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

S. No.	E- TENDER SPECIFICATION NUMBER
01	BHE/PW/PUR/MOFG-E&C-MMS-FGD/2263

FOR

Part A. MATERIAL MANAGEMENT & HANDLING WORK –

THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

AND

Part B. MECHANICAL ERECTION & COMMISSIONING WORK

COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION FINAL PAINTING AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

VOLUME I – TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	**Technical Conditions of Contract**
Volume-IB	**Special conditions of Contract**
Volume-IC	**General conditions of Contract**
Volume-ID	**Forms & Procedures**
Volume-IE	**Plot Plan**
Volume II	**Price Bid**

Bharat Heavy Electricals Limited
(*A Government of India Undertaking*)
Power Sector - Western Region
345-Kingsway, Nagpur-440001

CONTENTS		
Volume No	Description	Hosted in website bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled
NIL	Tender Specification Issue Details	(Part of **Vol-IA-2263**)
NIL	Notice Inviting Tender	(Part of **Vol-IA-2263**)
I-A	Technical Conditions of Contract	Vol-I-A-2263
I-B	Special Conditions of Contract	Vol-I-BCD-2263
I-C	General Conditions of Contract	(Part of Vol-I-BCD-2263)
I-D	Forms & Procedures	(Part of Vol-I-BCD-2263)
I-E	Technical Specifications and Plot Plan	Vol-IE-2263
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-2263

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

S. No.	E- TENDER SPECIFICATION NUMBER
01	BHE/PW/PUR/MOFG-E&C-MMS-FGD/2263

FOR

A. MATERIAL MANAGEMENT & HANDLING WORK –

THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT** AT **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

AND

B. MECHANICAL ERECTION & COMMISSIONING WORK

COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION FINAL PAINTING AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION: Refer Notice Inviting Tender

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

M/s. ……

……

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date:

2263

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

E-Tender Spec No: BHE/PW/PUR/MOFG-E&C-MMS-FGD/2263 Date: 04/03/2020

NOTICE INVITING E-TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD/ UPLOAD THE TENDER/ OFFER FROM/ON BHEL E-PROCUREMENT PORTAL → https://bhel.abcprocure.com

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To,

Dear Sir/Madam,

Sub : NOTICE INVITING E-TENDER

Offers are invited in two part bid system from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-I) through **E-procurement portal→https://bhel.abcprocure.com only** for the subject job by the undersigned on behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender documents. Following points relevant to the tender may please be noted and complied with:

Note: ***The bidder should respond by submitting their offer online only in our e-Procurement platform at* https://bhel.abcprocure.com. *No Hard copy bid/ bids through email/ fax shall be accepted***.

1.0 Salient Features of NIT

S No.	ISSUE	DESCRIPTION	
i	**E-TENDER NUMBER**	**BHE/PW/PUR/MOFG-E&C-MMS-FGD/2263**	
ii	**Broad Scope of job**	**A. MATERIAL MANAGEMENT & HANDLING WORK –** THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT** AT **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.** **AND** **B. MECHANICAL ERECTION & COMMISSIONING WORK** COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION FINAL PAINTING AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**	
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*

S No.	ISSUE	DESCRIPTION	
C	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
D	Volume-ID	*Forms and Procedures*	*Applicable*
E	Volume-IE	*Technical Specifications and Plot Plan*	*Applicable*
F	Volume-II	*Price Bid as specified in E-Procurement Portal*	*Applicable*
iv	**Issue of Tender Documents**	**From https://bhel.abcprocure.com** *(Tender documents will be available for downloading from BHEL e-Procurement website till due date of submission)* Brief information of the tender shall also be available at Central Public Procurement portal (**https://eprocure.gov.in**) *and* **BHEL website (www.bhel.com).**	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date: 16/03/2020, Time: 15.00 Hrs*** ***Place: on E-Tender Portal https://bhel.abcprocure.com*** • ***Offer to be submitted online only through e-procurement Portal***	*Applicable*
vi	**OPENING OF TENDER (Techno-Commercial Bid)**	***Date: 16/03/2020, Time: 16.00 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) T**his tender being an e-tender, it shall be opened online only through the E-Procurement Portal. Participating bidders may witness the Opening online only.***	*Applicable*
vii	**EMD AMOUNT**	***Rs. 41,11,000/- (Rupees Forty One Lakh Eleven Thousands Only)*** ***[To be submitted in the form and manner as mentioned below]*** ***Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.***	*Applicable*
viii	**COST OF TENDER**	~~*Rs 2000/-.*~~ ~~***[To be submitted in the form and manner as mentioned below]***~~	~~*Applicable*~~
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Three days before the due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below.*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**	--	*Not Applicable*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	**Sh. Arun Chandra Verma, IPS (Retd.)** **and** **Sh Virendra Bahadur Singh, IPS (Retd.)** *(Please refer Annexure-04 "Important Information" of NIT for more details)*	*Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments,	

S No.	ISSUE	DESCRIPTION	
		Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com-->Tender Notifications →View Corrigendum), Central Public Procurement portal (https://eprocure.gov.in) & on e-tender portal **https://bhel.abcprocure.com and not in the newspapers**. Bidders to keep themselves updated with all such information.	

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

~~3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender. along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day. Copy of Cash receipt or the proof of Demand Draft duly **digitally** signed is to be uploaded with the Techno Commercial offer **on e-tender portal https://bhel.abcprocure.com**. However Original Demand Draft shall be sent to the officer inviting tender within a reasonable time failing which the offer is liable to be rejected. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at _____, Sundays and second/ last Saturdays.~~

4.0 Unless specifically stated otherwise, bidder shall deposit EMD as per the provisions in General Conditions of Contract Clause no. 1.9.1. In case of remittance of EMD through **Demand Draft/Pay Order**, same shall be in favour of **Bharat Heavy Electricals Ltd**, payable at Nagpur. In case of remittance of EMD through **Bank Guarantee** (for the balance EMD amount in excess of Rs 2 Lakhs) OR through **FDR**, refer General Conditions of Contract Clause no. 1.9.1(iv). Proforma of Bank Guarantee for Earnest Money shall be as provided in Vol-ID "FORMS & PROCEDURES". For other details and for 'One Time EMD' please refer General Conditions of Contract.

In case of remittance of EMD through Electronic Fund Transfer, Bank account details of BHEL PSWR to be used is as below: -

NAME OF THE COMPANY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	SHREE MOHINI COMPLEX 345, KINGSWAY,NAGPUR
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH AND BRANCH CODE	SBI,KINGSWAYBRANCH,BRANCH CODE-00432
CITY	NAGPUR
ACCOUNT NUMBER	31380025872
ACCOUNT TYPE	CURRENT A/C
IFSC CODE OF THE BANK BRANCH	SBIN0000432
MICR CODE OF THE BANK BRANCH	440002002

Above bank account, details can be used for remittance of Security Deposit as well by the successful tenderer.

Procedure for Earnest Money Deposit					
Description/ Mode of Submission	**EFT**	**Cash**	**DD/Pay Order**	**FDR (Refer GCC clause no 1.9.1(iv) for FDR)**	**Bank Guarantee (Refer GCC clause no 1.9.1(iv) for Acceptable Portion of EMD in the Form of BG)**
Proof of EMD along with the offer	Receipt of Amount Transferred into BHEL Account	Receipt of cash deposit at BHEL office	Scan Copy has to be uploaded	Scan Copy has to be uploaded	Scan Copy of BG has to be uploaded.
Submission of EMD to BHEL PSWR, Nagpur			Original DD/ Pay order to be sent through Registered Post	The Original FDR to be sent through Courier/Post to BHEL PSWR Nagpur.	The Original Bank Guarantee/any extensions /amendments shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Purchase Department, BHEL PSWR, Nagpur.

~~Copy of One Time EMD Certificate or~~ The proof of Demand Draft/ Payorder/FDR or BG or receipt of Electronic Fund Transfer duly **digitally** signed is to be uploaded with the Techno Commercial offer on **'e-tender portal'→ https://bhel.abcprocure.com**. **In case of Demand Draft/ Payorder/FDR/BG, Original Demand Draft/ Payorder/FDR/BG shall be sent to the officer inviting tender within a reasonable time failing which the offer is liable to be rejected.**

5.0 **Procedure for Submission of Tenders**:

Procedure for Submission of Tender is available in the "Bidder Manual for BHEL Bidders" at E-tender portal https://bhel.abcprocure.com . Terms and conditions mentioned therein shall form integral part of the NIT and bidders shall abide by the same.

a) Hardware and Software requirements for participating in e-tender:

- Please refer the website for the minimum system requirements and setting document for Bidders under the link: https://bhel.abcprocure.com

b) Digital Signature

- To know the procedure for obtaining Digital Signature Certificate (DSC), suppliers who are not having the DSC are advised to visit our website www.bhel.com → Tender Notifications → Sample Checklist.

c) M/s E-Procurement Technologies Limited Helpdesk Contacts:

During normal business hours, helpline maintained by the service provider e-Procurement Technologies Limited is available for clarifying any doubts of supplier/s. The helpline numbers are provided in the e-procurement website.

- Mr. Swapnil Hamilton, Support Executive, Ph: +91 7940270549, e-mail ID: swapnil.h@eptl.in
- Mr. Hardik Oza, Support Executive, Ph: +91 7940270560, e-mail ID: hardik.oza@eptl.in
- Mr. Ankur Bhatt, Support Executive, Ph: +91 7940270590, e-mail ID: ankur.bhatt@eptl.in
- Mr. Prashant, Asst. Manager – Implementation & Support, Ph: +91 7940270545, e-mail ID: prashant@eptl.in

Note

i. **Offers/tenders submitted in the E-tender portal shall only be considered for further evaluation. Offers sent by FAX / E-mail / any mode other than E-tender would not be entertained.**

The Tenderers must submit their Tenders, as detailed below:

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/~~COST of TENDER~~)'
- PART-II (Price Bid)

The contents of the offer/tender are as given below. **(All Documents to be digitally signed and uploaded in E-tender Portal)**

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

	PART-I B	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender **OR**	

	~~Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender~~ ~~2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)~~ Note: Refer Clause No~~-3-~~and 4 of NIT for further details	

	PART-II	
ii	Volume II – PRICE BID	

- **SPECIAL NOTE: All documents/ annexures to be submitted should be uploaded in respective places in the E-Tender portal as per the list mentioned given in this NIT. BHEL shall not be responsible for in-complete documents.**

6.0 Void

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

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

9.0 Assessment of Capacity of Bidders:

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

1 **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.

2 **PERFORMANCE**: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:
(**Note**: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table I))

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. $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}$). Similarly, S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. 'S_T '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating 'R_{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)

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
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_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	--------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

ii). Calculation of Overall 'Performance Rating' (**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

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

3 'Assessment of Capacity of Bidder':

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

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

Note:

i). In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number

ii). For R_{BHEL} = 60, P_{Max} = '1'

iii). For $R_{BHEL} \geq 80$, there will be no upper limit on P_{Max}

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

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

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

4 **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 TabIe-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 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

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

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

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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

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

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

a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
c) If even after using option "a" and "b", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

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

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

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

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

c. Up to Synchronization in all Balance Packages

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

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

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

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

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

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

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

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

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail or **through E-tender 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.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may

be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

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

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

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

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

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

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

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

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

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

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents. For the tenders requiring services of Original supplier of equipment/services, offer is preferred from the OEM/Principal. However, if the OEM/Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/supplier in the same tender. Moreover, either the agent could bid on behalf of manufacturer / supplier or manufacturer / supplier could bid directly but not both. In case bids are received from both manufacturer / supplier and the agent, bid from agent shall be ignored.

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

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

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

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

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

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

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

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

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

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

~~23.9 Prime Bidder shall be responsible for the overall execution of the contract.~~
~~23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats.~~

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

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

~~23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work.~~

~~23.14 The consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 0.5% of the total contract value in addition to the SD to be submitted by the prime Bidder for the total contract value. The 100% SD value to be submitted by the consortium partner/(s) shall be remitted before start of work. All the terms & conditions of the SD clause in Vol-IC GCC shall be applicable for this SD except clauses no 1.10.1, 1.10.4 & 1.10.6 of Vol-IC GCC. For "modes of deposit" of this SD, clause no 1.10.3 of Vol-IC GCC shall be applicable.~~

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

24.0 The bidder shall submit/upload documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized signatory **(through Digital Signature**), as per the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

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

26.0 Order of Precedence

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

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

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

For BHARAT HEAVY ELECTRICALS LTD

(Addl. General Manager - Purchase)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Integrity Pact
04. Annexure-4: Important Information.
~~05. Annexure-5: MSE Annex.~~
06. Annexure-6: Declaration for Reverse Auction.

ANNEXURE - 1

PRE QUALIFYING CRITERIA

E-Tender Specification Number: BHE/PW/PUR/MOFG-E&C-MMS-FGD/2263	
JOB	**Part A. MATERIAL MANAGEMENT & HANDLING WORK –** THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT** AT **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.** **AND** **Part B. MECHANICAL ERECTION & COMMISSIONING WORK** COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION FINAL PAINTING AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

S No	PRE QUALIFICATION CRITERIA	~~Bidders claim in respect of fulfilling the PQR Criteria~~ Applicability	
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium /Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	**APPLICABLE**	
B	**TECHNICAL PQR** **B.1: Not Applicable** **B.2: Technical Criteria:** B.2.1) Bidder must have executed Erection and Commissioning of atleast One Flue Gas Desulphurization (FGD) system in power plant of one unit of 190 MW or higher rating in the last seven (7) years as on latest date of offer submission. OR B.2.2) Bidder must have executed Erection and Commissioning of at-least One Boiler (Consisting of Structure, Pressure Part, Non	**APPLICABLE**	

	Pressure Parts and Rotating Machines (of the same unit as standalone Bidder)) of One Unit of 190 MW or higher rating in the last seven (7) years as on latest date of offer submission. OR B.2.3) Bidder must have executed Erection and Commissioning of ESP of at-least One unit of 190 MW or higher rating, under direct order of BHEL, in the last seven (7) years as on latest date of offer submission. OR B.2.4) Bidder must have executed Erection and Commissioning of at-least One STG of 400 MW or higher rating, under direct order of BHEL, in the last seven (7) years as on latest date of offer submission. OR B.2.5) Bidder must have executed atleast One Work of Erection of ESP And/Or Boiler (Consisting of Structure, Non Pressure Parts and Rotating Machines) of 3574 MT or higher tonnage in the last seven (7) years as on latest date of offer submission against single work order. OR B.2.6 (i) Bidder must have executed Erection of Structure or Non Pressure Parts of 3574 MT or higher tonnage in the last seven (7) years as on latest date of offer submission against Single work order. AND B.2.6 (ii) Bidder must have executed Erection of Rotary Machines in the last seven (7) years as on latest date of offer submission.		
C-1	**Financial TURNOVER** Bidders must have achieved an average annual financial turnover (audited) of **Rs. 933.30 Lakhs** or more over last three Financial Years (FY) i.e. 2016-17 , 2017-18 & 2018-19.	**APPLICABLE**	
C-2	**NETWORTH** (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.	**APPLICABLE**	
C-3	**PROFIT** Bidder must have earned profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1' above.	**APPLICABLE**	
C-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	**APPLICABLE**	

D	**Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)** The "Assessment of Capacity of Bidders" for this Tender shall be carried out by considering the identified similar package as "ESP".	**APPLICABLE**	**BY BHEL**
E	**Approval of Customer (if applicable)** **Note:** Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval	**APPLICABLE**	**BY BHEL**
F	Price Bid Opening **Note:** Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		**BY BHEL**
G	Consortium tie-ups	**Not APPLICABLE**	

Explanatory Notes for T*echnical Criteria (B)*:

1. Void.

2. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means achievement of milestones as defined below -

a. "ACHIEVEMENT OF PHYSICAL QUANTITIES" as per PQRs.

b. "READINESS FOR COAL FILLING" in respect of Mill Bunker.

c. "HARGING" in respect of Power Transformers/ Bus Ducts/ "HT/LT Switchgears" / "HT/LT Cabling".

d. For C&I works: "SYNCHRONISATION" in case of power project and "WORK COMPLETION of the value as defined in PQR" in case of industry.

e. "BOILER LIGHT UP" in respect of Boiler / CFBC / ESP.

f. "GAS IN" in respect of HRSG.

g. "STEAM BLOWING COMPLETION" in respect of Power Cycle Piping.

h. "HYDRAULIC TEST" of the system in respect of Pressure parts/ LP Piping/CW Piping.

i. "FULL LOAD OPERATION OF THE UNIT" in respect of Insulation work.

j. "SYNCHRONISATION" in respect of STG / GTG.

k. "SPINNING" in respect of HTG.

l. "COMPLETION AND HANDING OVER FOR MECHANICAL ERECTION" in respect of STG Deck and Machine/Equipment foundation.

3. Boiler means HRSG or WHRB or any other types of Steam Generator.

4. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.

5. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating of the same in terms of MW shall be considered for evaluation.

6. Scope for Capital overhaul of STG shall cover Bearing Inspection work and overhauling of all cylinders of the Turbine.

7. In case the tendered scope is not a Pulverized Fuel Boiler, experience of Oil/Gas Fired Boilers can also be considered.

Common Explanatory Notes:

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

2. Completion date for achievement of the technical criteria specified in the Common QR should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work.

3. "Executed" means the bidder should have achieved the technical criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed.

4. In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the E&C portion for Electrical and C&I works (i.e. the certificates enclosed are for composite order for supply and erection of Electrical and C&I and other works if any), then value of Erection & Commissioning for the Electrical and C&I portion shall be considered as 15% of the price for supply & erection of Electrical and C&I , unless otherwise specifically indicated in the PQR.

~~5. Following shall be complied with in case of consortium:~~

~~a. The Prime Bidder and Consortium Partner(s) are required to enter in to a consortium agreement with a validity period of six months initially. Thereafter, the Prime Bidder and Consortium Partner(s) shall certify to BHEL regarding existence and validity of their consortium agreement on six monthly basis.~~

~~b. Prime Bidder and Consortium partners shall be approved by Customer for being considered for the tender (applicable if customer approval is required).~~

~~c. Number of partners including prime Bidder shall be NOT more than 3 (three).~~

~~d. Prime Bidder alone shall necessarily comply with "B1Technical Criteria" except for mechanical package where B1 criteria is not applicable.~~

~~e. Prime Bidder and Consortium Partner shall together comply with the 'Pre-Qualification Requirements' specified for the respective category of technical requirement as per "B2 technical criteria".~~

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

~~g. All other conditions shall be read in conjunction with clause no 23.0 of NIT.~~

~~h. Prime Bidder shall be the Bidder who has a major share of work.~~

~~i. Prime Bidder shall be responsible for the overall execution of the Contract.~~

~~j. Performance shall be evaluated for Prime Bidder and the Consortium partner for their respective scope of work.~~

~~k. In case the Consortium partner backs out, another consortium partner meeting the QRs, has to be~~

~~engaged by Prime Bidder and if not, the respective work will be withdrawn and executed on risk and cost basis of the prime bidder.~~

~~l. In case Prime Bidder withdraws, the whole contract shall be considered cancelled and short closed.~~

~~m. After successful execution of one work with a consortium partner under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~

~~n. The Consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value.~~

Explanatory Notes for PQR -C (Financial):

i. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures.
ii. In case audited financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.
iii. 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.
iv. **C-2:** Net Worth (Only in case of companies) of the bidder should be positive.

Note: Net worth shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above.

Net worth = Paid up share capital* + Reserves

(* : Share Capital OR Partnership Capital OR Proprietor Capital as the case may be)

v. **C-3:** Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'C-1' above.

Note: PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above.

6. **C-4:** Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.

~~Annexure A~~

~~Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula-~~

~~P = R + 0.425 x R x (XN - X0) + 0.425 x R x (YN - Y0)~~
~~X0 Y0~~

~~Where~~

~~P = Updated value of work~~

~~R = Value of executed work~~

~~XN = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid~~

~~submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).~~
~~X0 = All India Avg. Consumer Price index for industrial workers for last month of work execution~~
~~YN = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).~~

b. ~~Y0 = Monthly Whole Sale Price Index for All Commodities for last month of work execution~~

BIDDER SHALL SUBMIT CREDENTIALS (DETAILED WORK ORDER, BOQ, ONGOING/COMPLETION CERTIFICATE, TDS CERTIFICATES AND FINANCIAL DOCUMENTS ETC) BASED ON WHICH BIDDER IS CLAIMING TO SATISFY THE PQ CRITERIAs.

Note:

Credentials submitted by the bidder against "PRE QUALIFYING CRITERIAS" shall be verified for its authenticity. In case, any credential (s) is/are found unauthentic, offer of the bidder is liable to the rejection. BHEL reserves the right to initiate any further action as per its internal guidelines.

ANNEXURE - 2

CHECK LIST

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

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

14	Declaration for Reverse Auction by Bidder	Applicable/~~Not Applicable~~	YES/NO
15	Declaration confirming knowledge about Site Conditions	Applicable/~~Not Applicable~~	YES/NO
16	Declaration for relation in BHEL	Applicable/~~Not Applicable~~	YES/NO
17	Non-Disclosure Certificate	Applicable/~~Not Applicable~~	YES/NO
18	Bank Account Details for E-Payment	Applicable/~~Not Applicable~~	YES/NO
19	Capacity Evaluation of Bidder for current Tender	Applicable/~~Not Applicable~~	YES/NO
20	Tie Ups/Consortium Agreement are submitted as per format	~~Applicable~~/Not Applicable	YES/ NO
21	Power of Attorney for Submission of Tender/Signing Contract Agreement ~~Power of Attorney of Consortium Partner~~.	Applicable/~~Not Applicable~~	YES/NO
22	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO

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

DATE :

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)

ANNEXURE-3

INTEGRITY PACT

Between

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

And

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

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____. The Principal values full compliance with all relevant laws of the land, rules and regulations and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

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

Section 1 - Commitments of the Principal

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

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for 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)/ Contractors(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption 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 Foreign Bidders (s)/ Contractor(s) shall disclose the name and address of agents and representative in India and India Bidder(s)/Contractor(s) to disclose their foreign principals or associates. The Bidders (s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per separate "Guidelines on 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 to Earnest Money Deposit/ Bid Security.

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

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

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

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

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

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

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

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

Section – 8 Independent External Monitor(s)

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

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

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

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

8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.

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

8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organization.

8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/Prevention of Corruption 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.

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

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

Section 9 – Pact Duration

9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidder 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.

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

Section 10 – Other Provisions

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

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

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

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

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

For & On Behalf of the Principal

TAPISH KUMAR

Digitally signed by TAPISH KUMAR
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, postalCode=440001, st=Maharashtra, 2.5.4.20=6acdf3d1a7c296ee69b78f868182004661d762b445bc875e1f32074290ccc4b, 2.5.4.45=032100B432338A1D192BECC15AEDD9982A440B1556029DC1194C57D01C7CF6DC839A33, cn=TAPISH KUMAR
Date: 2020.03.04 12:11:37 +05'30'

(Office Seal)

Place ----------

Date----------

Witness: _____

(Name & Address) _____

_____

For & On Behalf of the Bidder/ Contractor

(Office Seal).

Witness: _____

(Name & Address) _____

_____

ANNEXURE-4

IMPORTANT INFORMATION

E -Tender for this work is invited by BHEL PSWR NAGPUR and offer shall be submitted through BHEL e-procurement portal only. All correspondences regarding this tender shall be through E-procurement portal.

Postal Address:
AGM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, 345 KINGSWAY, NAGPUR 440001, INDIA

Following are the concerned BHEL officials to whom bidders can contact in case of any difficulty:

AGM Purchase, Email: prchiwarkar@bhel.in. Ph: +91 – 712 – 3048 - 633
Dy Manager Purchase, Email: tapishkhandelwal@bhel.in Ph: +91 – 712 – 3048 –732/9010903666
Sr Engineer Purchase, Email: shubh@bhel.in, Ph: +91 – 712 – 3048 – 742
Dy Manager Purchase, Email: vivekjha@bhel.in Ph: +91-9429198214
Asst. Engineer Purchase, Email: baijnath@bhel.in , Ph: +91 – 712 – 3048 - 652

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

2. **Refer Chapter XII of Volume IB Special Conditions of Contract regarding Suspension of Business Dealings: The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link:** http://www.bhel.com/vender_registration/pdf/Suspension_guidelines_adbridged.pdf

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

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

3.1. 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.

3.2. Commitment by Bidder/ Supplier/ Contractor:

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

3.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries

in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

3.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.
If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www.bhel.com and/or under applicable legal provisions".

4. **"Pradhan Mantri Kaushal Vikas 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".

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

6. **BHEL Fraud Prevention Policy: "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."**

7. **Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'**

"In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract"

9. **Price Variation Compensation**
Price Variation Compensation Clause no. 2.17 of Vol I C GCC shall not be applicable for Section B of Part A of Chapter XVIII Weightages & Factor pertaining to Schedule of Quantities

10. OVER RUN COMPENSATION

Over Run Compensation Clause no. 2.12 of Vol I C GCC shall not be applicable for Section B of Part A OF Chapter XVIII Weightages & Factor pertaining to Schedule of Quantities.

11. **"<u>Performance Guarantee for Workmanship</u>":** Clause no 2.24 of General Conditions of contract is amended as below:

2.24 **PERFORMANCE GUARANTEE FOR WORKMANSHIP**

2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of **12 months commencing from the date of Completion of contract as certified by BHEL Engineer**, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from the Guarantee money.

2.24.2 Release of guarantee money: As per Cl no. 2.24.2 of General Conditions of contract

12. The clause 2.7.9.1 below is added under the heading "Rights of BHEL" of General Conditions of Contract Volume-IC GCC.

2.7.9.1 Provision of Penalty in case of slippage of Intermediate Milestones:

i) Two major Intermediate Milestones are mentioned as M1 & M2 in Chapter VI: Time Schedule of Vol IA Technical Conditions of Contract.

ii) In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.

iii) 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.

iv) 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.

v) 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.

vi) Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.

vii) Final deduction towards LD (if applicable as per clause 2.7.9 above), 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.

viii) 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.

* **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.

13. **Delay in 1st submission of SDBG/ PBBG:** SDBG/ PBG is to be furnished by the vendor before start of work. No payment will be released till SDBG/PBG is submitted by the vendor.

However if requested by the vendor, cash recovery equivalent to SDBG/ PBG value to be made from the running bills submitted by the vendor. In such case, recovery of interest calculated @SBI PLR +2% on amount equivalent to SDBG/ PBG value to be made for the gap period (difference between date of start of work and date of submission of BG/ cash recovery).

14. **Compensation in case of Death/ Permanent Incapacitation of Person:** BHEL shall recover the amount of compensation paid to victim (s) by BHEL towards loss of life/ permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employee as detailed below:

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

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

c) Compensation in respect of each of the victims:
- **(i)** In the event of death or **permanent disability** resulting from **Loss of both limbs**: Rs 10,00,000/- (**Rs Ten Lakh**)
- **(ii)** In the event of **other permanent disability**: Rs 7,00,000/- (**Rs Seven Lakh**)

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

15. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (iii) of Vol I C GCC:

Clause No. 1.10.3 (iii) of Vol IC GCC is revised as below: -

"Bank Guarantee issued by:

a. Any of the BHEL consortium bank listed below:

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank
Citi Bank N.A.
Corporation Bank

Deutsche Bank
HDFC Bank Ltd.
The Hongkond and Shanghai Banking Corporation Ltd
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that "**It is enforceable at Nagpur, Maharashtra**".

c. Any private sector banks, with a clause in the text of Bank Guarantee that "**It is enforceable by being presented at any branch of the bank**".

Note: "Bank Guarantees issued by Co-operative Banks are not acceptable".

16. Broad Terms & Conditions of Reverse Auction

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction for which Declaration Proforma by bidder has been given in Annexure VI of NIT:

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.

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

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

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as

fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

As a reminder to the bidders, system will flash following message (in RED color) during the course of 'online sealed bid':

"Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL"

Note:- In case the tender is an e-tender and bids are submitted on e-procurement portal of BHEL → https://bhel.abcprocure.com, the term 'envelope sealed bid' to be read as "price bid in e-procurement portal".

17. **MSE Vendors:** MSE bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.

~~**Micro & Small Enterprises (MSE) is exempted from Payment of Tender Fees (as in Sl No 1 viii of NIT) and Earnest Money deposit (EMD) (as in Sl No 1 vii of NIT), if Applicable.**~~

~~To avail this benefit, participating MSEs should be registered with District Industries Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or Udyog Aadhaar Memorandum or any other body specified by Ministry of Micro Small and Medium Enterprises.~~

~~MSE bidders can avail the above benefit only if they submit along with the offer, copies of either Udyog Aadhaar Memorandum or EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with copy of a CA certificate (format enclosed at **Annexure- 5** where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (part 1 in case of two part bid). Non submission of said documents will lead to consideration of their bid at par with other bidders in terms of EMD. No benefit shall be applicable for this enquiry, if any deficiency in the above required documents is not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.~~

18. PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA) CLAUSE:

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

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

19. Integrity Pact:

(a) IP is a tool to ensure that activities and transactions between the company and its Bidder/Contractors are handled in a fair, transparent and corruption free manner.
Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl	IEM	Address	Phone & Email
1	Sh. Arun Chandra Verma, IPS (Retd.)	Flat No. C -1204, C Tower, Amrapali, Platinum Complex, Sector 119, Noida (U.P.)	acverma1@gmail.com
2	ShVirendra Bahadur Singh, IPS (Retd.)	H. No. B-5/64, Vineet Khand, Gomti Nagar, Lucknow - 226010	vbsinghips@gmail.com

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in bidding. In other words, entering into this pact would be a preliminary qualification.

(c) 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 any of the IEM(s). All correspondence with the IEMs shall be done through email only.

Note:
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's officials whose contact details are provided below:

Details of contact person (s):

Name: (1) P R Chiwarkar/ AGM (Purchase) (2) Tapish Kumar/ Dy Manager (Purchase)
Dept.: Purchase Department
Address: Shreemohini Complex, 345 Kingsway, Nagpur-440001
Phone: (LL/ Mobile) (1) 0712-3048633 (2)0712-3048732
Email: prchiwarkar@bhel.in (2) nktiwari@bhel.in
Fax: 0712-3048699

ANNEXURE-5

MSE ANNEX

Certificate by Chartered Accountant on letter head

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

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

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

Rs _____ Lakhs

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

Rs _____ Lakhs

The above investment of Rs _____ Lakhs is within permissible limit of Rs _____ Lakhs for _____ Micro / Small (Strike off which is not applicable) Category under MSMED Act 2006.

OR

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

Date:
(Signature)

Name –

Membership number –

Seal of Chartered Accountant

ANNEXURE-6

Declaration for Reverse Auction

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir,

Sub: Declaration for Participation in Reverse Auction (RA)
Ref: NIT/Tender Specification No: **----------**

We declare that we will participate in Reverse Auction (RA) if BHEL decides for that instead of opening the sealed envelope/ E-Procurement Portal Price Bid, submitted by us. We have read all the guidelines of reverse auction available in tender enquiry as well as on www.bhel.com portal. We also declare that during reverse auction:

- We will submit online sealed bid less than or equal to of our envelope sealed/ E-Procurement Portal price bid already submitted to BHEL along with the offer.

We also declare to submit the "Process Compliance Form" (to the designated service provider) as well as "Online Sealed Bid" in the Reverse Auction, in case BHEL decides to go for that.

Yours Faithfully,

(Signature, Date & Seal of Authorized Representative of the Bidder)

Date:

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

CONTENTS

1.0	**Project Information:**
1.1	**INTRODUCTION:** The proposed site is located near Mouda town in Nagpur district of Maharashtra. Latitudes : 21° 10 ‘ 50'' N Longitudes : 79° 23’ 52” E Tehsil : Mauda Town : Mauda town (4km) District : Nagpur Nearest Airport : Nagpur **Above information furnished are for general guidance of Contractor. However, Contractor has advised to visit the site and appraise himself about the conditions of site and infrastructure available in the area for fulfilling their commitments under the contract.**

The scope of work shall comprise but not limited to the following:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

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

A. MATERIAL MANAGEMENT & HANDLING WORK –

THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT** AT **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

AND

B. MECHANICAL ERECTION & COMMISSIONING WORK

COLLECTION / LOADING / UNLOADING/ TRANSPORTATION OF MATERIALS FROM BHEL / CLIENT'S STORES / STORAGE YARDS TO SITE OF WORK, ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION, APPLICATION OF THERMAL INSULATION, FINAL PAINTING AND HANDING OVER OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

Part A

2.1 The scope of work of "Section: A-Materials Handling & Material Management services" shall broadly as under:

- The work receipt, unloading, verifying, shifting, stacking, preservation, handling and handing over of components of Flue Gas desulphurization system (FGD) with auxiliaries; pumps, rotating machines, tanks & vessels, pipe & fittings, complete electrical, controls and instrumentation equipment, panels, cables / cable trays, and other related items including items of BOP packages; insulation materials, BHEL T&P & other materials; components & equipment of various other systems, structural & reinforcement steel and providing services for **Materials management.**
- Unloading of **all types of heavy consignments and/or over-dimensional consignments** (e.g. Tanks / Vessels, Motor, Transformers and other equipment's

etc.) directly from trailers by suitable crane or by jack and sleeper method (all to be arranged by the contractor).

- Receipt of materials dispatched by road transport on door delivery basis at the BHEL stores and unloading thereof.
- Collection of materials dispatched by road transport on go-down delivery basis from transporters' go-downs, loading at transporters go-down, local transport up to BHEL stores / storage yard in Mouda FGD Project and unloading thereof.
- **Preliminary verification** of all materials at the time of unloading from transport vehicle or while receiving consignments from transporters' Go-down, as the case may be, reporting immediately the discrepancies like damages and shortages noticed.
- **Detailed verification** of materials with reference to packing list and loading advice slip after unpacking of boxes & crates; repacking, where called for, after detailed verification; preparation of receipt inspection reports.
- **Stacking and storing** at BHEL open storage yard / covered stores / closed & semi-closed sheds Mouda FGD Project, and submission of stacking / storing records.
- **Preservation of the materials** in accordance with BHEL preservation manual and as per BHEL instructions.
- **General cleaning, grass cutting and upkeep of storage yard, covered and semi-closed stores sheds** within the quoted rates for unloading, verification and stacking.
- **Providing Materials Management Services.**
- **Re-handling and restacking** of materials as and when called for by BHEL. This also includes excess / redundant / scrap materials returned to stores by BHEL erection contractors.
- **Handling and loading of outgoing materials** those are to be sent to other destinations.

SCOPE OF WORK IS FURTHER DETAILED IN VARIOUS CLAUSES HEREAFTER.

MAJOR PACKAGES TO BE HANDLED ARE AS UNDER:

Components of the following major systems are to be handled under this contract:

- Structural & Reinforcement Steel
- Cement in bags
- Limestone grinding and slurry preparation system.
- Absorber System

- Gypsum dewatering system
- Auxiliary absorbent tank
- Thermal insulation, lagging, cladding & refractories
- Rotary system, ducts, damper and gates
- Air conditioning system
- Compressed air system
- Fire detection and protection system
- Equipment cooling water system
- Controls & Instrumentation Systems
- Switch gears, Electrical and pneumatic actuators and motors.
- Electrical Panels, cables, cable trays and accessories.
- Batteries & Chargers
- Cable & cable trays etc.
- Other BHEL supplied (manufactured/bought out items).
- BOP Package items
- Construction equipment's of BHEL sent in dismantled condition and other items received from other sites/locations.
- Materials and consumables required for erection & commissioning of plant.

The above list is not exhaustive; it only includes most common major packages. It should in no way a basis for any claim/dispute on account of any variation. The intent of specification is to provide the complete material handling and material management services. All the work shall be carried out as per the instructions of BHEL engineer which shall be final and binding on the contractor.

2.1.1 Total Approx. Weight to be supplied by BHEL Unit / PSWR –

a) **Main Plant Equipment =22210 MT**

b) **Reinforcement Steel = 2800 MT**

c) **Structural Steel = 700 MT**

d) **Cements in bag = 2500 MT**

Total Approx. Weight of Main Plant Equipment: 28210 MT

The weight indicated above are only the tentative indication and should in no way become a basis for any claim on account of any variation in actual weight. Work shall be carried out for all the Material / Equipment's received from various manufacturing units / PSWR and their vendors for the project under this specifications and drawings.

2.1.2 The intent of specification is to provide Material Handling and Materials Management services according to the most modern and proven Techniques and codes. The omission of specific reference to any method, equipment or materials necessary for proper and efficient unloading, transportation, verification, stacking & preservation etc shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

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

2.1.4 The contractor shall perform all required services which may not be specified herein but nevertheless required for the completion of work within quoted rates.

2.1.5 All necessary certificates and licenses required to carry out this work are to be arranged by the contractor expeditiously.

2.1.6 All cranes, transport equipment's, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables (excluding those indicated as BHEL scope), etc. required for this scope of work shall be provided by the contractor.

2.1.7 All expenditure including taxes and incidentals in this connection will have to be borne by the contractor unless otherwise specified in the relevant clauses elsewhere here. The contractor's quoted rates shall include of all such contingencies. In this connection refer relevant clause of general conditions of contract.

2.1.8 Successful bidder shall have to engage a separate agency/gang for Unloading, Stacking, Issuing, Re-shifting, Re-stacking, Loading, etc for Cement Material Handling.

2.1.9 Weekly Cleaning, Housekeeping, etc inside Cement storage shed shall have to be ensured by vendor.

Part B

2.2 The scope of work will include 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.at 2X500 MW NTPC Mouda FGD:

The scope of work under these specifications for Erection, testing, commissioning, trial operation & handing over of FGD system(Mechanical), fire protection system and ECW system of Two (2) Units of 500 MW. Scope of work broadly consists of but not limited to following:

2.2.1 Handling of Materials at BHEL / Client's Stores / Storage Yard and transportation to site of Erection, Testing & Assistance for commissioning and Trial Operation including supply and application of final Painting of FGD system(Mechanical), fire protection and ECW system etc.,

2.2.2 **Tapping off of Duct from existing Flue Gas Duct up to Booster Fan inlet gate with related supports for One Unit. Scope involves following**

2.2.2.1 Removal of Insulation (Cladding sheet & Insulation wool) at three locations per Unit to facilitate for cutting & removal of existing duct for erection of bypass damper (1 location) & tap off ducts (2 locations).
2.2.2.2 Cutting & removal of portion of existing duct.
2.2.2.3 Making suitable scaffolding arrangement to reach out at the duct location for safely removal of Insulation & cutting & removal of duct portion.
2.2.2.4 Shifting of removed Insulation materials & removed duct plates from erection site to BHEL/NTPC yard.
2.2.2.5 Erection, alignment, welding & NDT of duct/damper supporting structures.
2.2.2.6 Erection, alignment, welding & NDT of tap off duct including booster Fan inlet gates & bypass damper.
2.2.2.7 Erection, alignment, welding & NDT of tap off duct & booster Fan Inlet gate supports.
2.2.2.8 Patch work on Insulation at removed area to make it suitable for operation.
2.2.2.9 The above work should be completed within 20 days from date of shutdown. Separate payment shall be made as per Cl 7.5 of Chapter VII of this document.

2.2.3 The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and

transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipment at the preassembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, including supply and application of final painting.

2.2.4 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.

2.2.5 The PG wise breakup of FGD and Auxiliaries etc. are indicated in the relevant chapters of this tender specification, but the contractor is required to erect actual tonnage which may be necessary to complete the work in all respects as detailed in the tender specifications, for which payments shall be released on finally settled rates. The weights and dimensions of material shown are approximate and are liable to vary. No increase in quoted / accepted rates / prices shall be allowed due to change in weights and dimensions of the equipment / materials.

2.2.6 The weights given in the Chapter XVIII (Weightages/ Factors) / Chapter-IX of Vol I are approximate and these are subject to change as per site conditions.

2.2.7 During the course of execution of work, certain rework / modification / rectification / repairs / fabrication etc will be necessary on account of feedback from various relevant sources, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours etc shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per conditions of contract and payments will be released as per the agreed rates.

2.2.8 Supervisors / Engineers, consumables etc., required for the scope of work shall be provided by the contractor. All the expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.

2.2.9 It shall be specially noted that the contractor's labour and staff may have to work round the clock to meet the completion schedules / plans, which may involve payment of considerable overtime. The contractor's quoted rates should be inclusive of all such contingencies.

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

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

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

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

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

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

2.2.16 The storage yard is located within the plant boundary. All materials have to be transported from storage yard to construction area by the contractor at his own cost.

2.2.17 FGD system trial run, resolving any deficiencies observed and handing over the FGD system to customer M/s NTPC.

2.3	**BRIEF DESCRIPTION OF THE FGD SYSTEM**
2.3.1	The FGD system shall be based on Wet Limestone Forced Oxidation process. Each unit shall be provided with an independent absorber.
2.3.2	Gas from terminal point on ID fan discharge duct shall be taken directly to the absorber through Booster Fans. In the absorber, SO2 in flue gas shall be removed by a spray of recirculating slurry, pumped by slurry recirculation pumps.
2.3.3	Compressed oxidation air shall be blown through the slurry in the oxidation tank, to oxidize the Calcium sulphite to gypsum.
2.3.4	Clean gas from the absorber shall be taken to the Wet Chimney through three stage mist eliminators.
2.3.5	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.
2.3.6	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.
2.4	The brief list of the major equipment to be erected under the FGD system but not limited to following:
2.4.1	Absorber System along with supporting structures

2.4.2	Booster Fans & isolation gates
2.4.3	Tanks of various sizes
2.4.4	Lime stone grinding and slurry preparation system consist of lime stone silos, bunker, gravimetric feeder, wet ball mills, hydrocyclones
2.4.5	Slurry pumps (Absorber Slurry recirculation pumps, Gypsum Bleed pumps , limestone Slurry feed pumps)
2.4.6	Gypsum Dewatering system consists of Vacuum belt filter, hydrocylones
2.4.7	Process water and cooling water storage system
2.4.8	Thermal Insulation and cladding sheets
2.4.9	Sump Pumps
2.4.10	Piping system
2.4.11	Equipment Cooling water System (PHEs, DMCW pumps)
2.4.12	Misc platforms, galleries, handrails
2.4.13	Fire Protection System including hydrant , MVWS,HVWS
2.4.14	Equipment Handling System
2.5	**Tentative weight to be erected for the FGD System shall be 18347 MT and detailed break up indicated in Chapter – IX of this book.**
2.5.1	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.
2.5.2	The customer 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.
2.6	**Site Visit**
2.6.1	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.
2.7	**SITE ORGANISATION**
2.7.1	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.
2.7.2	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.
2.7.3	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.
2.7.4	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.
2.7.5	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.
2.8	**ERECTION SCHEDULE**
2.8.1	Contractor shall submit within 15 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-Nagpur. L2 schedule shall be the working level document demonstrating contractor's ability and methods of completing the work within the key milestones identified in the tender specification These program would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detailed monitoring, The three monthly rolling program with the first month's program being tentative based on the site conditions would be prepared based on these program. The Contractor shall also be involved along with the Customer/BHEL to tie up detailed resource mobilization plan over the period of time of the contract matching with the performance targets.
2.8.2	The program would be jointly finalized by the site in-charge of the contractor with BHEL/Customer's project coordinator as well as the site planning representative. The erection program will also identify the sequential erectable tonnages

2.8.3	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.
2.9	**Detailed description of major equipment (per unit & common) to be Installed, Tested and Commissioned under this specification is given below:**
2.9.1	**Absorber System:**
2.9.1.1	An independent Limestone Forced Oxidation (LSFO) type absorber system shall be provided for each unit. Each absorber system shall be complete with:
2.9.1.2	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.
2.9.1.3	2x100% re-circulating slurry pump for each level of spray.
2.9.1.4	Complete Ducting System from ID fan common outlet duct to absorber tower & from absorber outlet to wet stack chimney.
2.9.1.5	2x100% Centrifugal/ positive displacement type oxidation blowers / compressors
2.9.1.6	1 No. Emergency water tank for spraying water at inlet of Absorber for upset condition.
2.9.1.7	2x100% gypsum bleed pumps.
2.9.1.8	Auxiliary Absorbent tank
2.9.1.9	Piping from Gypsum bleed pumps to gypsum dewatering system, along with recirculation line, necessary isolation and control valves.
2.9.1.10	Routing of the ducting/piping system complete with supports, structures, trestles, absorber platforms
2.9.2	**LIMESTONE GRINDING AND SLURRY PREPARATION SYSTEM(Common)**
2.9.2.1	Limestone grinding system shall comprise of:
2.9.2.2	Two numbers Limestone storage silos complete with supporting steel structure, platforms, staircase, air canons, power operated gates, gravimetric feeders etc.
2.9.2.3	Two numbers of wet horizontal ball mills
2.9.2.4	Two (2) limestone slurry tanks, complete with all accessories and Agitator(s).
2.9.2.5	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.
2.9.2.6	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves.
2.9.2.7	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
j)	All connecting pipes/chutes along with necessary valves between various systems of the mills
k)	Limestone grinding System
2.9.3	**GYPSUM DEWATERING SYSTEM (COMMON)**
	Each set of dewatering equipment (01 working set + 01 standby set) comprising of the following items as a minimum requirement:
2.9.3.1	One set of primary hydro-cyclones
2.9.3.2	One vacuum belt filter
2.9.3.3	Vacuum receiver tank
2.9.3.4	Vacuum pump
2.9.3.5	One set of secondary hydro-cyclones
2.9.4	**PROCESS WATER STORAGE TANKS AND PUMPS**
2.9.4.1	Two (2) Process water Storage tanks along with two numbers of 2x100 % Booster water pumps, if required,
2.9.4.2	2x100% Process Water Pumps for each unit connected to each of the Process water Storage tanks along with all necessary piping, valves.
2.9.4.3	2x100% Mist Eliminator Wash Water Pump for each unit connected to each of the Process water Storage tanks along with all necessary piping, valves.
2.9.4.4	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.
2.9.4.5	2X100 % cake Washing Pumps for each Vacuum Belt Filter.
2.9.4.6	2X100 % cloth Washing Pumps for each Vacuum Belt Filter.
2.9.4.7	Any other pump or storage system not specified but required to meet the system requirement shall be provided by the contractor with the approval of Employer.
2.9.4.8	All drains and overflow lines from the tanks shall be terminated to the nearest trench/drain.
2.9.4.9	Emergency water storage tanks
2.9.5	**Booster Fan & Isolation Gates**
2.9.5.1	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.
2.9.5.2	Each Booster Fan 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.
2.9.5.3	Motorized Guillotine type gates with 2x100% seal air fans at suction & discharge of each Booster Fan.
2.9.5.4	Inter connected piping, valves and fittings. Electrical actuator with accessories.
2.9.6	**PIPING**
2.9.6.1	**Slurry Piping**
2.9.6.1.1	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and control valves.
2.9.6.1.2	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves.
2.9.6.1.3	All connecting pipes / chutes along with necessary valves between various systems of the mill and from hydro-cyclone to common slurry storage.
2.9.6.1.4	All slurry pipes having Material of construction carbon steel and rubber lined. End connections are bolted flanged connections.
2.9.6.2	Oxidation Air piping
2.9.6.3	Service Water
2.9.6.4	Service Air & Instrument Air
2.9.6.5	Process water piping
2.9.6.6	Equipment Cooling water system piping
2.9.6.7	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.
2.9.6.8	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.
2.9.7	**Fire Protection system (Common)**
2.9.7.1	**Hydrant System**
2.9.7.1.1	Hydrant system consists of (pipe, hydrant valves, landing valves, water monitors, hoses, branch pipes and nozzles etc)
2.9.7.2	**HVW & MVW Spray System (High Velocity and Medium Velocity)**
2.9.7.2.1	It shall consists of water mains network, deluge valves, isolation valves, Y type strainers, spray nozzles/ projectors, spray nozzles piping network.
2.9.7.3	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.

2.9.7.4	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. 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.
2.9.8	**Equipment Cooling Water System (Common)**
2.9.8.1	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
2.9.8.2	2x100% capacity self cleaning strainers on the secondary side.
2.9.8.3	3 x 50% (2 working + 1 standby) capacity of plate type heat exchangers.
2.9.8.4	4 x 50% (2 Working + 2 standby) capacity FGD Auxiliary (Secondary) Cooling water pumps, along with drives.
2.9.8.5	3 x 50% (2 Working + 1 standby) capacity FGD DM (Primary) cooling water pumps along with drives.
2.9.8.6	One Overhead DM water tank (ECW O/H tank).
2.9.8.7	Alkali (Sodium Hydroxide) preparation tank, agitator and motor, piping, valves etc
2.10	The scope of work also includes Erection, fit-up/alignment, welding/bolting, NDT of Structure Steel works for the following buildings / structures of Flue Gas Desulphurization (FGD) Systems
	2.10.1 FGD CONTROL ROOM BUILDING (FGDCR) 2.10.2 COMPRESSOR HOUSE 2.10.3 ACW BUILDING 2.10.4 BALL MILL BUILDING [BMB] (LIME STONE GRINDING HOUSE) 2.10.5 GYPSUM DEWATERING BUILDING [GDWB] 2.10.6 STRUCTRAL PLATFORM FOR CHIMENY (2 NOS OF 150 M HEIGHT) 2.10.7 LIMESTONE CRUSHER HOUSE 2.10.8 TRANSFER HOUSES 2.10.9 OVERGROUND LIMESTONE CONVEYER, GALLERIES AND TRESTLES 2.10.10 OVERGROUND GYPSUM CONVEYER, GALLERIES AND TRESTLES 2.10.11 CLOSED GYPSUM STOCK PILE SHED WITH TRAVELLING TRIPPER

	2.10.12 LIMESTONE STORAGE SILOS 2.10.13 CABLE GALLERIES AND TRESTLES. 2.10.14 MISCELLENEOUS STRUCTURES TO COMPLETE FGD SYSTEM
2.11	**Diesel Generator Set :** DG sets (1 no) with integral piping, Galvanized pre-fabricated exhaust support structure, exhaust piping and enclosure.
Notes:	
1	Weight schedule /BOQ of the FGD system given in chapter IX of this document
2	**Important information for the Erection Work of FGD system under this tender specifications:**
2.10.1	Absorber is rectangular type of elevation 28.7 mtr. Max size of plate is 3m X 12m and 9 mm thick (incl cladding of 2 mm thick).
2.10.2	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.
2.10.3	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 is mentioned below to give general idea to the bidders regarding the extent of work.

	Description	**Dia in mm**	**Height in mm**	Shell-1 (t/ht)	Shell-2 (t/ht)	Shell-3 (t/ht)	Shell-4 (t/ht)	Shell-5 (t/ht)	Shell-6 (t/ht)	**Qty**
1.	Primary Hydrocyclone Tank	5500	6600	6/2500	6/2500	6/1600				1
2.	Belt filter washing tank	3000	3500	6/2500	6/1000					2
3.	Filtrate Water Tank	4500	5100	6/2500	6/2500	6/100				1

4.	Secondary Hydrocyclone Tank	5000	5100	6/2500	6/2500	6/100				1
5.	Waster Water Tank	6500	6700	6/2500	6/2500	6/1700				1
6.	Neutralisation Tank									
7.	Mill Separator Tank									
8.	Lime stone Slurry Storage Tank	11000	12400	10/2500	8/2500	7/2500	7/2500	7/2400		2
9.	Auxiliary absorbent tank	11500	12700	10/2500	8/2500	7/2500	7/2500	7/2500	7/200	1
10.	Process Water tank	5000	5800	6/2500	6/2500	6/800				2
11.	Clarified Water Tank(cake washing)	3000	3500	6/2500	6/1000					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 for meeting the makeup water requirement of ECW system.
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.
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.
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.
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.
2.15.7	**Waste Water**	Neutralized waste water pipes shall be taken up to the Ash mound located near the plant
2.15.8	**Fire detection and Protection system**	Separate hydrant and spray header (within 100m) available in plant area for tapping required for hydrant and spray system of FGD.
2.15.9	All interconnections of matching flanges/expansion joints/piping/ducting etc, at terminal points specified above shall, however, be in the scope of Contractor.	

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE:**			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Fire fighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
a	Open space for labour colony (as per availability)		**Yes**	Agency has to make his own arrangement at his own cost.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2	**ELECTRICITY**			
3.2.1	Electricity for construction purposes only of Voltage 415/440 V, 3 phase, 50Hz	Yes		Chargeable

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Single point source	Yes		At a distance of 500 M from site (Distance is only tentative, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	Electricity for the office, stores, canteen etc of the bidder	**Yes**		**Chargeable**
a	Single point source	Yes		At a distance of 500 M from site (Distance is only estimated, it may vary upto an extent depending on site condition)
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc		**Yes**	Agency has to make his own arrangement at his own cost.
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3	**WATER SUPPLY**			
3.3.1	For construction purposes:			

Sl. No	Description **PART I**	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
a	Making the water available at single point		**Yes**	Agency has Agency has to make his own arrangement at his own cost.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	Water supply for bidder's office, stores, canteen etc.			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	Water supply for Living Purpose			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4	**LIGHTING**			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	

Sl. No	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.5	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6	**COMPRESSED AIR** wherever required for the work		**Yes**	
a	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc		Yes	
b	Installation of above system and operation & maintenance of the same		Yes	
c	Supply of the all the consumables for the above system during the contract period		Yes	
3.7	Demobilization of all the above facilities		**Yes**	
3.8	**TRANSPORTATION**			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No	Description PART II 3.9 ERECTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.9.1	Engineering works for construction:	Yes		
a	Providing the erection drawings for all the equipments covered under this scope	Yes		

Sl. No	Description PART II 3.9 ERECTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	In consultation with BHEL
d	Shipping lists etc for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on SL No. e		Yes	In consultation with BHEL
h	Daily erection / work plan based on SL No. g		Yes	In consultation with BHEL
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of preassembly bay		Yes	
k	Arranging the materials required for preassembly		Yes	

3.10 ELECTRICITY:

3.10.1 The construction power (415V) will be provided at a single point for construction purpose only at chargeable basis and the further distribution is to be arranged by the bidder at his cost. Construction power shall be provided from the nearest Substation / tapping point.

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

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

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

3.10.5 Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.8 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.

3.11 CONSTRUCTION WATER

Water shall not be provided by BHEL and bidder has to make their own arrangement.

3.12 DRINKING WATER

Bidder shall provide drinking water at the work spot at their cost.

3.13 ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM (SCMS):

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

3.14 CONSUMABLES:

3.14.1 Such of those consumables as indicated as consumables provided by BHEL alone will be provided to the contractor by BHEL free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.

3.14.2 All the required electrodes (in his scope) as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement regarding, suppliers, type of

electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

3.14.3 Only TIG welding wires for CS, AS & SS welding will be supplied by BHEL free of cost for Boiler for applicable Pressure Parts as provided by manufacturing units. All other electrodes including stainless steel electrodes required for shall be arranged by the contractor at his cost. However, BHEL will provide imported electrodes as provided by manufacturing units. The bidder shall use the Customer approved quality welding electrodes only. The utilization of the TIG welding wires issued by BHEL shall be duly accounted for exercising maximum care and ensuring economical usage for minimum wastage. If during erection, it is found that the consumption of filler wire is more than the actual requirement due to improper usage, the cost for the additional quantity so consumed shall be recovered from the contractor.

3.14.4 The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc. required for temporary works such as supports, scaffoldings, bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

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

3.15 MATERIAL SUPPLY:

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

3.16 LIGHTING FACILITY:

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

3.17 GASES:

3.17.1 All the required gases like Oxygen / Acetylene / argon / Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non availability of gases cannot be considered as reason for not attaining the required progress. BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

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

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

3.18 ELECTRODES SUPPLY AND STORAGE

3.18.1 The bidder shall use the BHEL / Customer approved quality welding electrodes only.

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

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

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

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

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

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

4.1 LIST OF TOOL & PLANTS TO BE DEPLOYED BY THE CONTRACTOR – The following minimum major Tools & Plants (T&P) shall be arranged by the Contractor for execution of items mentioned in Chapter IX of Technical Conditions of Contract of this tender within the quoted rate.

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
1	Crawler Crane	150 MT	01 No	This crane should be made available at site from the start of work and to be deployed till erection completion of Absorber of Unit#1&2 and Crusher house.
2	Crawler Crane	100 MT	01 No	Crane to be made available at site from the start of work till completion of erection work of Unit#1&2 for which said crane is required.
3	Tyre mounted / mobile crane (Telescopic boom, Hydraulically operated with turret function)	40 MT	01 No	To be deployed from the start of the contract
4	Crawler Crane	40 MT	01 No	To be deployed from the start of the contract (For MM works, Separate monthly rate available for this crane)
5	Pick & carry type tyre mounted mobile crane. (Farana only)	12/14/18 MT	02 Nos	To be deployed from the start of contract for MM Works.
6	Pick & carry type tyre mounted mobile crane. (Farana only)	12/14/18 MT	04 Nos	To be deployed as per instruction of BHEL Engineer.
7	Trailer with prime mover	20 MT	03 Nos	As required
8	Trailer with prime mover	40 MT	As required	As required
9	TRACTOR TRAILER	15/20MT	As required	To be deployed as per instruction of BHEL

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
				Engineer.
10	TRUCK	Adequate capacity	As required	To be deployed as per instruction of BHEL Engineer.
11	SLINGS, 'D'-SHACKLES, MAX PULLER.	01 MT TO 10MT	As required	To be deployed as per instruction of BHEL Engineer.
12	SLINGS, 'D'-SHACKLES, MAX PULLER, PULLEY BLOCKS, HYDRAULIC JACKS, ETC ABOVE 10 MT.	AS REQUIRED	As required	To be deployed as per instruction of BHEL Engineer, WITH TEST REPORTS
13	SPANNER SETS RING/D	UP TO 56 MM	As required	To be deployed as per instruction of BHEL Engineer.
14	Tube expander	As required	1 No	As required
15	Air compressor (electric/diesel operated)	210 CFM, 7 KG/CM2	02 nos.	
16	TIG welding set	As required	As required	
17	Submerged ARC WELDING M/C		Adequate nos.	
18	Oxy Acetelyne Gas cutting Machine		Adequate nos.	
19	DC arc welding machine		As required.	
20	Electric operated Bolt tightening machines		As required	
21	3-phase distribution board with complete set up for drawl of construction power	As required	As required	
22	Power cable for drawl of construction power	As required	As required	
24	Radiography arrangement with radioactive isotope source	Iridium-192	As required	
25	Radiography arrangement with radioactive isotope source	Cobalt-60	As required	

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
26	Theodolite of required accuracy	To ensure verticality of structural columns.	As required	
27	Self-drilling cum tapping machine for screws of roof sheets	As required	As required	
28	Electro-hydraulic pipe bending machine	Up to 2" nb and 12 mm thick pipes	As required	
29	Radiography film viewer	As required	As required	
33	Hydraulic pipe bending machine (manual)	For bending of pipes up to 50 mm nb size	As required	
34	Pipe chamfering machine /Tube Cutting	4-14"	As required	
35	Pipe chamfering machine /Tube Cutting	14-20"	As required	
36	Pipe cutting & beveling machines		Adequate nos.	
37	Chain pulley blocks of various & Suitable capacities		As Required (as per the instructions of BHEL Engineer)	
38	Baking oven with thermostat and temperature gauge for welding electrodes	As required	As Required	
39	Holding oven with thermostat and temperature gauge for welding electrodes	As required	As Required	

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
40	Portable oven for welding electrodes	As required	As Required	
41	Electric winch	2/3/5/10/ 15 ton capacity	As Required	
44	Hand winch	0.5 ton capacity	As Required	
43	Scaffolding materials with clamps.	Suitable for working at various heights	As required	For Alignment, welding & Insulation works
44	Profile making m/c	For aluminium sheet cladding work	as required	
45	Nibbling m/c	For refractory and other required activities	as required	
46	Shearing m/c		as required	
48	Portable grinding m/c	As required	as required	
49	Portable drilling m/c	As required	as required	
50	Hoisting and pulley devices/pulleys	As required	As required	
51	Fire retardant tarpaulins	As required	As required	
52	Fire extinguisher	As required	as required	
53	Hydraulic Jacks	10/20/50/ 100 MT	as required	
54	Dewatering pumps		as required	

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
55	Various sizes of clamps/ fixtures for assembling		as required	
58	Magnetic particle testing equipment-DRY & WET Type		as required	
59	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		as required	
60	Spectrometer for metal testing		as required	
61	Alco meter for paint thickness checking		as required	
62	Hand Operated Megger 500 / 1000 V		as required	
63	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy		as required	
64	Digital and Analogue Multimetres		as required	
65	U Tube Manometer 0-2000 mm Water Column		as required	
66	Inclined Manometer 0-50 mm Water Column		as required	
67	Calibrated Pneumatic Torque wrench		4 nos.	
68	Bolt Tension Calibrator		as required	

MEASURING AND MONITORING DEVICES (MMD):

As per requirement to be finalized at site, shall meet the requirements as per field quality plan and other erection, testing related activities.

NOTE:

1. Considering operational safety, the use of material handling equipment "HYDRA" is banned, agencies has to deploy the Pick & Carry cranes (Farana) of required capacity.

2. Any or part or all of the T&Ps of the contractor identified for the tendered package shall not be engaged for any works other than that of the works intended in this tender. However, BHEL reserves the rights to engage those T&Ps for which separate monthly rates are being paid as per section B of Part A of Chapter XVIII (Weightage & Factors Pertaining to Schedule of Quantities) for execution of Part B of scope of work.

3. During the extended period of contract, services of T&Ps shall be provided by the contractor as per the instruction of BHEL engineer. The monthly charges towards deployment of the particular crane shall be paid at the rate of 90% of monthly awarded rates for a period of 12 months after completion of contract period. Thereafter (contract period+12 months) rate will be decided after mutual agreement. No extra payment shall be made for T&Ps other than cranes.

4. Above T&P list is common for both Part A and Part B scope of work unless otherwise specified. However, BHEL at its discretion may engage this T&P in any of the work of Part A or Part B of scope of work.

5. All above T&Ps are to be deployed by contractor as and when required as per instruction of BHEL engineer unless otherwise specified. If works gets delayed due to non-availability of above T&Ps, BHEL reserves the right to procure/hire the equipment/T&P and get the work done and charge the contractor as per current market rate/hiring rate + applicable BHEL overhead.

6. This above list of T&Ps is only indicative and neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL engineer and required for completion of work.

7. Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be to Contractor 's account.

8. Contractor has to submit the Calibration certificates of all the precision Equipement to BHEL. BHEL may ask for recalibration of the MME‟s /precision equipments for ensuring quality of work. Contractor must reascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.

9. Any T&P‟s, Cranes, Slings, D-shackles and other lifting tackles, Trailers required for shifting of material from store to site shall be arranged by contractor over and above T&P‟s/ crane provided by BHEL.

10. 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.

11. T&P mentioned in Sr no 1,2 & 3 may be allowed to demobilized and taken out by the bidder with written permission from BHEL site construction Manager on completion of work for which said T&P was required.

5.1 LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS:

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	Industrial Air Blower and accessories with power cable	20,000 m^3/hr	For ATT of ducts and absorber

5.2 Contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores T&Ps mentioned above for his use.

6.1 TIME SCHEDULE

6.1.1 The entire work as detailed in the Tender Specification shall be completed within **21 (Twenty-One)** months from the date of "Start of Contract period" at site, for both the scope of work, i.e. Part A and Part B.

6.1.2 There is a likelihood of phase gap of 3 months between Unit#1 and Unit#2.

6.1.3 During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.

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

6.1.5 The contractor shall have to mobilize his resources earlier than the start of contract period for preparatory work like taking over and chipping of foundations, blue-matching, grouting of packer plates etc or start of fabrication. The contractor shall complete all the works in the scope of this contract within the contract period. Pending points identified by the customer/BHEL during the execution of the contract are to be liquidated during the contract period itself.

6.2 INITIAL MOBILIZATION

After receipt of fax LOI, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall reach site, make his site establishment and be ready to commence the erection work within two weeks from the date of issue of Letter of Intent or as per the directions of Construction Manager/ Project Manager of BHEL. Such resources shall be progressively augmented to match the schedule of milestones and commissioning.

6.3 COMMENCEMENT OF CONTRACT PERIOD AND TENTATIVE SCHEDULE

Erection/placement on its designated foundation / location, of the first major permanent equipment / component / column covered in the scope of these specifications, (whichever is earlier as decided by BHEL) shall be recognized as "Start of contract period". Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period. The date of Start of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy, the decision of BHEL engineer is final.

Based on the availability of civil foundations from BHEL and materials from manufacturing units, contractor may have to advance the start of erection after getting clearance from construction manager, or the start of erection may get delayed due to site condition.

The Contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules. The schedule of important milestones is as follows:

SL No.	Milestones	Unit # 1	Unit # 2
1	MM works start	1st Month	1st Month
2	Erection Start	1st Month	3rd Month
3	Equipment Erection Completion	11th Month	17th Month
4	Commissioning of FGD system	12th Month	18th Month
5	Completion of Facilities	15th Month (Tentatively by Jun'21 as per customer L2 schedule)	21st Month (Tentatively by Dec'21 as per customer L2 schedule)

Above time schedule is tentative and in order to meet above schedule in general, and any other intermediate targets set, to meet customer/project schedule, contractor shall arrange & augment all necessary resources from time to time as per the instructions of BHEL.

6.4 CONTRACT PERIOD

The contract period for completion of entire work under scope for each of the packages shall be **21 (Twenty-One) months** from the "COMMENCEMENT OF CONTRACT PERIOD" as specified earlier for completion of the entire work.

6.5 PROVISION OF PENALTY IN CASE OF SLIPPAGE OF INTERMEDIATE MILESTONES:

In case of slippage of Two Major Intermediate Milestones, mentioned as M1 & M2 hereunder, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to F-14.

Milestones	Activities	To be completed by
M1	Commissioning of FGD system of Unit#1	12th Month from Date of Start
M2	Commissioning of FGD system of Unit#2	18th Month from Date of start

Note 1: Refer clause no 12.0 of ANNEXURE-4 IMPORTANT INFORMATION of the NIT regarding modalities against provision of penalty in case of slippage of Intermediate Milestones.

Note 2:

1. In order to meet above schedule in general, and any other intermediate targets set, to meet customer/project schedule, contractor shall arrange & augment all necessary resources from time to time as per the instructions of BHEL.
2. In case the activities in the schedule are to be advanced, the related structural activities in the scope of the contractor are to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.
3. The contractor shall submit area-wise L3 schedule within 7 days in consultation with BHEL. The detailed L3 schedule shall be approved by BHEL and same shall be implemented. Bidder shall submit L3 schedule in MS Projects to meet the agreed project schedule covering various mile stone activities and their split up details such as mobilization, procurement of materials, fabrication & erection activities. This schedule shall also clearly indicate the interface facilities / inputs applicable in each package.

Part-A : MATERIAL MANAGEMENT & HANDLING WORK

THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF FLUE GAS DESULPHURIZATION SYSTEM (FGD) WITH AUXILIARIES; PUMPS, ROTATING MACHINES, TANKS & VESSELS, PIPE & FITTINGS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOP'S PACKAGES; BHEL T&P & OTHER MATERIALS; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, STRUCTURAL & REINFORCEMENT STEEL AND PROVIDING SERVICES FOR **MATERIALS MANAGEMENT** AT **AT 2X500 MW NTPC MAUDA, STAGE-I, TPP-FGD, MAHARASHTRA.**

7.1 The "Rate per MT of materials" calculated/arrived as per Rate Schedule shall be paid on completion of the activities mentioned in the following table on pro-rata basis.

ITEM NO	DESCRIPTION OF ACTIVITY	UNIT	QTY	% BREAK UP
Section A1				
7.1.1	**Material Handling and Material Management for Materials received through Trucks/Trailers at Project Site (Sr no 1.1 of Rate Schedule)**			**100%**
7.1.1.1	Unloading, Shifting to Open/Covered Stores	MT	22210	**30%**
7.1.1.2	Updation of Receipt details, in store Material Registers/BHEL MM Package system	MT	22210	**15%**
7.1.1.3	Stacking and Verification	MT	22210	**15%**
7.1.1.4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurance claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	22210	**25%**
7.1.1.5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	22210	**12%**
7.1.1.6	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	22210	**3%**

7.1.2	**Material Handling and Material Management for Materials received at Transporters Godowns within a radius of 50 KM from Project Site (Sr no 1.2 of Rate Schedule)**			**100%**
7.1.2.1	Unloading from Railway wagons or collection from godowns, Re-loading, transportation to site and unloading	MT	200	**30%**
7.1.2.2	Updation of Receipt details, in store Material Registers/BHEL MM Package system	MT	200	**15%**
7.1.2.3	Stacking and Verification	MT	200	**15%**
7.1.2.4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurane claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	200	**25%**
7.1.2.5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	200	**12%**
7.1.2.6	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)		200	**3%**
7.1.3	**Material Handling and Material Management for Structural steel and Reinforcement steel received through trucks/trailers at project Site (Sr no 1.3 of Rate Schedule)**			**100%**
7.1.3.1	Unloading, Shifting to Open/Covered Stores	MT	3500	**30%**
7.1.3.2	Updation of Receipt details, in store Material Registers/BHEL MM Package system	MT	3500	**15%**
7.1.3.3	Stacking and Verification	MT	3500	**15%**
7.1.3.4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurane claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	3500	**25%**
7.1.3.5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	3500	**12%**
7.1.3.6	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4	MT	3500	**3%**

	and 7.1.9.5)			
7.1.4	**Material reshifting and re stacking within project premises (Sr no 1.4 of Rate Schedule)**			**100%**
7.1.4.1	Material Re-shifting Stacking	MT	1500	**85%**
7.1.4.2	Updation of store material register / BHEL MM package system	MT	1500	**12%**
7.1.4.3	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	1500	**3%**
7.1.5	**Despatch/Outgoing materials (Sr no 1.5 of Rate Schedule)**			**100%**
7.1.5.1	Identification of Material, Tagging, Packing if required, Preparation of Gate passes etc.	MT	500	**40%**
7.1.5.2	Loading of materials, including T&P of BHEL, into trucks/Carriers at site stores/ erection site for onwrd transportation to other destinations (Transportation by other agencies)	MT	500	**45%**
7.1.5.3	Updation of store material register / BHEL MM package system	MT	500	**12%**
7.1.5.4	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	500	**3%**
Section A2				
7.1.6	**Material Handling and Material Management for Cement received through trucks/trailers in bags at project Site (Sr no 1.6 of Rate Schedule)**			**100%**
7.1.6.1	Unloading, Shifting to Open/Covered Stores	MT	2500	**30%**
7.1.6.2	Updation of Receipt details, in store Material Registers/BHEL MM Package system	MT	2500	**15%**
7.1.6.3	Stacking and Verification	MT	2500	**15%**
7.1.6.4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurane claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	2500	**25%**
7.1.6.5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	2500	**12%**

7.1.6.6	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	2500	**3%**
7.1.7	**Material re-shifting and re-stacking for Cement within project premises (Sr no 1.7 of Rate Schedule)**			**100%**
7.1.7.1	Material Re-shifting Stacking	MT	100	**85%**
7.1.7.2	Updation of store material register / BHEL MM package system	MT	100	**12%**
7.1.7.3	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	100	**3%**
7.1.8	**Despatch/Outgoing materials for cement materials (Sr no 1.8 of Rate Schedule)**			**100%**
7.1.8.1	Identification of Material, Tagging, Packing if required, Preparation of Gate passes etc.	MT	50	**40%**
7.1.8.2	Loading of materials, including T&P of BHEL, into trucks/Carriers at site stores/ erection site for onwrd transportation to other destinations (Transportation by other agencies)	MT	50	**45%**
7.1.8.3	Updation of store material register / BHEL MM package system	MT	50	**12%**
7.1.8.4	Completion of contractual obligations as Serial No. 7.1.9 (7.1.9.1, 7.1.9.2, 7.1.9.3, 7.1.9.4 and 7.1.9.5)	MT	50	**3%**

Note: The quantities mentioned above are tentative in nature and may vary to any extent.

7.1.9	**OTHER** payment terms & condition	
	% from every RA Bill to be paid only after satisfactory completion otherwise forfeited	
7.1.9.1	REMOVAL OF GRASS/WEEDS AND OTHER PLANT GROWTH IN THE STORE AREA	0.5%
7.1.9.2	HOUSEKEEPING & CLEANING OF ALL CLOSED SHEDS	0.5%
7.1.9.3	PRESERVATION planned for the month	0.5%
7.1.9.4	Safe working & availability of adequate illumination at the place of work	0.5%
7.1.9.5	Implementation of E-stores for records/data	1%

7.1.10 Cranes **(For Section B of PART-A)** **(Sr no 1.9 of Rate Schedule)**

Payment for Crane shall be made on monthly basis as per the awarded monthly rate. No other payment shall be paid for the other / additional T & Ps deployed for carrying out the work as per the scope of this tender.

7.2 Terms of payment (Part B)

The progressive payment for erection, testing and commissioning on accepted price of contract value will be released as per the break up given hereinafter:

7.2.1 Progressive Payment against monthly running bills will be made upto 85% of the value of the erected Pro-rata as per Cl no 7.2.1.1 to 7.2.1.7 of the following table.

SL NO	Contract (Main Package) Identification ----> Rate schedule Identification -------->	Structure 1A	Non Pressure Parts (Ducts/dampers, etc) 2A	Rotating Machine ,etc 3A	Tanks 4A	Insulation 1) Iron Components 2) Wool mattresses 3) Aluminium sheeting 5A,5B,5C	Piping CS piping SS piping 6A,6B
	PRO RATA PAYMENTS (85%)						
7.2.1.1	ON PRE-ASSEMBLY WHEREVER APPLICABLE (IF NOT APPLICABLE, THIS PORTION SHALL BE CLUBBED WITH PLACEMENT IN POSITION)	20%	20%	20%	20%		15%
7.2.1.2	PLACEMENT IN POSITION	20%	20%	20%	20%	50%	20%
7.2.1.3	ALIGNMENT	20%	20%	20%	10%	15%	15%
7.2.1.4	WELDING/BOLTING/FIXING	20%	20%	20%	20%	20%	20%

7.2.1.5	COMPLETION OF NON DESTRUCTIVE EXAMINATION & STRESS RELIEVING/ HEAT TREATMENT (if not applicable, then this portion to be paid along with welding)	5%	5%	5%	10%	--	5%
7.2.1.6	HANGERS & SUPPORTS ETC WHEREVER NECESSARY AS PER DRG	--	--		--	--	5%
7.2.1.7	HYDRAULIC TEST OR PNEUMATIC TEST	--	--	--	5%	--	5%
	TOTAL FOR PRO RATA PAYMENTS (TOTAL 85%)	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**

7.2.2 Further 15 % payment on pro-rata basis common to all PGs shall be released on achievement of the following stage / milestones events (as per Cl no 7.2.2.1 to 7.2.2.11 of the following table) for the tonnage erected.

7.2.2	**STAGE/MILESTONE PAYMENTS (15%)**		**% Payment**
7.2.2.1	Completion of air & gas tightness test for Ducts	2x1%	2%
7.2.2.2	Completion of trial run of Slurry pumps		1%
7.2.2.3	Trial run of Wet ball mills	2x1%	2%
7.2.2.4	Trial run of Booster Fans	4x0.25%	1%
7.2.2.5	Trial run of Oxidation Blower	4x0.25%	1%
7.2.2.6	Commissioning of FGD system	2x1%	2%
7.2.2.7	Completion of Painting		2%
7.2.2.8	Area cleaning, temporary structures cutting/removal and return of scrap		1%
7.2.2.9	Punch List points/pending points liquidation		1%
7.2.2.10	Material Reconciliation		1%
7.2.2.11	Completion of Contractual Obligation		1%
	TOTAL FOR STAGE/MILESTONE PAYMENTS (15%)		**15%**

7.3 Contractor supplied items that go as permanent part of the system: Progressive payment/final payment (Part B2 of Rate Schedule):

The payments for works under the scope of this contract shall be as per clause no 2.6; clause 2.22; clause 2.23 of General Conditions of Contract and Chapter IX of Special Conditions of Contract. Few points of consideration are as below:

- 100% of item rate on pro rata basis shall be made as per progress of work. BHEL decision in this regard shall be final and binding on the contractor.
- Final bill shall be submitted after completion of works and upon material reconciliation along with all prescribed formats.

7.4 Payment towards installation and commissioning of DG set shall be done as follows (Rate Schedule – 7A)

7.4	Description of activity	% payment
7.4.1	Preparation of foundation, erection, placement in position, leveling, grouting, and completion etc of DG set, Fuel day tank, exhaust support structure.	45%
7.4.2	Internal fuel oil piping and complete exhaust piping completion	25%
7.4.3	Alignment of Engine with Generator, Completion of erection, welding of accessories viz. Pipes, Structural, cable laying, connections/ terminations, pre-commissioning tests	20%
7.4.3	Testing, trial run and commissioning.	10%

7.5 Payment towards works of Tap-off duct work shall be done as per follows (Rate Schedule – 8A)

7.5	Description of activity	% payment
7.5.1	Removal of Insulation (Cladding sheet & Insulation wool) at three locations per Unit to facilitate for cutting & removal of existing duct for erection of bypass damper (1 location) & tap off ducts (2 locations). Cutting & removal of portion of existing duct.	35%
7.5.2	Erection of tap off ducts, gates and dampers	50%
7.5.3	Shifting of removed Insulation materials & removed duct plates from erection site to BHEL/NTPC yard.	15%

8.0 TAXES, DUTIES, LEVIES (Rev 13 dated 05/11/2018)

1. All taxes excluding GST, GST Cess **& BOCW** Cess **but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.**

2. Any increase of the taxes excluding GST, GST Cess & BOCW **Cess**, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.

3. **GST :**
   The successful bidder shall furnish proof of GST registration .GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.

4. GST charged in the Tax Invoice/Debit note by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return

5. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:
   BHEL GSTN – As per **Annexure -1**
   NAME -- Bharat Heavy Electricals Limited
   ADDRESS – Site address

6. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-
   Email id ---- to be intimated later on.

In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.

7. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.

8. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.

9. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law , GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.

10. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.
    The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit/ Way Bill, if required, shall be arranged by the contractor and BHEL will not supply any Road Permit/ Way Bill for this purpose.

11. **New taxes and duties**:-Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
    Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.

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 must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

12. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.

13. **TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.**
14. **TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.**
15. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

Sl. No	Projects under state	GSTIN
1	Andhra Pradesh	37AAACB4146P7Z8
2	Bihar	10AAACB4146P1ZU
3	Chhattisgarh	22AAACB4146P1ZP
4	Gujarat	24AAACB4146P1ZL
5	Jharkhand	20AAACB4146P5ZP
6	Madhya Pradesh	23AAACB4146P1ZN
7	Maharashtra	27AAACB4146P1ZF
8	Orissa	21AAACB4146P1ZR
9	Telangana	36AAACB4146P1ZG

ANNEXURE-2

BOCW Act & Cess Act

Bidder may please note that the sub-contractor/bidder of BHEL engaging building or construction worker in connection with building or other construction work, are required to follow the procedures enumerated below:

1. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

2. It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.

3. It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.

4. It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may , by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.

5. It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.

6. It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

7. It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.

8. It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics :

   (i) Number of Building Workers employed during preceding one month.
   (ii) Number of Building workers registered as Beneficiary during preceding one month.
   (iii) Disbursement of Wages made to the Building Workers for preceding wage month.
   (iv) Remittance of Contribution of Beneficiaries made during the preceding month

9. BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.

10. It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor

being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.

11. Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%) on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.

12. The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

BILL OF QUANTITY

Summary of Weight of BOQ under the Scope:-

9.1 GENERAL IDEA OF WEIGHTS TO BE HANDLED FOR MM WORKS

S.no.	Unit	Description of Supplies	Tonnage (MT)
1	Ranipet	FGD System (Mechanical & Electrical components)	14500
2	EDN	Control and Instrumentation /Panels	125
3	PC, Chennai	Piping System	162
4	IS	Motors	228
5	PEM	Mechanical BOIs and Electrical BOIs	850
6	Rudarapur	Busduct	23
7	EPD	LV switchgear	130
8	Bhopal	HT Switchgear	110
9	ISG	DG Set	22
10	PESD	Fire Protection System	111
11	Jhansi	Transformers	50
12		O&M Spares	300
13	PSWR	Structural steel	700
14	PSWR	Pre-fabricated Structural steel	5500
14	PSWR	Reinforcement steel (TMT)	2800
15	PSWR	Cement in bags	2500
16		Re-shifting /Restacking of the material	1500
		Approximate Weight to be handled	**28211 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.

Weight Summary for the E/T/C of the FGD System			
S.no.	**Unit**	**Description of Supplies**	**Tonnage (MT)**
i	Ranipet	FGD System(Mechanical)	13182
ii	PEM	Mechanical BOIs	13.5
iii	PC Chennai	Piping System	93
iv	IS	Motors	66
v	PESD	Fire Protection System	111
Vi	PSWR	Structures	5100
		Total Tonnage	
Notes:			
1.	Weight mentioned above 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.		

9.2 WEIGHT SCHEDULE – SUMMARY

S. No.	Description	Weight in MT	Rate Schedule ID
1	Structure	10668.32	1A
2	Non Pressure Part/Ducts/Dampers	4500.90	2A
3	Rotating Machine	1224.08	3A
4	Tanks	1088.00	4A
5	Mineral wool	100.00	5A
6	Fixing components	110.00	5B
7	Aluminum sheet & Sealing compound	114.00	5C
8	CS Piping	534.45	6A
9	SS Piping	8.00	6B
10	DG Set	1 Lot	7A
11	Tap-off duct work	1 nos	8A
Total			

9.3 PSWR Supplied Structural material

Description	Qty in MT	Rate schedule identifier
Erection, fit-up/alignment, welding/bolting, NDT of structures of FGD Control room, Compressor House, ACW Building, Ball mill building, Gypsum dewatering building, Limestone Crusher House, Transfer Houses, Overground Limestone Conveyor Galleries & Trestles, Overground Gypsum Conveyor Galleries & Trestles, Closed Gypsum Stockpile Shed with Travelling Tripper, Cable Galleries & Trestles, Compressor House etc to complete the system requirements of FGD package.	**4700**	1A
Erection, fit-up/alignment, welding/bolting, NDT of Limestone Storage Silos.	**400**	4A

9.4 BAP Ranipet Supplied Material

CUST	PGMA	Description	Estimated Wt in kgs		Rate schedule Identifier
			Unit#1	Unit#2	
G503	55082	BOOSTER FAN HANDRAILS & INSERT	1577.22	1577.22	1A
G503	55084	AXIAL BOOSTER COOLING/SEAL FAN	3000	3000	3A
G503	55089	BOOSTER FAN CANOPY FOR MOTOR	1322.974	1322.974	1A
G503	55287	AXIAL BOOSTER FAN ROTOR	15898.821	15898.821	3A
G503	55587	AXIAL BOOSTER FAN STATOR	71538.001	71538.001	3A
G503	55880	AXIAL BOOSTER FAN COUPLING	2000	2000	3A
G503	55980	BOOSTER FAN LOS WITH LUBRICANT	3000	3000	3A
G503	55983	BOOSTER FAN ACTUATOR	100	100	3A
G503	57141	SEAL AIR HAG AND ID FAN OUTGAT	14250	14250	2A
G503	57209	MTG BKT FOR CL DAMPER AIR CYL	819	819	1A
G503	57491	BLOWER WITH MOTOR	2880	2880	3A
G503	57497	KNIFE GATE VALVE	1460	1460	2A
G503	57540	GATE-FGD BOOSTER FAN INLET	41772.754	41772.754	2A
G503	57550	GATE-FGD BOOSTER FAN OUTLET	45203.6	45203.6	2A
G503	57566	PLATFORMS AND LADDERS-FGD GD	16500	16500	1A
G503	57577	ELECT ACTUATOR FOR GATE,DAMPER	12000	12000	2A

G503	57583	DAMPER FGD BYPASS	29992.366	29992.366	2A
G503	FW212	SLURRY RECIRCULATION PUMP SYST	128000	128000	3A
G503	FW213	ABSORBER SYSTEM INTERNALS	23000	23000	2A
G503	FW214	ABS BAFFLE GRATING	10000	10000	2A
G503	FW215	MIST ELIMINATOR & ACCESSORIES	41000	41000	2A
G503	FW216	ABS BAFFLE GRATING SUPP	8000	8000	2A
G503	FW217	ABS ME SUPPORT	10000	10000	1A
G503	FW218	ABS SPRAY PIPE SUPP	10000	10000	1A
G503	FW219	ABSORBER SYSTEM-BASE	15000	15000	1A
G503	FW220	ABSORBER SYSTEM-STRUCTURES	237000	237000	1A
G503	FW221	ABSORBER SYSTEM-CASING BOTTOM	167000	167000	2A
G503	FW222	ABSORBER SYSTEM-CASING TOP	250000	250000	2A
G503	FW223	ABSORBER SYSTEM ACCESSORIES	15000	15000	2A
G503	FW226	EMERGENCY QUENCH WATER TANK	20000	20000	4A
G503	FW227	EMERGENCY QUENCH SYSTEM	9000	9000	2A
G503	FW228	ABSORBER-W/D INTERFACE	13000	13000	2A
G503	FW229	W/D WASH SYSTEM	5000	5000	2A
G503	FW230	OXIDATION BLOWER & ACC	23000	23000	3A
G503	FW231	ABSORBER SHEAR PLATE	10000	10000	1A
G503	FW232	DUCT SUP BYP & BUF/GGH	18000	18000	1A
G503	FW233	DUCT SUPPORT BUF/GGH & ABS	122000	122000	1A
G503	FW234	DUCT SUP ABS & STACK/BYP	52000	52000	1A
G503	FW236	STRUCTURES FOR RC PUMP HOUSE	120000	120000	1A
G503	FW237	GALLERIES & RAILING FOR STAIR	80000	80000	1A
G503	FW238	HOOK UP DUCT WITH STRUCTURE	35150.104	35150.104	2A
G503	FW239	VIEWING PORTS	5000	5000	2A
G503	FW243	SLURRY DIST RC PUMP & ABS	50000	50000	3A
G503	FW244	OXIDATION AIR DISTRIBUTION SYS	11000	11000	1A
G503	FW249	HANDLING EQUIP- RC PUMP	5000	5000	1A
G503	FW250	FLOOR GRILLS -UNIT SYS	10000	10000	1A
G503	FW251	EXPNSN JNT METALLIC	43000	43000	2A
G503	FW253	EXPANSION JOINT BETWEEN SCRUBR	11500	11500	2A
G503	FW255	DUCT BYP & BUF/GGH/ABS	115000	115000	2A
G503	FW256	DUCT BUF/GGH & ABS	806000	806000	2A
G503	FW257	DUCT ABS & BYP/STACK	343000	343000	2A
G503	FW260	DUCT STR BYP & BUF/GGH/ABS	140000	140000	1A
G503	FW261	DUCT STR BUF/GGH & ABS	656000	656000	1A
G503	FW262	DUCT STR ABS & BYP/STACK	341500	341500	1A

G503	FW267	INSULATION MATERIALS FOR DUCT	50000	50000	5A
G503	FW268	FIXING COMP FOR DUCT	55000	55000	5B
G503	FW269	CLADDING SHEET FOR DUCT	57000	57000	5C
G503	FW280	FOUNDATION MATL FOR DUCT STRUC	20340.6	20340.6	1A
G503	FW281	FOUNDATION MATL FOR ABS	4739.462	4739.462	1A
G503	FW282	FOUNDATION MATL FOR ELEVATOR	10000	10000	1A
G503	FW283	FOUNDATION MATL RC PUMP SHED	20000	20000	1A
G503	FW285	SUPRTING STR FOR EMERGENCY QWT	7000	7000	1A
G503	FW292	STRUCTURES FOR ELEVATOR	90000	90000	1A
G503	FW310	STRU FOR BOOSTER FAN HANDLING	110000	110000	1A
G503	FW610	GALLARIES & RAIL FOR GGH	40000	40000	1A
G503	FW612	GALLARIES AND RAILINGS FOR DAM	35000	35000	1A
G503	FW613	GALLARIES AND RAILINGS FOR DUC	35000	35000	1A
A1/A2			**4807554.90**	**4807554.90**	
Common System					
G503	FW701	SLURRY PUMPS & ACCESSORIES	50000	3A	
G503	FW705	WATER PUMP & ACCESSORIES	40000	3A	
G503	FW710	MONORAIL FOR HOIST & CRANES	60000	1A	
G503	FW712	FLOOR GRILLS-COMM SYS	5000	1A	
G503	FW713	CHAIN PULLEYS	75000	1A	
G503	FW714	HOISTS	75000	1A	
G503	FW717	MAN HOLE DOOR	5000	1A	
G503	FW720	AGITATORS	60000	3A	
G503	FW721	AGITATOR SUPPORT	187000	1A	
G503	FW722	GALLERIES & RAILINGS FOR TANK	90000	1A	
G503	FW723	AIR CANNON-SILO	4000	2A	
G503	FW724	BAGFILTER & FAN ASSY SILO	4000	3A	
G503	FW725	NOZZLES & FLANGES	10000	6A	
G503	FW730	LIMESTONE SILO STRUCTURE	210000	1A	
G503	FW731	LIMESTONE SILO	146000	4A	
G503	FW733	LIMESTONE SILO APPROACH PLATF	63000	1A	
G503	FW734	LIMESTONE MILL	330000	3A	
G503	FW738	GYPSUM BELT FILTER AND ACCESS	70000	3A	
G503	FW740	FOUNDATION MATL FOR TANKS	3724.112	1A	
G503	FW742	LIMESTONE SLURRY STORAGE TANK	107000	4A	
G503	FW743	AUXILIARY ABSORBER TANK	84000	4A	
G503	FW744	FILTRATE TANK	128000	4A	
G503	FW745	WASTE WATER TANK	47000	4A	

G503	FW747	HYDROCLONE WASTE WATER TANK	62000	4A
G503	FW748	PROCESS WATER TANK	20000	4A
G503	FW749	ALL TANKS INTERNAL STRUCTURE	7000	1A
G503	FW750	TANK ACCESSORIES	8000	6A
G503	FW751	PROCESS WATER PIPE ACCESSORIES	18000	6A
G503	FW752	COOLING WATER PIPE ACCESSORIES	18000	6A
G503	FW753	SLURRY PIPE ACCESSORIES	400000	2A
G503	FW754	SERVICE AIR PIPE ACCESSORIES	200000	6A
G503	FW755	INSTRUMENT AIR PIPE ACCESSORIE	40000	6A
G503	FW760	FOUNDATION MATL FOR PIPE RACKS	25000	1A
G503	FW761	STRUCTURE FOR PIPERACKS	106500	1A
G503	FW762	FNDN MATL FOR SILO STRUCTURE	71000	1A
G503	FW763	FNDN MATL SUB PIPE RACK	25000	1A
G503	FW765	STR FOR SUB PIPE RACK	106500	1A
G503	FW766	PLATFORM FOR PIPE RACK	30000	1A
G503	FW767	PLATFORM SUB PIPE RACK	30000	1A
G503	FW768	TRESTLE FOR MAIN PIPE RACK	143500	1A
G503	FW769	TRESTLE-SUB PIPE RACK	143500	1A
G503	FW784	HSFG BOLTS	10000	1A
G503	FW785	BELT FILTER WASHING TANK	16000	4A
G503	FW786	PRIMARY HYDROCYCLONE FEED TANK	17000	4A
G503	FW787	STRUCTURES INSIDE GDWB & BMB	30000	1A
G503	FW798	AIR RECEIVERS	10000	4A
G503	FW800	CLARIFIED WATER TANK	11000	4A
G503	FW802	NEUTRALISATION TANK & ACCESSOR	4000	6A
G503	FW814	ROOFING SHEET	7000	1A
G503	FW815	RC PUMP INLT & OUTLT VALVE	63700	6A
G503	FW816	MANL BTRFLY VALV- UTLTY	1820	6A
G503	FW817	MOTOR BTRFL VALV-UTLTY	390	6A
G503	FW818	PNEM BTRFLY VALV-UTLTY	1040	6A
G503	FW819	MAN BTRFLY VALV-LS SLRY	2730	6A
G503	FW820	MOTOR BTRFLY VALV-LS SLRY	780	6A
G503	FW821	PNEUM BTRFLY VALV-LS SLRY	5720	6A
G503	FW822	MAN BTRFLY VALV-GYP SLRY	4810	6A
G503	FW823	MOTOR BTRFLY VALV -GYP SLRY	20150	6A
G503	FW828	MAN GATE VALV-UTLTY	12610	6A
G503	FW829	MOTOR GATE VALV-UTLTY	910	6A
G503	FW834	MAIN GLOBE VALV-UTLTY	6500	6A

G503	FW840	CERAMIV VALVES	260	6A
G503	FW841	CONTROL VALVES	910	6A
G503	FW842	MAN PINCH VALV-GYP SLRY	520	6A
G503	FW845	BALL VALVES- WATER	390	6A
G503	FW848	CHECK VALVES- WATER	1040	6A
G503	FW851	DIAPHRAGM VALV-SLURRY	1170	6A
B		**Total for Common System**	**3657174.112**	
Grand Total A1+A2+B in Kgs			**13182263.92**	
Grand Total A1+A2+B in MT			**13182.263**	
SS Piping			8000	6B

9.5 Water Based Fire Protection System

Rate Schedule identifier : 6A					
Sl. No.	**Description**	**Unit**	**Quantity**	**Unit Weight (Ton)**	**Total Weight (Tonnes)**
HYDRANT SYSTEM					
Sl. No.	**Description**	**Unit**	**Quantity**		
1	**MS Pipe-1239/3589 Heavy Grade ERW MS Black**				
1.1	200 mm dia	Mts	400	0.033	13.2
1.2	150 mm dia	Mts	1800	0.021	37.8
1.3	100 mm dia	Mts	400	0.015	6
1.4	80 mm dia	Mts	300	0.01	3
2	**SS Hydrant Valve**	No.	70	0.03	2.1
3	**Air Release Valve**				
	25 mm dia	No.	6	0.005	0.03
5	**Hose Reel (15 M lemght)**	No.	90	0.02	1.8
6	**Hose Box**				
	External + Internal	No.	45	0.015	0.675
7	**Branch Pipe with Nozzle**	No.	45	0.01	0.45
8	**Gate Valve (CI -valve)**				

8.1	200 mm dia	No.	6	0.1	0.6
8.2	150 mm dia	No.	20	0.08	1.6
8.3	100 mm dia	No.	3	0.04	0.12
8.4	80 mm dia	No.	12	0.02	0.24
9	**Structural Steel**	lot	1	7	7
10	**M.S Fittings**	lot	1	21.735	21.735
11	**Water Monitor**	No.	5	0.08	0.4
12	**Wrapping and coating of UG pipe**	sqmt	564		0
		Weight of Hydrant System Items			**97**
HVWS SYSTEM					`
Sl. No.	**Description**	**Unit**	**Quantity**		
1	**ERW, MS (Galvanized) pipe as per IS:1239 Class B medium grade**				
1.2	100 NB	Mts	50	0.015	0.75
1.4	65 NB	Mts	8		0
1.5	50 NB	Mts	100	0.006	0.6
1.6	40 NB	Mts	100	0.005	0.5
1.8	25 NB	Mts	70	0.003	0.21
2	**ERW, MS black pipe as per IS:1239 Hvy grade**				
2.1	80 NB	Mts	2	0.01	0.02
2.2	65 NB	Mts	120	0.007	0.84
2.3	50 NB	Mts	10	0.006	0.06
2.5	25 NB	Mts	206	0.003	0.618
3	**Cast Iron Rising Spindle Type Gate Valve - IS : 14846**				
3.2	100 NB	No.	4	0.04	0.16
4	**Cast Iron Wafer Type Butterfly Valves as per BS :5155**				
4.2	100 NB	No.	2	0.009	0.018
5	**Cast Iron Deluge Valve (Wet Pilot Actuated) complete with necessary Trims,Water**				

	Motor gong				
5.2	100 NB	No.	2	0.1	0.2
6	**MS Y Strainer with SS mesh**				
6.2	100 NB	No.	2	0.025	0.05
7	**HVW SPRAY NOZZLE with Strainer(SS Construction)**				
7.1	K-23 Angle - 120	No.	108	0.00025	0.027
8	**Q. B . Detector 79 degree**	No.	68	0.0001	0.0068
9	**Pressure Switch**	No.	4	0.0005	0.002
10	**Limit Switch**	No.	8	0.0005	0.004
11	**15 NB Solenoid Valve**	No.	2	0.0002	0.0004
12	**DV Control Panel**	No.	2	0.02	0.04
13	**SS Orifice Plate**	No.			
13.2	100 NB	No.	2	0.005	0.01
14	**Pipe Fittings**	Lot	1	0.8995	1.0794
15	**Structural steel**	Lot	1	1.2	1.2593
16	**Paints & Primers**	Lot	1		
MVWS SYSTEM for FGD control room					
1	**ERW, MS (Galvanized) pipe as per IS:1239 class B medium grade**				
1.2	100 NB	Mts	82	0.015	1.23
1.3	80 NB	Mts	30	0.01	0.3
1.5	50 NB	Mts	140	0.006	0.84
2	**Cast Iron Rising Spindle Type Gate Valve - IS : 14846**				
2.2	100 NB	No.	12	0.04	0.48
3	**Cast Iron Wafer Type Butterfly Valves as per BS :5155**				

3.2	100 NB	No.	6	0.009	0.054
4	**Cast Iron Deluge Valve (Wet pilot Actuated) complete with necessary Trims,Water Motor gong**				
4.2	100 NB	No.	6	0.1	0.6
5	**MS Y Strainer with SS mesh**				
5.2	100 NB	No.	6	0.025	0.15
6	**MVW SPRAY NOZZLE (SS Construction)**				
6.3	K-30	No.	100	0.00025	0.025
7	**QB Detector (79 Deg C)**	No.	0	0.0001	0
8	**Pressure Switch with root valve**	No.	2	0.0005	0.001
9	**Limit Switch**	No.	8	0.0005	0.004
10	**15 NB Solenoid Valve**	No.	2	0.0002	0.0004
11	**DV Control Panel**	Lot	2	0.02	0.04
12	**SS Orifice Plate**	Lot			
12.2	100 NB	Lot	2	0.005	0.01
13	**Pipe Fittings**	Lot	1		0.8295
14	**Structural steel**	Lot	1		3
15	**Paints & Primer**	Lot			
		Weight of Spray System Items			**14**
			Weight of Hydrant and spray Grand Total in Tonnes		**111**

TESTS TO BE CONDUCTED				
Sl No	**Description**	**Units**	**Qty.**	

1	Hydro Test of all the lines - 1.5 times of the design pressure	LOT	For 100 % Piping	
2	Radiography - 10 % of the welded joints	LOT	10 % of Butt welded Joints	
3	Holiday test - Underground piping	LOT	For 100 % Piping	
4	Flushing of all the line (Open to atmosphere)	LOT	For 100 % Piping	
5	Die Penetration test for all longitudinal & cross weldings	LOT	100 % of Fillet welded Joints	
6	Dry Film Thickness test for paint	LOT	For 100 % Piping.	
7	TAC approval - for the total system after erection (In PSNR scope)	LOT	For complete System	

Notes -

1	Cable vault is considered with 55 meters length, 5 rows and 6 tiers.
2	Supervision of Tests to be conducted, inspection & TAC approval on the system will be in the Scope of work.
3	Erection activities like cutting/ threading/welding etc. of conduit/pipe/ISMC/ISA shall be carried out at site as per requirement for installation of illumination equipments.
4	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 considered in Erection agency.
5	Surface preparation and base coat of primer shall be carried and final painting shall be done after completion of structural steel erection.
6	Obtaining statutory approvals from TAC, PESO, Electrical Inspector or any other Governing Agencies shall be in PSNR scope. Documentation required like Layouts, Schemes shall be furnished by PE&SD.
7	The wrapping of coating for underground pipe will be in E&C scope of work.
8	Painting along with primer for Fire water Piping will be in the scope of erection agency.

9.6 PEM Supplied item

SR. NO	PACKAGE DESCRIPTION	QUANTITY (Nos)	PLAN DIMENSION	WEIGHT		Rate Schedule identifier
				PER EQUIPMENT (MT)	TOTAL FOR STATION (MT)	
MSE						
1	ACW PUMPS (Hor)	4	2000MM X 1000MM (BASE PLATE DIM.)	0.75	3	3A
2	ECW PUMPS (Hor)	3	2000MM X 1000MM (BASE PLATE DIM.)	0.75	2.25	3A
3	SCS	2	2500MM X 750MM	1.5	3	2A
4	CONICAL STRAINERS (200NB)	3	L=1000MM; DIA=200NB	0.25	0.75	2A
5	PHE	3	3000MMx1000MM	1.5	4.5	2A
					13.5	

9.7 Weight Schedule of HT Motors

S. No.	Item Description	UOM	Wt / Motor(MT)	Total Weight(MT)	Rate Schedule identifier
1	HT Motors-4 no.	MT	16.5	66	3A
	Total Weight of IS Supplies (MT)			66	

9.8 ISG Supplied 1*750 KVA DG SET

Rate Schedule identifier : 7A				
S NO.	***ITEMS***	***QUANTITY***	***WEIGHT***	***REMARKS***
1	UNLOADING , STORAGE AND SHIFTING OF THE FOLLOWING MATERIALS FROM STORES TO SITE. 1. DG SET 2. ACOUSTIC ENCLOSURE 3.990 LTRS FUEL TANK AND PIPING 4.SILENCERS AND EXHAUST PIPES AND ACCESSORIES 5. EXHAUST SUPPORT STRUCTURE 6.CABLES AND ACCESSORIES 7.CONTROL PANELS, DBs, BATTERY CHARGER, BATTERY 8.CONSUMMABLES - LUBE OIL, COOLANT AND FILTERS 9.SPARES	1 SET	**22 TONS**	DG SET AND FEW PARTS OF ACOUSTIC ENCLOSURE SHALL BE SUPPLIED IN CONTAINER.
1.1	PLACEMENT OF DG SET ON FOUNDATION	1 SET	10 TONS	DG SET SHALL BE INSTALLED OUTDOORS.
1.2	INSTALLATION/ASSEMBLY OF ACOUSTIC ENCLOSURE	1 SET	4 TONS	
1.3	ERECTION OF SILENCER, EXHAUST PIPING (MS Class 200 NB pipes, CLASS-B), SUPPORT , AND STACK (MS Class 200 NB pipe- CLASS B)	1 SET	2 TONS	REFER TO DG LAYOUT DRAWING FOR EXHAUST PIPING.
1.4	ERECTION OF EXHAUST SUPPORT STRUCTURE (HEIGHT- 10 MTRS)	1 SET	3 TONS	GALVANISED, PRE FABRICATED , BOLTING TYPE EXHAUST SUPPORT STRUCTURE SHALL BE SUPPLIED. SAME TO BE ASSEMBLED AT SITE.
1.5	INSTALLATION OF DG AMF PANEL, DISTRIBUTION BOARD, BATTERY CHARGER AND BATTERY ON DG FOUNDATION , INSIDE THE ACOUSTIC ENCLOSURE.	1 SET	1.5 TONS	

1.6	INSULATION AND ALUMINIUM CLADDING OF SILENCER, EXHAUST PIPING AND STACK	1 SET	0.5 TONS	
1.7	ERECTION OF FUEL TANK AND FUEL PIPING (MS Class 1 inch Pipes). FLUSHING OF TANKS AND FUEL LINES AT THE TIME OF COMMISSIONING. PAINTING OF FUEL LINES. FILLING OF 1000 LTRS OF HIGH SPEED DIESEL DURING COMMISSIONING.	1 SET	0.5 TON	*REFER TO DG LAYOUT DRAWING AND P&ID OF FUEL TANK FOR REFERENCE.
1.8	DRAINING AND FILLING OF LUBE OIL AND COOLANT IN THE ENGINE AT THE TIME OF COMMISSIONING.	1 SET	150 LITRES LUBE OIL AND 300 LITRES COOLANT.	
1.9	INSTALLATION OF TERMINAL BOX, PROTECTION CTs	1 SET	0.1 TON	

9.9 BOQ for Misc. structural works: -

(Note: This is in addition to the BHEL supplies as fabricated items for structural framing of various FGD system)

ST NO.	ITEM DESCRIPTION	UNIT	QUANTITY
A2301	Supply, Fabrication, erection and alignment of structural steel with mild steel (E250) rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, gantry girders, bunkers, silos, hoppers, roof trusses, portals, laced purlins, space frames, hangers, struts, monorails, galleries, stiffeners, wall beams, sheeting runners, brackets, stub columns, bracings, cleats, trestles, base plates, splice plates, chequered plate flooring, decking and seal plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc, connection design & preparation of fabrication drgs, collection of steel from stores, fabrication, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts, nuts and welds not payable. However, permanent bolts are payable separately), assembly, edge preparation, preheating (min) preheat and interpass temperature of 20o C for welding over 20 mm and upto 40 mm & 66o C for welding over 40 mm and upto 63 mm & 110o C for thickness over 63 mm & use of low hydrogen/ radiogenic electrodes), post heating, testing of welders, inspection of welds, visual inspection, non destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a seperate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL. (Rate shall be exclusive of surface preparation and primer)	MT	50

	Payment terms Fabrication: 65% Erection: 25% Alignment, welding/bolting: 10%		
2307	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.		
a	Minimum galvanisation of 610 g/sqm	MT	64
2308	Supplying, fabrication, erection and alignment of factory made galvanised welded grating units with mild steel conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including 2 coats of redoxide zinc-chromate primer (one coat at shop and one coat after erection), fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT	14
A2309	Extra over above ST NO. A2301 for finishing the grating units/bolts/inserts with hot dipped galvanisation @ 610 gm/sqm over blast cleaned steel surfaces instead of painting with two coats of red oxide zinc-chromate primer all complete.	MT	10
2311	Providing and fixing in position of permanent mild steel bolts (class 4.6 as per IS : 1367 and grade `C' as per IS: 1363) and nuts, washers etc. up to and inclusive of 39 mm diameter and upto 300mm long for structural steel work etc all complete.	KG	1250
2312	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	KG	49090
2313	Dismantling of steel structure, lowering of material and carriage of the dismantled material up to field fabrication shop / projects storage including temporary dismantling, cutting, re-welding, supporting, and restoring to correct position all temporarily dismantled members, re-alignment of all adjacent connected members to their correct positions (weight of such adjacent members and temporarily dismantled members not payable), scaffolding, staging, tools & tackles, gas cutting, welding, consumables etc all complete.	MT	14

2314	Addition to, alterations in and/or modifiction of "Erection Marks" including cutting of parts, gauging of welds, cutting, grinding, fabrication, welding, drilling holes, straightening, removal of bends, raising to the required level, painting, transportation, return of unutilised steel pieces to the project store, temporarily dismantling, cutting, re-welding, supporting and restoring to correct position of all the temporarily dismantled members, realignment of adjacent connected members (weight of such temporarily dismantled and adjacent members not payable) etc all complete for the following:		
a	In erected position	MT	10
b	In fabrication yard	MT	10
2315	Re-erection of dismantled fabricated structural steel members including carriage of modified "Erection Marks" from the field fabrication shop to erection site, lifting to required posiion, aligning in position, tack welding, final welding and touch up painting including temporary dismantling and re-erection of temporarily dismantled members, cutting, rewelding, supporting and restoring to the correct position of all temporarily dismnatled members, re-alignment of adjacent connected members(weight of such temporarily dismantled members and adjacent members not payable), scafolding, staging, tools & tackles, gas cutting, welding, consumables etc all complete.	MT	13
2318	Providing and fixing in position PTFE type sliding bearings of reputed manufacturer, individual bearing suitable for required vertical loads as per the construction drawings and for maximum displacement of ±50 mm including all taxes, duties, transportation, installation, drilling, bolting, erecting, aligning etc all complete for following vertical loads.		
a	20 Tons	EACH	2
b	25 Tons	EACH	2
c	40 Tons	EACH	2
d	50 Tons	EACH	2
e	60 Tons	EACH	2
2320	Supply, fabrication and fixing of stainless steel pipe hand railing conforming to SS 409 of 32 mm/40 mm dia including transportation, loading/unloading etc. all complete.	MT	2
A2322	Supply, fabrication and fixing of galvanised MS pipe hand railing (1000 mm high) of 32mm/40mm/50mm dia (Medium Class) including transportation, loading/unloading, painting etc. all complete.	MT	32

2323	Conducting radiography test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	30
2324	Conducting ultrasonic test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	30
2325	Conducting ultrasonic test on steel plates as per ASTM-A435 or equivalent wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	SQM	15
2326	Conducting magnetic particle test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	30
2327	Conducting dye penetration test on welds wherever specified by the engineer including provision of necessary equipments, measuring devices, gauges etc. all complete (over and above the work already specified in the specifications.)	RM	30
2328	Supply, fixing lightning arrester and air terminal over roof of power house building, pump house and other structures including all materials, labour, electrodes etc complete (all materials to be supplied by the contractor).	EACH	2
2334	Providing and fixing 20mm square MS bar balustrade with suitable MS flat and teakwood handrails etc all complete.	RM	40

Note:

1. The above detailed Bill of Quantity is furnished for reference. The weights mentioned above are approximate and liable to vary as per design consideration. There will be change in PG, weight, description etc. However, payments will be made to the contractor for the tonnage actually erected at the respective category as per the quoted / accepted rate. Quantity Variation will be dealt as per clause 2.14 of General Conditions of Contract (Volume IC).

2. Besides PG / PGMA indicated in the weight schedule, there is likelihood of addition of product groups integral to FGD system. The quoted rate shall be applicable for such product groups also.

3. There may be variation or addition of PGMAs, description, weights etc., and any additional scope of work supplied under the above package shall be erected by the contractor and payment will be made as per the quoted / accepted rate in the respective category. Identifying the category shall be on discretion of BHEL Engineer.

4. Payment for additional CONTROL VALVES / STEAM TRAPS/ FLOW NOZZLES / ORIFICES & OTHER VALVES AND FITTINGS (except temporary system valves) will be made as per the quoted / accepted tonnage rate of respective piping category in which these material is installed. i.e. CS & SS piping.

5. Imported electrodes / TIG welding wires released by manufacturing Units will be supplied by BHEL. All other electrodes / TIG welding wires are to be supplied by contractor under his scope.

10.1 GENERAL

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

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

10.1.3 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc. for any temporary supporting or scaffolding works or as bed for pre-assembly works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

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

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

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

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

10.1.8 No temporary supports shall be welded on the pressure parts of piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alternation of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer.

10.1.9 Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies / personnel on ISO 9001 – 2008 Standards.

10.1.10 Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer for other agencies, like piping, Turbine, Generator erection, Cabling, instrumentation, insulation etc., to commence their work from / on the equipments coming under this scope. Sometimes, more than one agencies may have to work in same location. Sometimes it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the overall project schedule.

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

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

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

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

10.1.15 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

10.1.16 Upon completion of daily work , the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

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

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

10.1.19 The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the Contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

10.1.20 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Contractor and his personnel shall cooperate with personnel of BHEL, BHEL'S Customer, Customer's consultants and other Contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

10.1.21 Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

10.1.22 The work shall confirm to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to Contractor's fault, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by BHEL and recoveries will be effected from the Contractor's bills towards expenditure incurred including cost of materials and departmental overheads of BHEL as per GCC.

10.1.23 The Contractor shall perform any services, tests etc, which may not be specified but nevertheless, required for the completion of work within quoted rates.

10.1.24 All necessary certificates and licenses required for carrying out this work are to be arranged by the Contractor expeditiously.

10.1.25 The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

10.1.26 BHEL reserves right to recover from the Contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes due to Contractor's lapse during any stage of work. Any loss to BHEL due to Contractor's lapse shall have to be made good by the Contractor as per GCC.

10.1.27 All cranes, transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.

10.1.28 During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc may become necessary on account of feed back / revision of drawing etc. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the Contractor for such reworks. Claim of Contractor if any, for such works will be governed by relevant clauses of 'General Conditions of Contract'.

10.1.29 All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of structures, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the Contractor as part of the work within the quoted rates.

10.1.30 The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel for such usage.

10.1.31 The Contractor shall take delivery of the components, equipments, chemicals, and lubricants etc from the BHEL stores/ storage area after getting the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

10.1.32 The distance between storage area and erection site is approx **3 KM**. Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the Contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by Contractor most expeditiously as incidental to work.

10.1.33 Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc. The details of equipments to be erected under this contract are generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the Contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.

10.1.34 Hangers & suspensions, supports etc for tubes, piping, & ducts etc will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

10.1.35 Spring suspension / constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done as part of work. This exercise may have to be repeated till satisfactory results are achieved.

10.1.36 Layout of field routed/ small bore piping 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 pipe lines even after completion of erection.

10.1.37 Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc are received in assembled condition as integral part of equipments. Contractor shall dismount such instruments for calibration and hand over the same to BHEL. C & I erection agency will do storage / re-erection calibration etc.

10.1.38 Fixing and seal welding of thermowells & plugs before Hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermowells after hydro test/steam blowing of lines as part of work.

10.1.39 Actuators/drives of valves, 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.

10.1.40 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. BHEL will provide the motorized insulation testers.

10.1.41 In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free -returnable basis which shall be returned to BHEL after the use.

10.1.42 The work shall be carried out strictly in accordance to the "Field Quality Plan" approved by BHEL/client. Contractor, jointly with BHEL, shall prepare all necessary records of measurements/readings/ protocols etc.

10.1.43 Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

10.1.44 Contractor shall regulate flow of material to and from site in such a manner and sequence that material accumulation at site does not lead to congestion at site. In case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.

10.1.45 It may so happen that certain components like manhole doors, hanger etc may be supplied in loose items. They need to be assembled as per relevent drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

10.1.46 The Contractor shall have total responsibility for all equipment and materials in his custody at Contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

10.1.47 BHEL is operating web based computerized E-store system that includes, inter-alia, issue of materials, daily progress reporting, Contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work.

10.1.48 In the event the computerized E-store/SOMS is inoperative for any reasons, the Contractor shall take delivery of materials from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. All these records however shall be

updated in the E-store/SOMS as and when the E-store/SOMS is reactivated/ normalized.

10.1.49 Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost. For T-91 material site weld joints argon as per grade-3 of is 5760: 1998 with oxygen and water vapour restricted to max 6 ppm each and with argon purity level of minimum 99.99% shall be arranged and used by the Contractor. The supply should accompany test certificate for the batch indicating individual element 'ppm' level and overall purity level.

10.1.50 Nitrogen gas, if required, for preservation of boiler and nitrogen capping during chemical cleaning process, will be provided by BHEL free of charge. Contractor shall arrange necessary connector, nipple, regulator, header and piping for usage of such gas from cylinders.

10.1.51 All lubricants and chemicals required for testing, preservation, chemical cleaning / acid cleaning, oil flushing, and the lubricants for trial runs of the equipments and trial operation of the unit will be supplied by BHEL free of charges.

10.1.52 **Adequate water less urinals (at least 4 nos. per level) shall be arranged by the contractor within quoted rates, at site of construction at different locations**

10.1.53 UTILITY POINTS

10.4.24.1 Number of utility points (Service / plant air, service / plant water, service / washing steam, inert gas (N2) etc., shall be indicated in the P & I diagram. Contractor to locate the utility points as advised by site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout with 'BILL OF MATERIAL' to BHEL for approval.

10.4.24.2 The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe.

10.1.54 DOCUMENTATION

10.4.25.1 Contractor shall be supplied with two extra copies of the layout & isometrics drawings. Contractor to incorporate in one of the copy with Red ink all the changes / deviations / alterations etc. carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

10.4.25.2 After successful completion, testing and commissioning of installation work, as built drawings / documents if any, in line with the actual work carried out as per site routing drawing shall be submitted by the contractor as agreed for the project.

10.4.25.3 The contractor shall maintain a record in the form as prescribed by BHEL for all operations carried out on each weld and maintain a record indicating the number of welds, the name of welders who welded the same, date and time of start and

completion, preheat temperature, radiographic results, rejections if any, percentage of rejection, etc. and submit copies of the same to the BHEL Engineer as required.

10.1.55 SITE INSPECTION

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

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

10.1.56 PLATFORMS, CROSSOVERS & CANOPIES

Platforms, ladders, crossovers and canopies shall also be provided at places where it has not been shown in drawings but if felt necessary by site engineer. Canopies shall be provided for all outdoor pumps and motors. Platforms, ladders, crossovers and canopies shall have to be fabricated from raw materials supplied by BHEL and erected by contractor as per instruction of BHEL and shall be paid as per accepted tonnage rate for “structures” i.e, Rate schedule Id. 1A

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

11.1 Refer forms F -14 to F-18 of volume I D (Forms & Procedure) of volume - I Book-II. Plan and review will be done as per the formats.

11.2 The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan the slippages do not accumulate and affect the overall programme.

11.3 It is the responsibility of the contractor to provide all relevant information on a regular basis regarding progress of work, labour availability, equipment deployment, testing, etc.

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

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

11.6 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer. The periodicity of the reports will be decided by BHEL Engineer at site.

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

11.8 The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard.

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

11.10 The monthly report as a booklet shall be submitted at the end of every month and shall contain the following details :-

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

12	**CIVIL WORKS, FOUNDATION, GROUTING**
12.1	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.
12.2	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.
12.3	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.
12.4	**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.
12.5	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.

13.0	**ERECTION**
13.1	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,
13.1.1	Scaffolding and rigging operations,
13.1.2	Machine / flame / electric cutting, grinding, welding, radiography and stress relieving
13.1.3	Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, as cleaning, checking, levelling, blue matching, aligning and assembly.
13.1.4	Machining, surface grinding, drilling, doweling, shaping
13.1.5	Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication.
13.1.6	Insulation and painting
13.2	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.
13.3	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.
13.4	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.
13.5	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.
13.6	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.
13.7	**Below mentioned erection sequence is indicative only and give the general idea to the contractor for absorber erection. :** **Absorber is rectangular type with elevation of 41m.** **L= 9.9 m, W= 20.4 m, H= 41 m** **Max size of plate is 3m X 12m and 9 mm thick (incl. cladding of 2 mm thick).**

	However above dimensions may vary during engineering finalization.
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.	4^{th} stage casing panel installation
12.	Scaffolding and Structure up to 35.4 Mtr. and spary pipe installation
13.	5^{th} stage casing panel installation
14.	Scaffolding and Structure up to 39 Mtr.
15.	6^{th} stage casing panel installation
16.	Scaffolding and Structure up to 43 Mtr.
17.	7^{th} 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
13.8	**Casing Panel Installation**
13.8.1	Splices of bottom plates at which casing panel are located shall be cleaned.
13.8.2	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
13.8.3	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.
13.8.4	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.
13.8.5	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.
13.8.6	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.
13.8.7	Spacers used for root gap of welds shall be removed.
13.8.8	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.
13.9	**Spray Pipe Installation**
13.9.1	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.
13.9.2	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.
13.10	**Spray Nozzle**
13.10.1	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.
13.11	**Mist Eliminator Installation**

13.11.1	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.
13.12	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.
13.13	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.
13.14	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.
13.15	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.
13.16	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.
13.17	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.
13.18	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.
13.19	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.
13.20	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.
13.21	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
13.22	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.
13.23	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.
13.24	Whenever required the contractor shall arrange for pre-qualification of process task performers.
13.25	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.
13.26	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.
13.27	Instrument tapping coming on the FGD and associated equipment's to be welded/fitted by the contractor with in the quoted price
13.28	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.
13.29	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.
13.30	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.
13.31	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.
13.32	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.
13.33	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.
13.34	The contractor at no extra cost to BHEL shall carry out servicing and realignment of skid mounted equipment.
13.35	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.
13.36	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.
13.37	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.
13.38	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
13.39	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.
13.40	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.
13.41	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.
13.42	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.
13.43	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.
13.44	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.
13.45	Suspension for piping, etc., will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.
13.46	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.
13.47	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.
13.48	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.
13.49	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.
13.50	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.
13.51	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.
13.52	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.
13.53	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.
13.54	The contractor shall prepare as built piping drawing & submit to BHEL Engineer for approval & verification of material used.
13.55	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.
13.56	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.
13.57	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.
13.58	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.
13.59	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.
13.60	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.
13.61	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.

13.62 ERECTION - FIRE PROTECTION PIPING & EQUIPMENTS OF FIRE PROTECTION PUMP HOUSE

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

13.62.1 GALVANISED STEEL PIPING

13.62.1.1 Galvanized pipe shall be joined by screwing in to socket and screwed ends of GI pipes shall be thoroughly cleaned and painted with a mixture of red and white lead before joining. The exposed threaded portion on either side of the socket joint shall be applied with Zinc Silicate Paste. All these consumables are in the scope of contractor and shall carry out within the quoted rate.

13.62.1.2 GI pipe with flanged joints shall have screwed flanges. Flanged joints faces shall be painted with red lead and bolting up evenly on all sides with compressed asbestos gaskets in between two flanges.

13.62.1.3 Teflon tapes shall be used to seal out screwed joints and shall be applied to the male threads only. Threaded parts shall be wiped clean of oil or grease with appropriate solvent if necessary and allowing proper time for drying before applying the sealant. Pipe ends shall be attached by screwing the pipe through the flange and pipe and flange shall be refaced accurately. Required Teflon tapes are to be arranged by the contractor at his cost.

13.62.1.4 Required threading should be done by the contractor at site as specified in the drawing. The pipes shall be cut only by Hacksaw / Machining. Required Teflon tapes are to be arranged by the contractor within the quoted rate.

13.62.1.5 ALL THE SCREWED JOINTS ARE TO BE SEAL WELDED IF REQUIRED BY CUSTOMER, SUITABLE ELECTRODES FOR FULL SEAL WELDING ARE TO BE ARRANGED BY THE CONTRACTOR AT HIS COST.

13.62.2 BURIED PIPING

13.62.2.1 The pipe in general shall be laid with the top of the pipe minimum 2.0 / 1.5 metre below finished general ground level or as specified in the drawing. Anti-corrosive treatment for all buried pipes as specified in the drawings including supply & application of anti-corrosive treatment, required consumables are in the scope of contractor and shall carry out as per drawing within the quoted rate.

13.62.2.2 Buried GI pipes shall not have flanged joints. All the joints shall be screwed with socket. Screwed ends of GI pipes shall be thoroughly cleaned and painted with a mixture of red and white lead before joining. Threaded portion on either side of the socket joint shall be applied with Zinc Silicate Paste. All these consumables are in the scope of contractor and shall carry out within the quoted rate.

13.62.2.3 The civil works like excavation, compaction, sand filling & etc. for the buried piping identified in this contract are excluded in the scope of work.

13.62.2.4 Prior to lowering and laying pipe in any trench, the contractor shall ensure for the backfill and compaction the bottom of the trench or excavation in accordance with IS 5822 / as per drawing to provide an acceptable bed for placing the pipe.

13.62.2.5 Dewatering of excavated area for pipe laying, welding, wrapping coating etc is in the scope of the BHEL.

13.62.2.6 Preparation of pipe surface as per customer consultant's specification by sand / shot / grit blasting for wrapping and coating is included in the scope of this tender. All fittings like elbows, tees, reducers, flanges, inserts etc., valves flow nozzles, etc shall be matched with pipes for welding which may require re-edge preparation, grinding etc., if found necessary.

13.62.2.7 Erection of platform and supporting structures around the equipment / valves / filters / in the Fire protection system area, etc. Is covered in the scope of contract and shall be erected by the contractor as per accepted tonnage rate for other structural work

13.62.2.8 All dimensions / elevations refers to centerline of pipe unless otherwise specified, the pipe routing shall be carried out as per the drawing. Wherever the dimensions are not specified / shown as approximate the same may be routed as per site requirement / convenience as per site engineer's advice.

13.62.2.9 Contractor should fabricate bends of </=2" diameter size from running meters of pipe.

13.62.2.10 Contractor shall arrange all the equipments, alignment bolts, tools, consumables like welding electrodes (all type), TIG wires (Other than the supplied TIG wires from BHEL if any) and argon gas cylinders etc., for welding of pipes at his cost. Consumables like jute, cotton waste, hacksaw blades, petrol, Kerosene oil etc. are in contractor's scope.

13.62.3 TARIFF ADIVSORY COMMITTEE APPROVAL FOR FIRE PROTECTION SYSTEM

BHEL 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. Also responsible for getting any necessary approval from statutory and regulatory body of TAC if any needed. All the reports from concerned statutory departments obtaining is the responsible by contractor. All these activities should be carried with in the quoted rates.

SCOPE OF SERVICES

25.1 Receipt of materials (2 sets of DG Set) from BHEL's/Customer's Store/storage yards; handling at BHEL's/Customer's Store / storage yards / site of works; Transportation between BHEL's/Customer's Store / storage yards and site of works.

25.2 Preparation of foundations (chipping/ levelling of concrete) ; fabrication of packer plates from raw materials, cutting of required shims, drilling, tapping, grinding, cleaning, blue matching, pre-assembly/trial assembly, dismantling of certain items/equipment/components for checking & cleaning, blue matching, erection, leveling and alignment of loose components of 3 sets of the DG Sets; grouting of

foundation bolts, Sole / Base plates, etc. with non-shrink grout materials Conbextra GP-2; testing; trial run, commissioning and handing over to customer.

25.3 Arrangement of T&P, special tools and tackles for handling, complete planning, monitoring of work, site supervision, testing and trial run of the DG Sets (3 sets). Total estimated Static Weight of the one set of DG and Acoustic Set is 11.5 MT(approx.) and 7 MT (approx.) respectively. Dynamic weight is 1.5 times the static weight.

25.4 Any scaffolding, temporary platforms, ladders etc. that may be required for the purpose of the DG Sets erection shall be arranged by the vendor for the execution of work. All miscellaneous steel, if required, necessary for the DG Sets erection and commissioning are to be arranged by the Contractor / bidder.

25.5 Arranging of Tools; calibrated MME [(Measuring and Monitoring Equipment) traceability to National and International standards] like High Precision Spirit Level, Vernier Calipers, Filler Gages, inside/outside Micrometers, Dial gauges, Measuring Tapes, Surface plate, etc. etc. required for the DG Sets erection & alignment; required capacity of slings & D-shackles; Trailer with prime mover; loading, unloading, shifting of materials shall be in the scope of the Contractor / bidder

25.6 For grouting of the DG Sets foundation bolts and Base / Sole plates etc. (as required for completion of erection of DG Sets) with fresh non-shrink (free flow) grout materials Conbextra GP-2 cement including form work & shuttering materials is to be arranged by the Contractor / bidder at his cost. Batch certificate of Conbextra GP-2 cement should be submitted well in advance for verification and acceptance of the same for use.

25.7 All electrical equipment have to be tested for IR & PI values prior to the trial run. If required, dry out of electrical equipment may have to be carried out by using external heating source (Halogen lamps) using own manpower and other resources. No separate payment is envisaged for the same.

25.8 The contractor/ bidder shall have total responsibility for all equipment and materials in his custody at contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from the action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL's Engineers instructions. The machined/finished surfaces should be greased and covered.

25.9 Required manpower assistances are to be provided during the course of commissioning with required hand tools.

25.10 Arranging of required sizes of Allen Keys and Ring spanners / D-spanners spanners required for erection of the DG Sets are to be arranged by bidder. Torque wrenches of required capacity, if/ as required, are also to be arranged by the bidders.

The list of consumables, T&P, MME etc. etc. mentioned in various clauses are not intended to be exhaustive. Contractor / bidder shall arrange at his cost all approved consumables, Conbextra GP-2 cement, T&P, MME etc. required though not listed specifically.

25.11 All welders shall be tested and approved by BHEL / Customer engineers before actually they are engaged on work.

25.12 Welding of necessary instrumentations to be provided for the DG Sets are covered within the scope of this specification.

The contractor/bidder shall at his cost perform any services, test etc. although not specified but nevertheless required for the completion of work. Access to site for inspection by BHEL/Customer engineers shall be made available by contractor all times.

WELDING, HEAT TREATMENT, RADIOGRAPHY AND NDT (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified)

14.1 All welders shall be tested and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification 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.

14.2 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.

14.3 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The Engineer, prior to any repair being 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.

14.4 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.

14.5 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.

14.6 Only BHEL/ CUSTOMER approved electrodes and filler wire are to be arranged and used by the contractor, within the finally quoted price. BHEL/ CUSTOMER 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.

14.7 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.

14.8 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.

14.9 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.

14.10 Pre-heating, radiography, UT 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.

14.11 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.

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

14.13 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).

14.14 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

14.15 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.

14.16 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.

14.17 Lead intensifying screens for front and back of the film should be used as per the above referred ASME specification.

14.18 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.

14.19 For multiple exposures on pipes, an overlap of about 25-mm of film should be provided.

14.20 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.

14.21 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.

14.22 The contractor shall have a dark room fully equipped with radiography equipment, film (un-exposed), chemicals and any other dark room accessories.

14.23 Radiography inspection of welds shall be performed in accordance with requirement and recommendation of BHEL Engineer. The quantum of radiographic inspection shall be as per provision of ASME /BHEL/NTPC/UPRVUNL approved documents. 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.

14.24 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. 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.

14.25 The percentage of Radiography are tentative, which may be increased depending upon the quality of joints at the discretion of BHEL.

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

14.27 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.

14.28 Wherever radiographs are not accepted, on account of bad shot, joints shall be reradiographed and re- submitted for evaluation.

14.29 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.

14.30 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.

14.31 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.

14.32 Check slots as per requirement BHEL/ Customer will be taken at contractor's cost.

15 **APPLICATION OF INSULATION** (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified)

15.1 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 the scope of work.

15.2 The contractor has to supply and apply heat resistant primer on welded portions before application of insulation.

15.3 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.

15.4 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.

15.5 Contractor should ensure, proper finishing surface of the insulation, sheeting and cementing.

15.6 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.

15.7 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 contractor.

15.8 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 any material for such purpose is received from BHEL Manufacturing Units then the same shall be issued free of cost to Contractor.

15.9 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 contractor's responsibility.

Any cutting/ bending/ welding of fabricated skin casing sheets if required will also covered within the scope of this contract.

15.10 A log book 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.

15.11 Contractor is liable for the exact accounting of the material issued to him and he shall make any unaccountable losses good. Allowed Wastage for the material issued are as below:

1. Wool/ LRB mattresses and cladding sheets 2%
2. Insulation bricks and mortar 2%
3. Castable Refactory 1%

15.12 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.

15.13 The contractor shall leave certain gaps and openings 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 the drawings at a later date by the contractor at his cost.

15.14 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, 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.

15.15 Removal type insulation shall be provided for valves, fittings, expansion joints, etc as per the drawing or as directed by BHEL Engineer.

15.16 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.

15.17 Insulation of expansion joints, dampers, etc. shall be carried out after NDT/air tightness test is completed.

15.18 Day to day cleaning of insulation debris and scraps to be ensured by the contractor. Excessive wastage will attract cost recovery.

PAINTING INCLUDING FINISH PAINTING & STENCILING (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

16.1 The scope of work shall also include supply and application of final painting of all the erected equipment's as required and specified as per painting schedules. Before commencement of Final Painting, the contractor has to obtain written clearance from BHEL/Customer for effective completion of surface preparation.

16.2 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.

16.3 Required paints, thinner, and other consumables such as wire brush, brush etc. shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc. shall be provided by the contractor with in the quoted rate. The arrangement of primer/paint for final painting will be in contractor's scope.

16.4 After applying the primer paints all structure/ equipment/ items, shall be finish painted with two coats of alloyed resin machinery enamel paints 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. Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL / Customer. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.

16.5 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.

16.6 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/Customer approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. 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

16.7 Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc. has been carried out by the bidder. Clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper. (Painting procedure to be followed also for touch-up painting on damaged areas).

16.8 Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and the DFT of finish paint shall not be less than the specified. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.

16.9 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.

16.10 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.

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

16.12 The contractor shall ensure availability of

- Ford Cup-4 to measure consistency of paint,
- Automatic magnetic gauge/Elcometer to measure the dry film thickness and
- SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.

16.13 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.

16.14 Please Refer Annexure 1 (Painting Schedule) also.

TESTING, PRE-COMMISSIONING & COMMISSIONING AND POST COMMISSIONING (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified)

17.1 Contactor shall carry out all the required tests and pre-commissioning and commissioning activities required for their successful and reliable operation of FGD system. These would include Air/ Gas tightness test of ducts, Hydraulic test of piping, Water fill test/ vacuum box test of tanks, trial run of pumps/ blowers/ ball mills/ feeders/ vacuum belt filter/ hydro cyclones, etc. as instructed by BHEL using contractors own consumables, labour and scaffoldings etc. Specific omission of any test which is required for the successfully commissioning all the equipment's covered under scope does not absolve the contractor of its responsibilities of performing of that test.

17.2 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. HT and LT electrical testing of motors and megger/IR value checking is also part of scope. These tests/ activities may not have been listed in these specifications.

17.3 The 'initial operation'/ trial operation of the complete facility as an integral Unit shall be conducted for 720 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 72hours. 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.

17.4 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 of work)

17.5 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 sitewelded joints arising out of the failure during testing.

17.6 Scope of pre-commissioning activities cover installation of all necessary equipment including temporary piping, supports, valves, blanking, with accessories with access platforms valves, pressure gauges, electrical cables, switches, cutting of some existing valve, or for any other tests as the case may be and will carry out above activities under this scope of work as per instruction of BHEL Engineer. The scope also covers the offsite disposal of effluents of the tests under the scope of this contract as per instruction of BHEL Engineer.

17.7 All items / material required for conducting hydraulic test, alkali boil out, acid cleaning/EDTA cleaning steam blowing, pre commissioning test and commissioning etc.,

will be supplied by BHEL / its customer. However, installation, servicing, dismantling after commissioning and returning of the same to stores is the responsibility of the contractor who is erecting the equipment. The contractor may note that no separate payment shall be released for any temporary works that are to be carried out for conducting precommissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be as under: • Erection etc. of blowers and blanks and putty, temporary fixtures & ducts required for conducting air leak test are to be installed. (Putty to be procured by the contractor). • Dismantling of the temporary equipment etc. and return the same to the BHEL stores is also included in the scope of work. The above is only a broad breakup of the temporary works. The engineer at site will make final break up. His decision will be final and binding by all the parties.

17.8 Contractor shall lay all necessary electric cables and switches etc. required for the air leak test, other tests etc., and maintain the system till the tests are completed satisfactorily.

17.9 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. Contractor will provide necessary consumables, Certified 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.

17.10 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.

17.11 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.

17.12 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.

17.13 The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydrostatic testing on all piping equipment covered in the specification at no extra cost.

17.14 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.

17.15 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.

17.16 All temporary supports shall be removed in such ways that pipe supports are not subjected to any sudden load. During hydraulic testing of the 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.

17.17 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.

17.18 Necessary technical support during commissioning of the equipments shall be provided by BHEL.

17.19 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.

17.20 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 for 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 offsite disposal of effluents.

17.21 Any temporary fasteners, gaskets etc, if required to be provided for commissioning of the system, are under the scope of this contract within the quoted rates.

17.22 It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.

17.23 The contractor shall make all necessary arrangements including making of temporary closures on piping/ equipment for carrying out the hydrostatic testing on all piping equipment covered in the specification a no additional cost. The contractor shall carryout the required test on the pipelines such as Hydraulic test of various piping system,

Ultrasonic Test for weld defects and finding thickness, Dye Penetration test, Magnetic particles test for weld defects and material defects etc. All facilities (manpower, materials, equipment, consumables etc) including proper approaches wherever required for these tests shall be arranged by the contractor along with qualified technician within finally accepted rates.

17.24 In certain places blanking has to be resorted prior to Hydraulic test and spool pieces have to be erected in place of control valve, 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.

17.25 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.

17.26 Valves will have to be checked, cleaned or overhauled in full or in part before erection, alkali flushing, steam blowing and during commissioning as may be necessary.

17.27 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.

17.28 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.

17.29 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 s 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.

17.30 Contractor to provide necessary commissioning assistance from pre-commissioning state onwards and up to continuous operation of the Unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various precommissioning and commissioning programs made to achieve the schedule agreed with customer.

17.31 After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance for a period of six months after synchronization or till handing over of sets to customer, whichever is earlier.

17.32 Commissioning of the FGD & Aux will involve trial runs of all the equipments erected. Contractor shall provide required workers along with supervisors with all the requisite

tools round the clock and material for all these works, which shall form part of the work to be done.

17.33 During commissioning any improvement or rectification due to design requirement is involved and if the contractor is asked to carry out the job, they shall be paid at man-day rates as per GCC clause no. 2.15. For this purpose, daily labour report indicating therein nature of work carried out, consumables used, etc. shall be maintained by contractor, and got signed by BHEL Engineer every day. It is not obligatory on the part of BHEL to get the works done by the contractor. They can employ any other agency if they so desire at that time.

17.34 During commissioning changing of gaskets, tightening of bolts, realigning of rotating and other equipment, attending to leakage and minor adjustments erected equipment may arise. The quoted rate of the contractor shall be inclusive of all such works.

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

17.36 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 the 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 free of cost. The empty containers of the lubricating oils should be returned to BHEL stores/ place indicated by BHEL from time to time.

17.37 The contractor has to provide required man power assistance during pre-commissioning and commissioning checks of motor operated valves, actuators, control valves etc. without any extra charges.

17.38 The instruction of motor manufacturer regarding storage of the motors and re conservation must be strictly followed without any deviation.

17.39 Attending punch points post commissioning and resolve the deficiency for handing over the Unit to customer.

17.40 All oils and greases to be filled in the main equipment's as first fill and subsequent topping up's will be furnished by BHEL. All services including labor and T&P will be provided by the contractor for transporting from BHEL/ customer stores handling, filling, emptying, refilling etc. The consumption of lubricants/chemicals shall be properly accounted for. Surplus material if any shall be properly stacked/tagged and returned to BHEL/Customer stores at no extra cost to BHEL. BHEL reserves the right to recover costs for wastage by the contractor.

17.41 For conducting gas tightness test, it may be required to erect the blowers and connecting ducts and commission the same for tightness test. It is the responsibility of the contractor to erect the blowers & dismantle once the test is over. Contractor shall

carry out the work within the quoted rate and BHEL will provide required temporary pipes / ducts, blowers and dummies free of cost for conducting the test.

17.42 The commissioning activities and trial operations will continue till handing over of the unit. It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers as per the work requirement along with supervisors including necessary consumable tools etc., during this period. The rate quoted shall indicate all these contingencies also. The various categories of workers required for precommissioning, commissioning and post-commissioning activities are as follows:

a) Fitters
b) Structural welders
c) Riggers
d) Unskilled workers
e) Supervisors
f) Electricians
g) Laggers
h) Sheet metal fabricator/fitter
i) Any other category of workers as may be required.

Further in addition to the above, contractor has to arrange the following minimum manpower exclusively for assisting BHEL commissioning engineers during stabilization and trial operation period. This manpower will be directly controlled by BHEL commissioning engineers.

1. One Supervisor in charge per shift for three shifts.
2. Two Fitters per shift for three shifts.
3. Four Helpers per shift for three shifts.
4. One Electrician per shift for three shifts.

17.43 The completion criteria shall be that as given in the commissioning procedure, and shall be done up to the satisfaction of BHEL Engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XVIII WEIGHTAGES & FACTORS PERTAINING TO SCHEDULE OF QUANTITIES

This Chapter consists of Part A & Part B of Volume II "Price bid":

CONTENTS	
Description	Remarks
Part A: Instructions to the Bidders	Instructions
PART B: % weightage for amount of individual items of Schedule of quantity	Refer Latest Chapter-XVIII of Vol-IA TCC (WEIGHTAGES & FACTORS PERTAINING TO SCHEDULE OF QUANTITIES).
PART C: Total Lump Sum Price for entire scope of Work	This part is implemented in the E-Procurement portal entitled as "Part-C of Vol-II Price Bid".

Part A: Instructions to the Bidders

1. **Bidders shall quote Total Lump-sum Price for the entire scope of work at the place implanted in the E-Procurement Portal titled as "Part-C of Vol-II Price Bid".** Price mentioned elsewhere in the offer of the bidder shall be treated as Null and Void.

2. BHEL has fixed the % weightages as in "Part-B" for the amount of individual items of Schedule of Quantity w.r.t. the total price of Price Bid Vol-II.

3. Based on the pre-fixed % weightages, amount of individual items shall be derived by BHEL. This amount shall not be rounded off.

4. Based on the quantities of individual item and the amount arrived in Sl No 3 above, item rate of individual items shall be derived by BHEL. This item rate shall be rounded off up to two decimal places and shall be used to calculate the total amount of an item.

5. For the convenience of bidders, BHEL has issued an excel sheet with all requisite formulae as detailed above. ***However this excel sheet shall not form part of contract document. Further, this sheet should not be uploaded at the e-Portal.***

6. Bidders to note that this is an '**Item rate contract'**. Payment shall be made for the actual quantities of work executed at the Unit rate arrived at as per serial no 4 above.

PART B: % weightage for amount of individual items of Schedule of quantity w.r.t. the total price (as quoted by the bidder in "Part C of Vol-II-Price Bid")

Note: This Chapter-XVIII is uploaded as file titled **'Chapter XVIII Weightages & Factor pertaining to Schedule of Quantities'**