. Lift Spray Pipe up to the same height as absorber nozzle. 4. Insert the tip of Spray Pipe into the absorber, and unload the tip of Spray Pipe onto the temporary support. 5. Insert Spray Pipe into the absorber by using of chain block. 6. Insert bolt to Spray Pipe flange and Spray Pipe saddle, and tighten as temporary. Then check the horizontal level and insert shim plate to adjust the horizontal level. The level tolerance should be referred to specific drawing. 7. Tighten all the bolts and nuts. In case of dissimilar material between Spray Pipe flange (especially FRP made) and absorber flange, bolt tightening procedure should be strictly complied with the specific drawings in order to prevent the crack on the flanges. 8. Loosen the saddle setting bolts and nuts by half rotation to allow the Spray Pipe thermal expansion, and then lock the nuts by double nuts fixing.
3.10	**Spray Nozzle**
3.10.1	Modify the scaffolding for installation of Spray Nozzle. Set the Spray Nozzle on the Spray Pipe flange, and tighten the bolts and nuts up to about 75% of full torque by using of torque wrench. 3. Check the horizontal level of Spray Nozzle face within the tolerance which is specified in the drawings, and tighten up to full torque. This level is most important for FGD performance. The special care shall be taken to SiC made Spray Nozzle, since these are weak against mechanical shock and impact.
3.11	**Mist Eliminator Installation**
3.11.1	Check all concerned absorber dimensions, ie. tolerance of absorber casing, support beam location, bolt hole location, size and spacing etc., before installation of Mist Eliminator. 2. Insert the lower washing spray pipe into the absorber. In order to protect the FRP made pipe, do not slide the pipe on the support. 3. Insert the dedicated shim plates between pipe and pipe support, and fixing U-bands or U-bolts and external flanges. 4. Install the lower panel of Mist Eliminator and tightly coupled each other by means of comb brace and tie insulock. 5. Install the lower down washing spray pipe and upper up washing spray pipe as same manner as the above. 6. Install the upper panel of Mist Eliminator, and install upper washing spray pipe as same manner as the above. After installation of Mist Eliminator, to protect the panels by means of load spreaders e.g. wooden planks to allow walking on them during further stage of installation.
3.12	Certain adjustment in length may be necessary while erecting pipelines / ducts / casings etc. The contractor should remove the extra lengths / add extra lengths to

	suit the final layout after preparing edges afresh by adopting specified heat treatment procedures.
3.13	Suspensions for ducting will be supplied in running lengths, which shall be cut to size and adjusted as required. Ducts / expansion bellows are dispatched to site in loose walls plates / pieces and these are to be assembled and welded at site along with stiffeners etc., before erection within the finally accepted rates. All joints connecting duct expansion piece and dampers shall be seal welded on inside as well as on outside.
3.14	Mechanical erection works associated with the power cylinders, valves, valve actuators etc., coming under various groups shall be provided by contractor within the finally accepted rates. The Erection, testing and commissioning of all electrically operated valves, actuators and dampers is covered within the scope of this specification.
3.15	The contractor shall carry out trial run of all motors including checking the direction of rotation in the uncoupled condition. Checking of alignment and recoupling of the motor to the driven equipment as per instructions of BHEL engineer and to their satisfaction. All electrical motors have to be tested for IR & PI values prior to the trial run. Where required, dry out may have to be carried out by using external heating source. Contractor shall make all arrangements in this regard and complete the work as instructed. Vendor shall all necessary MMDs including the motorized insulation testers for the above test.
3.16	The contractor shall fabricate pipe, special bends etc., threading and welding as required for installing lube oil system and carry out the acid cleaning of the fabricated piping. The contractor shall also service the lube oil system, carrying out the hydraulic test of oil coolers etc.
3.17	Contractor shall carry out kerosene testing of all bearing housings of various rotating equipment like pumps, fans etc., as per BHEL engineer's instructions. Performance of hydro test of oil coolers of rotating machines and hydro test of other equipment as per BHEL engineer's instructions is included in the scope of work. Forced lube oil system of motors or rotating equipment form parts of the work under this specification.
3.18	Certain rotating machinery after initial runs and commissioning of the equipment have to be hot aligned as per the instructions of BHEL engineer. Cleaning fans, ducting etc., free of extraneous steel, scaffolding materials electrodes, all foreign materials etc., before trial run of rotating machinery, and at various stages of pre-commissioning activities as per BHEL engineer's instruction, is within the scope of work.
3.19	Some of the rotating equipment and electrical motors are provided with protective greases only. Contractor shall arrange for cleaning of the same with kerosene or some other reagent. If necessary, dismantling some of the parts of the equipment would be necessary. He shall arrange for re-greasing / lubricating them with recommended lubricants and for assembling back the dismantled parts, at quoted rate. Lubricants will, however, be supplied free of cost by BHEL.
3.20	After initial trial of rotating equipment, control and power cabling for motors and other equipment / instrumentation shall have to be disconnected for checking alignment and re-setting / re-alignment / hot alignment. Contractor shall have to arrange for disconnecting control and power cabling as per BHEL engineer's instructions and clearance and reconnect the control and power cabling after realignment. Quoted tonnage rate shall be inclusive of the above.

3.21	Packer plates supplied may have to be machined to the correct dimensions. It may also be necessary to blue match the same with each other/ with equipment / with foundations as per BHEL instructions
3.22	Contractor shall arrange changing of preservative oil in the gearboxes, journal and other bearing assemblies of rotating equipment when in storage areas or after erection of equipment as the case may be as per the instructions of BHEL engineer. Necessary lubricants / oil will be supplied by BHEL and the same will be drawn by contractor from BHEL / customer's stores and transporting to site. No additional payment will be made for such works even though supply of lube oil might have been made under regular dispatch-able unit (DU) number against product group main assembly (PGMA) and appearing in the shipping list. Prior to the commissioning of the equipment, oil should be drained and collected in drums provided by BHEL and returned to BHEL / customer's stores.
3.23	The fans, mills and other rotating machines shall be checked for clearances and other vital tolerances. Necessary assistance for balancing of equipment during trial run, if required, shall be provided by the contractor free of cost.
3.24	Whenever required the contractor shall arrange for pre-qualification of process task performers.
3.25	Ducts/ expansion bellows (metallic & non-metallic) are normally supplied in loose wall plates/ segments and these are to be assembled and welded at site before erection. Correction of ovalities/ distortion of ducts, expansion bellows etc occurred during transportation/ handling are to be carried before erection as part of work. Erection of mechanical components of non-metallic joints is included in the scope of work. All joints connecting ducts, expansion pieces and dampers shall be seal welded. These welds have to be made leak proof and tested as per technical instruction / requirement.
3.26	Non specified jobs at the interface / terminal points like bolting welding, gasket changing etc. have to be done by the contractor within the quoted price.
3.27	Instrument tapping coming on the FGD and associated equipment's to be welded/fitted by the contractor with in the quoted price
3.28	The terminal points decided by BHEL should be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.
3.29	Actuators / drives of dampers, gates, powered vanes etc. may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the work.
3.30	All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.
3.31	All the shafts of rotating equipment shall be properly aligned to those of the matching equipment within design tolerances All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.
3.32	All the motors and equipment shall be suitably doweled after alignment of shafts with taper / parallel machined dowels as per the direction of the Engineer. Dowel pins required are be machined by the contractor at his own cost. However the materials for dowel pins shall be issued by BHEL free of cost.

3.33	The HT motor bearings shall be blue matched at site and checked for bearing clearances. The contractor if required shall carry out scraping of bearing housing. No extra claim for blue matching up to 1mm initial gap will be entertained.
3.34	The contractor at no extra cost to BHEL shall carry out servicing and realignment of skid mounted equipment.
3.35	Certain instruments like pressure gauges, pressure transmitters, temperature gauges, flow switches and indicators, etc., are received in assembled condition as integral part of equipment. Contractor shall be responsible for safe receipt, installation and custody of these instruments supplied mounted on skids / equipment. The calibration of skid / equipment mounted instruments shall be arranged by BHEL through other agency engaged for C&I. Contractor will be informed by BHEL engineer about the details of C&I agency. The contractor shall coordinate with the C&I agency for removal, calibration and re-installation of the instruments. Though C&I agency will remove and reinstall the instruments after calibration, the contractor for this package will maintain the list of all the instruments removed & reinstalled. Instruments prior to removal and after reinstallation shall be considered in custody of the contractor for this package.
3.36	All electrical panels, control gears, motors and such other devices shall be properly dried by heating to improve IR valve, before they are energized. Bearings, slip rings commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.
3.37	The contractor shall completely erect and test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves and accessories in accordance with the drawings furnished. This includes all necessary bolting, welding, pre-heating, stress relieving, testing, cleaning and painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged, screwed or other type joints are specified or sown on the drawings. All piping shall be erected true to the lines and elevation as indicated in the drawings.
3.38	Pipes sent in standard length shall be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends upto 65-mm nominal bore will have to be fabricated at site. Only cold cutting methods are to be employed for cutting of pipes and tubes irrespective of the size and material. Gas Cutting , if any ,will be allowed only in CS LP piping
3.39	The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.
3.40	It is possible that a few flanges may not be matching. The contractor shall be required to cut and re-weld the same as and when required without any additional cost.
3.41	Wherever piping erected by the contractor is connected to equipment / piping erected by the other agencies the joint at the connecting point shall be the responsibility of the contractor who is erecting the piping under this specifications.
3.42	Normally the high-pressure valves will have prepared edges for welding. But, if it becomes necessary, the contractor will prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes within the scope of the work.

3.43	All fittings like `T'-pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding. The valves will have to be checked, cleaned or overhauled in full or in part before erection and during commissioning.
3.44	The contractor shall be responsible for correct orientation of all valves so that seats, stems and hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same are installed.
3.45	Suspension for piping, etc., will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.
3.46	The adjustment of all hangers & supports erected in both cold & hot conditions for maintaining the proper slopes towards the drain pots and application of cold pull in the piping wherever required is also included in the scope of the contractor.
3.47	Spring suspensions / constant load hangers have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any adjustments, removal of temporary arrests / locks etc., have to be carried out as and when required.
3.48	Contractor shall install piping in such a way that no excessive or destructive expansion forces exists in either the cold condition or under conditions of maximum temperature and pressure. All bends, expansion joints and any other special fittings necessary to take care of proper expansion shall be incorporated as per the advice of Engineer. During installation of expansion joints, anchors, care must be taken to see that full design movement is available at all times from maximum and minimum temperature.
3.49	The hanger assemblies shall not be used for attachment of rigging to hoist the pipes into position. Other means shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the pipe and building structure.
3.50	Layout of small-bore piping, oil systems etc. as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines even after completion of erection or from aesthetic point of view. Contractor at no extra cost should carry this out. As built drawing is to be submitted by the contractor after erection completion.
3.51	All the valves, including motorized valves, flap valves, dampers, actuators, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.
3.52	Erection and welding of necessary instrumentation tapping points, thermocouple pads, thermo-wells, valves, battery of first root valves, condensing vessels, flow nozzles and control valves to be provided on, auxiliaries and pipe lines are covered within the scope of this specification. This will be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The welding of all the above items will be contractor's responsibility even if the: a. Product groups, under which these items are released, are not covered in the scope of this tender. b. Items are supplied by any agency other than BHEL.
3.53	The contractor shall carry out the tightening of the field bolts on the equipment and piping covered under this specification by using either the calibrated torque wrench method or the turn of part method. The methods used the tools and the equipment

	deployed shall be subject to the approval of Engineer. The competent technicians shall carry out the bolting work.
3.54	The contractor shall prepare as built piping drawing & submit to BHEL Engineer for approval & verification of material used.
3.55	Plate Type Heat exchangers will be supplied for cooling of Auxiliary Cooling water lines. Vendor scope covers erection of these PHEs as per the instruction of BHEL engineers.
3.56	Contractor has to make canopies for motors, actuators, lub oil units, control valves etc. Material for this will be supplied in random lengths / sizes. No separate payment for fabrication is envisaged. Only the erection tonnage rate applicable for Misc eqpt. / structure steel item no. 3 of rate schedule will be paid for this work.
3.57	BHEL will provide free of cost only the shims and packer plates (either machined orplain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL, will have to be cut out from steel plates / steel sheets at site to meet site requirement. Contractor shall cut and prepare packers and shims by gas cutting/chiseling / grinding/machining and de-burr the same. However, machining of the packers wherever necessary shall be arranged by the contractor.
3.58	All lifting tackles including wire-ropes slings, shackles, used by the contractor, shall be got approved by BHEL Engineer. It will be the responsibility of the contractor to ensure safe lifting of the equipment taking due precautions to avoid any accidents and damages to equipment and personnel. Calibration/fitness testing certificates from recognized agency are to be submitted to BHEL site office for equipment/instrument/appliances to be used, as per requirement of BHEL/ISO system. Expenditure on such works forms a part of the scope of work.
3.59	The contractor shall erect scaffoldings/Temporary platforms supports etc required during erection before the permanent supports are erected. These should be of adequate capacity and shall never be overloaded. These should be replaced when not found suitable during erection work. All structure materials required for the above shall be arranged by the contractor at his own cost. No such material shall be supplied by BHEL in any case. Welding of temporary supports, cleats etc on the columns shall be avoided. In case of absolute necessity, contractor shall take prior approval from BHEL Engineer. Further, any cutting or alteration of member of the structure or platform or other equipment shall not be done without specific prior approval of BHEL Engineer.
3.60	Tanks shall be supplied by the units in more than one segment (rolled sections) having height of segment approx. 2500 mm. Contractor have to complete the assembly at site with necessary welding/NDT/testing as per the approved FQP. Rubber lining of the tanks shall be in the scope of the rubber lining vendor.
3.61	Lime stone silos shall be supplied by the units in more than one segment (3 to 4 segment) and height of segment shall be 2500 mm. Contractor shall have to complete the assembly, final welding,/NDT/testing as per the approved drawings/ documents/ FQP.

4.0	**WELDING, HEAT-TREATMENT, RADIOGRAPHY AND NDT**

4.1	The pressure parts, equipment and piping shall be erected in conformity with the provisions of Indian Boiler Regulation and as may be directed by BHEL as per any standard / specification in practice in BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings / schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
4.2	Welding of pressure parts, equipment, piping, high tensile structural steel shall be done by certified high pressure welders who possess valid certificate of CIB of the State in which the equipment is erected as per provision of IBR.(if applicable) The H.P. welder who possesses necessary certificate shall ensure re-validation as per relevant provisions of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired shall not be utilized for high-pressure works.
4.3	All welders including tack welders, structural and high pressure welder shall be tested as per ASME section IX / IBR and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.
4.4	Engineer may stop any welder from the work if his performance is unsatisfactory for any reason or if there is a high percentage of rejection in the joints welded by him. The welder having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
4.5	Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The Engineer, prior to any repair being made, shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the engineer.
4.6	The contractor shall carry out the root run welding of all HP / LP piping, valves by TIG welding method only. The contractor shall have to carry out full TIG welding of butt weld joints of tubes / pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.
4.7	All expenses for testing of contractor's welders including destructive and nondestructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. Limited quantity of raw material required for making test pieces will be supplied by BHEL free of cost.
4.8	The regulators used on welding machines shall be calibrated before putting these into use for work. The Contractor at his cost shall also arrange periodic calibration for the same.
4.9	Only BHEL/ CUSTOMER approved electrodes and filler wire are to be arranged and used by the contractor, within the finally quoted price. BHEL/ NTPC reserve the right to test from the certified lab of approved electrode being used by the contractor. Testing charges for the same shall be borne by the contractor**.** All electrodes shall be baked and dried in the electric electrode-drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The test certificate should have a co-relation

	with the lot number/ batch number given on electrode packets. No electrodes will be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved/ accredited test house traceable to National/ International standards will be submitted to BHEL before putting the oven in use. The contractor shall also arrange periodical calibration for the same.
4.10	All butt / fillet welds shall be subject to dye penetration test as per the instructions of the engineer at no additional cost.
4.11	The contractor shall maintain a record in the form as prescribed by BHEL of all operations carried out on each weld. He has to maintain a record indicating the number of welds, the names of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejection if any, percentage of rejection etc. and submit copies of the same to the BHEL Engineer as required. Interpretation of the BHEL Engineer regarding acceptability or other wise of the welds shall be final.
4.12	The contractor shall carry out the edge preparation of weld joints at site in accordance with the details acceptable to BHEL Engineer. Wherever possible machining or automatic flame cutting should be done. Gas cutting will be allowed only wherever edge preparation otherwise is impractical. All slag / burrs shall be removed from the edge and all the hand cuts shall be ground smooth to the satisfaction of engineer.
4.13	All welds shall be painted with anticorrosive red oxide paint once radiography and stress reliving works are over. Necessary consumables and scaffolding etc including paints shall be provided by contractor at his own cost.
4.14	Pre-heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.
4.15	Contractor shall arrange all necessary stress relieving equipment with automatic recording devices. The contractor arrange for labour, heating elements, thermocouples, thermo-chalks, temperature recorders, thermocouple attachment units, graphs, sheets insulating materials like asbestos cloth, ceramic beads, asbestos ropes etc. required for heat treatment/ stress relieving operations. The contractor should take a note of the following,
4.15.1	• Temperature shall be measured by thermocouple and recorded on a continuous printing type recorder. All the recorded graphs for heat treatment works shall be the property of BHEL.
4.15.2	• All stress relieving equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt. Approved / accredited Test Houses traceable to National / International standards will also be arranged by the contractor for such equipment at his cost.
4.16	The contractor shall obtain the signature of Engineer or his representative on the strip chart of the recorder prior to the starting of SR operations.
4.17	The contractor shall also be equipped for carrying out other NDT like LPI / MPI/UT / Hardness test etc. as required as per welding schedules / drawings within the finally accepted price / rates. For UT machine shall be used of recordable type.

4.18	The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.
4.19	Contractor for radiography work shall use iridium-192. The geometric un-sharpness shall not exceed 1.5 mm. The contractor should take adequate safety precautions while carrying out radiography. Contractor at his cost shall arrange necessary safe guards required for radiography (including personnel from BARC).
4.20	Low speed high contrasts, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between 1.5 to 2.0.
4.21	All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.
4.22	Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract number, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.
4.23	Lead intensifying screens for front and back of the film should be used as per the above-referred ASME specification.
4.24	The joint is to be marked with permanent mark A, B, C to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the down streamside of the weld.
4.25	For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.
4.26	Radiography personnel with sufficient experience and certified by M/s BARC for conducting radiographic tests in accordance with safety rules laid down by Division of Radiological protection only have to be deployed. These personnel should also be registered with DRP / BARC for film badge service.
4.27	All arrangements for carrying out radiography work including dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved / accredited by BARC and / or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for radiography work.
4.28	The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.
4.29	Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL Engineer. The quantum of radiographic inspection shall be as per provision of ASME / BHEL/NTPC approved documents. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule / IBR / Customer's requirements. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL. Radiography on LP piping joints is not envisaged. However other NDT test as called for in the FQP including LPI, MPI and HT will have to be carried out
4.30	All the Radiographs shall be properly preserved and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL / customer.

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

5.0	**APPLICATION OF INSULATION**

5.1	All attachment welding, including welding of hooks / supports as per pitch both on equipment and piping shall be done as directed by Engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to correct length. Application of red oxide paint including supply of paint on welded portions as directed by BHEL is also included in scope of work.
5.2	The mineral wool mattresses (bonded / un-bonded) / LRB mattresses are received at site in standard sizes. These are to be dressed / cut to suit site requirements by the contractor.
5.3	The number of layers / thickness of mineral wool / LRB mattresses for auxiliaries, pipe lines, valves and other vessels shall be as per various drawings and as directed by Engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of rings/ hooks shall be fixed as directed and as per drawings and spec.
5.4	The contractor should ensure, proper finishing of surface of the insulation, sheeting and cementing.
5.5	The contractor should ensure that the finished surface of the insulation works conforms to the dimensions and tolerances given in the drawings. Aesthetic finish and accuracy of work are most important.
5.6	It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions. Closed / semi closed sheds or any other arrangements required for this will by him at his cost. If any damage occurs to the material due to improper storage or due to any causes attributable to the contractor except for normal breakage or damages allowed in such cases, the cost of such damaged material shall be to the account of the contractor.
5.7	Aluminum sheet cladding will be fabricated to the sizes and shapes specified in drawings. Beading, swaging, beveling of sheets, crowning the sheets if necessary will be carried out by him. Two coats of anti-corrosive black bituminous paint are to be applied on inner surfaces of the cladding. Bitumen sealing compound on the joints if necessary is included in the scope of this work. **Contractor may note that he will also supply anti-corrosive black bituminous paint & bituminous sealing compound required for above works at his cost. However if supply by the BHEL MUs same will be issue free of charges to contractor.**
5.8	Aluminum sheet metal cladding over insulation will consists of plain / ribbed / corrugated sheets. The sheets will be supplied in standard sizes. Cutting them to required size, grooving, fabricating bends, boxes etc., for proper covering is contractors responsibility. Any cutting / bending / welding of fabricated skin casing sheets if required will also covered within the scope of this contract.
5.9	A logbook shall be maintained by the contractor to obtain clearance for application of insulation. If the contractor does the work on his own accord without prior permission the area may have to be redone at his cost.
5.10	Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Wastage allowance for the material issued are as below:
1.	Wool / LRB mattresses and cladding sheets 2%

2.	Insulation bricks and mortar 2%
3.	Castable refractory 1%
5.11	The entire surplus, unused materials etc., supplied by BHEL shall be returned to BHEL after the work is over. Materials like gunny bags and packing materials, empty containers may be returned at periodical intervals.
5.12	The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.
5.13	If during erection and commissioning any of the parts are to be insulated temporarily fixed and then replaced by permanent ones at a later date or if any of the parts are to be removed for modification, rectification, adjustment and then refitted or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the erection rate quoted shall be inclusive of such contingencies.
5.14	Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL Engineer.
5.15	All temporary pipelines required during testing, pre-commissioning and commissioning should be insulated as directed by BHEL at no extra cost to BHEL. However required insulation material shall be issued by BHEL free of cost.
5.16	**Wrapping and Coating**
5.16.1	The external surfaces of the buried pipes shall be thoroughly cleaned of rust, weld scales, burns etc. by sand or grit blasting/power tool cleaning method or any other method specified in the drawings/ documents before start application of anticorrosive coats. Kerosene, solvent or other cleaning material should not be used for external cleaning of the pipes. The above work shall be carried out to the satisfactory of BHEL engineers or as instructed by BHEL engineers.
5.16.2	Coating & Wrapping shall be done after completion of weld and/ or flanged connections and after completion & approval of Hydro testing.
5.16.3	The materials used for coating and wrapping are a. Coating Primer (Coal Tar Primer) b. Coating Enamel (Coal Tar Enamel) c. Wrapping Materials
5.16.4	All primer/coating/wrapping materials and methods of application shall conform to IS:10221 except asphalt/bitumen material. Materials (primer/coating/wrapping) as per AWWA-C-203 are also acceptable. Number of coats and wraps, minimum thickness for each layer of application shall be as per IS-10221. Number of. Coats and wraps shall be decided based on soil corrosivity/resistivity as indicated in IS-10221. Total thickness of completed coating and wrapping shall not be less than 4.0 mm.
5.16.5	Alternatively, the anti-corrosive protection for buried pipes can consist of anticorrosive protection Coal-tar tapes. Material and application of tapes shall conform to IS 15337 or equivalent. These-tapes shall be applied hot over the cold coal tar primer in steps of 2mm thickness so as to cover the spiral edges of the first tape by the application of second tape. The total nominal thickness of the finished protective coating shall be 4.0 mm.
5.16.6	Tests to be carried out after application – (a) Bond / Adhesion test

	(b) Holiday test. The preservative paint, anticorrosive tape, all the required consumables, T&Ps and the instruments required for the above application and testing are to be arranged by the contractor at his cost.
5.16.7	All the provisions for bed preparation / laying the pipe / application of primer/ coating / wrapping with tapes etc., as indicated above are applicable for buried galvanized steel (GI) pipes also.
5.16.8	**BHEL shall provide the material for the wrapping and coating on free of cost basis. In event of loss of material due to wastage/wrong application by the contractor, then contractor shall arrange the material at his own cost. Wastage allowance will be 1%.**

6.0	**PAINTING INCLUDING FINISH PAINTING**
6.1	All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant paint. However, due to aging, the same may have got deteriorated for peeled off. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.
6.2	After applying the primer paints all structure / equipment / items, shall be finish painted with one coat of epoxy finish & one coat of aliphatic polyurethane / as specified by BHEL engineer. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish is achieved. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.
6.3	Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.
6.4	Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL/NTPC approved make only and painting should be as per colour scheme and quality approved / specified by BHEL/NTPC. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting.
6.5	The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.
6.6	The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.
6.7	The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work. The contractor shall ensure availability of
6.7.1	• Ford Cup-4 to measure consistency of paint,
6.7.2	• Automatic magnetic gauge to measure the dry film thickness and
6.7.3	• SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.
6.8	All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.

7.0	**TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING**
7.1	The contractor shall carry out all the required tests,pre-commissioning and commissioning activities required for the successful and reliable operation of FGD system as per the approved commissioning procedure / quality plans of BHEL/NTPC. These would include, Air /gas tightness test of ducts, Hydraulic test of piping , Holiday test of underground piping Water fill test/vacuum box test of tanks, Trial run of pumps/blowers/ball mills/feeders/vacuum belt filter/hydrocyclones, Testing of fire protection system etc. as instructed by BHEL using their own consumables, labour and scaffoldings etc. Specific omission of any test which is required for the successfully commissioning of the FGD system does not absolve the contractor of its responsibilities of performing of that test.
7.2	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 but contractor shall conduct the tests as per the approved commissioning procedure.
7.3	The 'Initial Operation'/trial operation of the complete facility as an integral unit shall be conducted for 720 continuous hours. During the period of initial operation of 720 hours, the FGD System shall operate continuously at full load for a period not less than 72 hours .The Initial Operation shall be considered successful, provided that each item/ part of the facility can operate continuously at the specified operating characteristics, for the period of Initial Operation with all operating parameters within the specified limits and at or near the predicted performance of the equipment/ facility.
7.4	Specialized test equipment, if any, shall be provided by BHEL / its client free of hire charges. However contractor has to take proper care of the equipment issued to him.
7.5	After completion of erection of ducts, the contractor shall conduct the air/gas tightness of the inlet duct from ID fan outlet to booster fan to absorber inlet and outlet duct from absorber outlet up to wet stack chimney. Erection etc. of blowers and blanks and putty required for conducting air tightness test shall be carried out as part of work (Putty to be procured by the contractor without any extra cost to BHEL).
7.6	All the tests may have to be repeated till all the equipment satisfy the requirement /obligation of BHEL at various stages. The contractor shall do all the repairs for site welded joints arising out of the failure during testing.
7.7	The scope of pre-commissioning activities cover installation of all necessary equipment including temporary piping, supports, valves, blanking, pumps, tanks, with access platforms valves, along with accessories required for hydro test for any other tests. The scope also covers the offsite disposal of effluents of the tests under the scope of this contract as per instruction of BHEL Engineer.
7.8	It shall be the responsibility of the contractor to provide various category 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&P's, IMTE's 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.
7.9	It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.

7.10	In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.
7.11	During commissioning, opening / closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price / rates shall also include all such work.
7.12	The contractor shall make all necessary arrangements including making of temporary closures on piping / equipment for carrying out the hydro-static testing on all piping, equipment covered in the specification at no extra cost.
7.13	The valves will have to be checked, cleaned or overhauled in full or in part before erection, during pre-commissioning and commissioning as may be necessary.
7.14	In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the contractor at his cost shall do the same as per Engineer's instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.
7.15	All temporary supports shall be removed in such ways that pipe supports are not subjected to any sudden load. During hydraulic testing of pipes, all piping having variable spring type supports shall be held securely in place by temporary means while constant spring type support hangers shall be pinned or blocked solid during the test.
7.16	The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left unserviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats. Cleaning and servicing of all the filters / strainers, toppings of oils coming in the system shall be done by the contractor within the accepted price.
7.17	Necessary technical support during the commissioning of the equipment's as mentioned in the clause no. 2.14.6 shall be provided by BHEL.
7.18	At the time of each inspection, the contractor shall take note of the decisions / changes proposed by the Engineer and incorporate the same at no additional cost. The contractor shall carry out any other test as desired by BHEL Engineer/ Manufacturer on erected equipment covered under scope of this contract during testing and commissioning to demonstrate the physical completion of any part or parts of the work performed by the contractor
7.19	The scope of pre-commissioning, commissioning and post commissioning activities cover installation of all necessary temporary piping, supports, valves, blanking, pumps, tanks etc. and other accessories with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc., required for hydro test, or any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposal of effluents
7.20	It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.

7.21	The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydro-static testing on all piping equipment covered in the specification at no additional cost. The contractor shall carryout the required test on the pipelines such as Hydraulic Test of various piping systems, Ultrasonic Test for weld defects and finding thickness, Dye penetrant test, Magnetic particles test for Weld defects and materials defects etc. All facilities (manpower, materials, equipment, consumables etc.) including proper approaches wherever required shall be provided by the contractor for satisfactory conduction of above tests. Special equipment such as magnetic particle tester, ultrasonic test kit and engineers required for these tests shall be arranged by the contractor along with Qualified technician within finally accepted rates.
7.22	In certain places blanking has to be resorted prior to Hydraulic test and spool pieces have to be erected in place of control valves, orifices and other fittings and these spool pieces have to be subsequently replaced with the regular valves/ fittings by the contractor at no extra cost.
7.23	During this period though the BHEL's/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision, consumables, labour, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer.
7.24	It is possible that due to any reason the final supporting may not be completed before conducting Hydraulic Test. The contractor may have to strengthen or install any additional supports as per instruction of BHEL. This work is a part of the work and no additional payment shall be made on this account
7.25	All the shafts of the equipment shall have to be properly aligned to that of matching equipment to perfection, accuracy as required and the equipment shall be free from excessive vibration so as to avoid over-heating of bearings or other conditions, which may tend to shorten the life of the equipment. All bearings, shafts and other rotating parts shall be thoroughly cleaned and lubricated as per recommendations of BHEL engineer.
7.26	During commissioning changing of gaskets , tightening of bolts, realigning of rotating and other equipment, attending to leakage and minor adjustments of erected equipment may arise. The quoted rate of contractor shall be inclusive of all such works.
7.27	Lubricating oil units of the rotating machines are to be cleaned thoroughly before pouring of final lubricating oil. Topping up of lubricants during running of the set till handing over to be done by the vendor. Required lubricants both for first filling and topping up are to be supplied by BHEL free of cost. The empty containers of the lubricating oils should be returned to BHEL stores/place indicated by BHEL from time to time.
7.28	The instruction of the motor manufacturer regarding storage of the motors and re conservation must be strictly followed without any deviation.
7.29	Attending the punch points post commissioning and resolve the deficiency for handing over the unit to customer M/s NTPC.