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

Sl No	E-Tender Specification Number
1	**BHE/PW/PUR/RGFGD-MECH-DUCT/2798**

PACKAGE: Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of **Flue Gas Desulphurization System (FGD)** Erection and Commissioning of Ducting Works from **Unit 4, 5 & 6** including tapping for Bypass Dampers up to Booster Fan inlet Gate, **Erection of Common Systems** incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets

AT

3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana"

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-2798**)
NIL	Notice Inviting Tender	(Part of **Vol-IA-2798**)
I-A	Technical Conditions of Contract	Vol-I-A-2798
I-B	Special Conditions of Contract	Vol-I-BCD-2798
I-C	General Conditions of Contract	(Part of Vol-I-BCD-2798)
I-D	Forms & Procedures	(Part of Vol-I-BCD-2798)
I-E	Technical Specifications and Plot Plan	Vol-IE-2798
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-2798

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

Sl No	E-Tender Specification Number
1	**BHE/PW/PUR/RGFGD-MECH-DUCT/2798**

PACKAGE: Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of **Flue Gas Desulphurization System (FGD)** Erection and Commissioning of Ducting Works from **Unit 4, 5 & 6** including tapping for Bypass Dampers up to Booster Fan inlet Gate, **Erection of Common Systems** incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets

AT

3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana"

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

GM (Purchase)
Place: Nagpur
Date:

2798

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

E-Tender Spec No: BHE/PW/PUR/RGFGD-MECH-DUCT/2798 Date: 07/06/2023

NOTICE INVITING E-TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD/ UPLOAD THE TENDER/ OFFER FROM/ON BHEL E-PROCUREMENT PORTAL → https://eprocurebhel.co.in

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To,

Dear Sir/Madam,

Sub : NOTICE INVITING E-TENDER

Sealed offers in two part bid system (National competitive bidding (NCB) ~~or International Competitive Bidding (ICB~~ are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 Salient Features of NIT

S No.	ISSUE	DESCRIPTION	
i	**E-TENDER NUMBER**	**BHE/PW/PUR/RGFGD-MECH-DUCT/2798**	
ii	**Broad Scope of job**	**Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of Flue Gas Desulphurization System (FGD) Erection and Commissioning of Ducting Works from Unit 4, 5 & 6 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets AT 3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana"**	
iii	**DETAILS OF TENDER DOCUMENT**		
A	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
B	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
C	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
D	Volume-ID	*Forms and Procedures*	*Applicable*
E	Volume-IE	*Technical Specifications*	*Applicable*
F	Volume-II	*Price Bid as specified in E-Procurement Portal*	*Applicable*
iv	**Issue of Tender Documents**	**Tender documents will be available for downloading from BHEL website (www.bhel.com) or e-procurement portal (https://eprocurebhel.co.in) as per schedule below:** ***Start :07/06/2023 , Time :18:00***	*Applicable*

S No.	ISSUE	DESCRIPTION	
		Closes : 17/06/2023 , Time : 13:00 Brief information of the tenders shall also be available at central public procurement portal. (***https://eprocure.gov.in/epublish/app***)	
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date: 17/06/2023, Time: 13.00 Hrs*** • ***Place: on E-Tender Portal*** **https://eprocurebhel.co.in**	*Applicable*
vi	**OPENING OF TENDER (Techno-Commercial Bid)**	***Date: 17/06/2023, Time: 17.00 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) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.*	*Applicable*
vii	**EMD AMOUNT**	***Waived*** ***BID Security Declaration to be Furnished (Annexure-13)*** ***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**	*Free*	
ix	**LAST DATE FOR SEEKING CLARIFICATION**	One day before due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: Viveka Nand Jha/ Tapish Kumar Designation: Manager Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-9429198214/ 9010903666 **Email :vivekjha@bhel.in/ tapishkhandelwal@bhel.in** 2) Mr. Kamlesh Kumar Designation: DGM Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Email: kamleshbhel@bhel.in Mob: 9425554615 3) Name: R. M. Malhotra Designation: GM Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		Not Applicable

S No.	ISSUE	DESCRIPTION	
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*1) Shri Otem Dai, IAS (Retd.)* *2) Shri Bishwamitra Pandey, IRAS (Retd.)* *3) Shri Mukesh Mittal, IRS (Retd.)*	Applicable
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com-->Tender Notifications →View Corrigendum), Central Public Procurement portal (https://eprocure.gov.in/epublish/app) & on e-tender portal https://eprocurebhel.co.in **and not in the newspapers**. Bidders to keep themselves updated with all such information.	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed digitally using Class III DSC & uploaded in E-Procurement Portal, 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 Not Used

4.0 Unless specifically stated otherwise, bidder shall deposit EMD as per clause 1.9 of General Conditions of Contract.

For Electronic Fund Transfer the details are as below-:

NAME OF THE BENEFICIARY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	5th Floor, SHREE MOHINI COMPLEX 345, KINGSWAY,NAGPUR
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH AND BRANCH CODE	SBI,NAGPUR MAIN BRANCH ,CODE-00432
CITY	NAGPUR
ACCOUNT NUMBER	40227423158
ACCOUNT TYPE	MC-C C Clean (C&I)
IFSC CODE OF THE BENEFICIARY BANK BRANCH	SBIN0000432
MICR CODE OF THE BANK BRANCH	440002002

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, 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**:

This is an E-tender floated online through our E-Procurement Site **(https://eprocurebhel.co.in)**. The bidder should respond by submitting their offer online only in our e-Procurement platform at **(https://eprocurebhel.co.in).** Offers are invited in two-parts only.

Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

- ~~**i.**~~ Earnest Money Deposit (EMD) furnished in accordance with NIT Clause 4.0. ~~Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT.~~
- **ii.** Technical Bid (without indicating any prices).

b. Price Bid:

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

Note:

- It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

DO NOT'S

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

Digital Signing of e-Tender

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

The Requirement:

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

BHEL has finalized the e-procurement service Provider-:
NIC PORTAL (https://eprocurebhel.co.in)

For E-PROCUREMENT ASSISTANCE & TRAINING, NIC PORTAL HELPDESK CONTACTS AS PER FOLLOWING:

For any technical related queries, please call at 24 x 7 Help Desk Number
0120-4001 002
0120-4200 462
0120-4001 005
0120-6277 787
1. Peter Raj, NIC, Ph: 9942069052
Email Support: support-eproc@nic.in
Other details/update yourself from : https://eprocurebhel.co.in

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

The contact details of the DSC certifying authority:-
please refer http://www.mca.gov.in/ →MCA SERVICES → DSC SERVICES

Vendors are requested to go through seller manual available on https://eprocurebhel.co.in.

~~**Procedure for Submission of Tenders (To be used in case of Paper bid only):** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:~~

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

6.0 ~~The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped) (To be used in case of Paper bid only):**~~

~~Sl. no.~~	~~Description~~	~~Remarks~~
	~~**Part-I A**~~	
	~~**ENVELOPE – I superscribed as:**~~ ~~PART-I (TECHNO COMMERCIAL BID)~~ ~~TENDER NO :~~ ~~NAME OF WORK :~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~**CONTAINING THE FOLLOWING:-**~~	
~~i.~~	~~Covering letter/Offer forwarding letter of Tenderer.~~	
~~ii.~~	~~Duly filled-in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above.~~ ~~**Note:**~~ ~~a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained.~~ ~~b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.~~ ~~i). In case of acceptance of the deviations, appropriate~~	

	loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc. as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph. no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc. pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc. as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

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

	PART-II	
	PRICE BID consisting of the following shall be enclosed	
	ENVELOPE-III superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**	

~~i~~	~~Covering letter/Offer forwarding letter of Tenderer enclosed in Part I~~	
~~ii~~	~~Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)~~	

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

- **SPECIAL NOTE: All documents/ annexures 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 any in-complete documents.**

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

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

9.0 Void

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 and/or through e-procurement portal, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

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

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking

clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

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

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

"Integrity Pact (IP)"

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. 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. No.	IEM	Email
1.	*Shri Otem Dai, IAS (Retd.)*	iem1@bhel.in
2.	*Shri Bishwamitra Pandey, IRAS (Retd.)*	Iem2@bhel.in
3.	*Shri Mukesh Mittal, IRS (Retd.)*	Iem3@bhel.in

(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 the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of 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 above 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:	R M Malhotra/ GM (Purchase)	Viveka Nand Jha/Dy Manager (Purchase)
Dept:	Purchase Department	
Address:	Floor No. 5 & 6, Shreemohini Complex, 345 Kingsway, Nagpur-440001	
Email:	rmalhotra@bhel.in	vivekjha@bhel.in
Phone:	0712-2858633	9429198214

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 **Reverse Auction:** Applicable. "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com on "**supplier registration page".**) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.

Price Bids of all the techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.

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

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

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

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

~~23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement for the said contract with a validity period of six months initially. In case bidder becomes L1, Consortium Agreement valid till contractual completion period shall be submitted to BHEL before signing the contract. Consortium Agreement shall be kept valid till scope of work awarded to consortium partner(s) as per contract is completed.~~

~~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) including Prime Bidder shall be NOT more than 3 (three).~~

~~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 and BHEL shall take necessary action as per extant guidelines. 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 Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL.~~

~~23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of one work with a consortium partner under direct order 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.~~

~~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. However, Prime Bidder has also option for submission of SD on behalf of consortium partner (s).~~

~~SD submitted by Consortium Partner(s) may be released in case corresponding scope of work of the respective Consortium partner(s) has been completed upto the extent of 80% based on certification by Construction Manager and concurrence by the prime bidder.~~

~~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, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

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

26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.

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

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

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

28.1.1 **Commitment by BHEL:**

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

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

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

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

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

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

29.0 ~~Micro and Small Enterprises (MSE)~~

~~Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.~~

~~Type under MSE~~	~~SC/ST owned~~	~~Women owned~~	~~Others (excluding SC/ ST & Women~~
~~Micro~~			
~~Small~~			

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

~~*a)* MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM-II~~

~~Certificate along with attested copy of a CA certificate (**format enclosed as Annexure – 3**) 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 last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits.~~

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

31.0 **PREFERENCE TO MAKE IN INDIA:**

For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/Non-Local Supplier and purchase preferences to Class I local supplier, is as defined I Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

31.1 ***Compliance to Restrictions under Rule 144 (xi) of GFR 2017***

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means: -

a. An entity incorporated established or registered in such a country; or
b. A subsidiary of an entity incorporated established or registered in such a country; or
c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
d. An entity whose beneficial owner is situated in such a country; or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

IV. The beneficial owner for the purpose of (III) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together

or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation

a. *"Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.*

b. *"Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.*

2. *In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.*
3. *In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.*
4. *Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;*
5. *In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.*

V. *An Agent is a person employed to do any act for another, or to represent another in dealings with third person.*

VI. *The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.*

Note:

(i) The bidder shall provide undertaking for their compliance to this Clause, in the Format provided in Annexure-11.

(ii) Registration of the bidder with Competent Authority should be valid at the time of submission as well as acceptance of the bids.

32.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.
All overwriting/cutting, etc., will be numbered by bid opening officials and announced during bid opening.

33.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

34.0 The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). 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.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

35.0 Order of Precedence:

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

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

It may please be noted that guidelines/ circulars/ amendments/ govt. directives issued from time to time shall also be applicable.

For BHARAT HEAVY ELECTRICALS LTD

(General Manager - Purchase)

Enclosure:

01. Annexure-1: Pre Qualifying Requirements.
02. Annexure-2: Check List.
~~03. Annexure-3: Certificate by Chartered Accountant~~
04. Annexure-4: Reverse Auction Process Compliance Form
05. Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
06. Annexure-6: RA Price Confirmation and Breakup
07. Annexure-7: Integrity Pact
08. Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR
09. Annexure-9: Declaration reg. Related Firms & their areas of Activities
010. Annexure-10: DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH JUNE, 2020 AND SUBSEQUENT ORDER(S)
011. Annexure 11: DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017
012. Annexure 12: Important information
013. Annexure-13: Bid security declaration

ANNEXURE - 1

PRE QUALIFYING CRITERIA

JOB	Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of Flue Gas Desulphurization System (FGD) Erection and Commissioning of Ducting Works from Unit 4, 5 & 6 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets at 3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangan
TENDER NO	**BHE/PW/PUR/RGFGD-MECH-DUCT/2798**

SL 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	B **Technical PQR** **B.1: Not Applicable** Bidder shall essentially meet the Qualifying Requirements (i.e. **B.2.1 OR B.2.2 OR B.2.3**) as under, in last seven years from latest date of bid submission: B.2.1) Bidder should have Executed at least one FGD/Boiler (Structures and Pressure Parts of the same unit as standalone bidder))/ESP/STG/PCP in any power plant of rating ≥ 67.5 MW **OR** B.2.2) R&M work involving erection of at least 1000 MT of one Boiler (Structures, Non-Pressure Parts and Pressure Parts of the same unit as standalone bidder)/ ESP in power plant of any rating. **OR** B.2.3) Executed Erection work of Structure and/or 'Pressure Part and/or Power Cycle Piping and/or Non-Pressure Parts and/or Rotating Machines' in industry/power plant of any rating of: B.2.3.a) At least 2000 MT in cumulative of two running/completed contracts. **OR** B.2.3.b) At least 1200 MT in one running/completed contract.	**APPLICABLE**	

C.1	Bidders must have achieved an average annual financial turnover (audited) of Rs. **390.00 Lakhs or more** over last three Financial Years (FY) i.e 2019-20 , 2020-21 & 2021-2022'	**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 **(Annexure-8)** to this effect.	**APPLICABLE**	
D	Void		
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**	
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 the PQR (unless otherwise specified in the PQR):

~~**Explanatory Notes for PQR B.1 (Technical)**~~

- ~~For the criteria (B.1), actual executed value shall be considered.~~
- ~~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~

$$P = R + 0.425 \times R \times \frac{(X_N - X_0)}{X_0} + 0.425 \times R \times \frac{(Y_N - Y_0)}{Y_0}$$

~~Where~~

~~P = Updated value of work~~

~~R = Value of executed work~~

~~X_N = 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).~~

~~X_0 = All India Avg. Consumer Price index for industrial workers for last month of work execution~~

~~Y_N = 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).~~

~~Y_0 = Monthly Whole Sale Price Index for All Commodities for last month of work~

~~execution~~

- The evaluation currency for this tender shall be INR.

Explanatory Notes for Technical Criteria (B2):

1. VOID
2. Unless otherwise specified, for the purpose of "B2 Technical Criteria", the word 'EXECUTED' means achievement of milestones as defined below –
    a. "ACHIEVEMENT OF PHYSICAL QUANTITIES" as per PQRs.
    b. "READINESS FOR COAL FILLING" of at least one Bunker, in respect of Mill Bunker Structure.
    c. "CHARGING" in respect of Power Transformers/ Bus Ducts/ "HT/LT Switchgears" / "HT/LT Cabling".
    d. For C&I works: "SYNCHRONISATION" in case of power project / "WORK EXECUTION of the value as defined in PQR" in case of industry.
    e. "BOILER LIGHT UP" in respect of Boiler / CFBC / ESP.
    f. "CHARGING OF ATLEAST ONE PASS" in respect of ESP(R&M)
    g. "GAS IN" in respect of HRSG.
    h. "STEAM BLOWING" in respect of Power Cycle Piping.
    i. "HYDRAULIC TEST"/ ANY OTHER EQUIVALENT TEST LIKE "100% RT/UT OF WELDED JOINTS" of the system in respect of Pressure parts/ LP Piping/CW Piping.
    j. "FULL LOAD OPERATION OF THE UNIT" in respect of Insulation work.
    k. "SYNCHRONISATION" in respect of STG / GTG.
    l. "SPINNING" in respect of HTG.
    m. "GAS IN" in respect of FGD
3. Boiler means HRSG or WHRB or any other types of Steam Generator.
4. 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.

Explanatory Notes for PQR –C (Financial):

C-1:

i. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above.
ii. Evaluation of Turnover criteria shall be calculated from the Audited Balance Sheet and Profit & Loss Account for the three Financial Years (FY).
iii. 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.
iv. 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.

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

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.

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.

Common Explanatory Notes:

1. For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria B1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
   a. The parent company shall have a controlling stake of ≥50% in the subsidiary company (as per Format-1).
   b. The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value
   c. The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
   d. In case Bidder is submitting bid as a Consortium Partner, option of utilizing experience of parent/subsidiary Company can be availed by Prime Bidder only.
   e. Parent Company/ Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder' or as a 'Consortium bidder'.
2. Completion date for achievement of the technical criteria specified in the 'B' above 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. Completion date shall be reckoned from the " Financial Year quarter of bid submission". (for e.g. –Work completed on 01.01.2014 shall be considered even if latest date of bid submission is 20.03.2021).
3. "Executed" means the bidder should have achieved the technical criteria specified in the Common QR 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.
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 and certify to BHEL regarding existence and validity of their consortium agreement in line with validity period mentioned in NIT.
   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 or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL 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.

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

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 extant guidelines for Suspension of Business Dealings.

Format-1: Not applicable

Format-2: Not applicable

ANNEXURE – 2

CHECK LIST

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

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

16	Non-Disclosure Certificate	Applicable/~~Not Applicable~~	YES/NO
17	Bank Account Details for E-Payment	Applicable/~~Not Applicable~~	YES/NO
18	Capacity Evaluation of Bidder for current Tender	Applicable/~~Not Applicable~~	YES/NO
19	Tie Ups/Consortium Agreement are submitted as per format	~~Applicable~~/Not Applicable	YES/ NO
20	Power of Attorney for Submission of Tender/Signing Contract Agreement ~~Power of Attorney of Consortium Partner~~.	Applicable/~~Not Applicable~~	YES/NO
21	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO
22	Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process	Applicable/~~Not Applicable~~	YES/NO
23	Annexure-6: RA Price Confirmation and Breakup	Applicable/~~Not Applicable~~	YES/NO
24	Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR	Applicable/~~Not Applicable~~	YES/NO
25	Annexure-9: Declaration reg. Related Firms & their areas of Activities (x) Other Tender documents as per this NIT.	Applicable/~~Not Applicable~~	YES/NO
26	Annexure-10 Declaration regarding minimum local content	Applicable/~~Not Applicable~~	YES/NO
27	Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017	Applicable/~~Not Applicable~~	YES/NO
28	Annexure-13: Bid security Declaration	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

Certificate by Chartered Accountant on letter head

(applicable upto 31st March'2021 in line with MSME notification no. S.O. 2119 (E), dated 26th June'2020)

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)/ Udyam Registration Certificate No. ..... dtd: ....., Category: ..... (Micro/Small/Medium)). (Copy enclosed).

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

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

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

3. For Enterprises (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)

4. For Enterprises (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)

(Strike off whichever is not applicable)

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

Or

The enterprise has been graduated upward from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise shall maintain its prevailing status till expiry of one year from the close of year of registration, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.

Or

The enterprise has been reverse graduated from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise will continue in its present category till the closure of the financial year and it will be given the benefit of the changed status only with effect from 1st April of the financial year following the year in which such change took place, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.

Date:
(Signature)
Name:
Membership Number:
Seal of the Chartered Accountant

ANNEXURE-4

Reverse Auction Process Compliance Form

(The bidders are required to print this on their company's letterhead and sign, stamp before RA)

To

- M/s. {*Service provider*
- *Postal address}*

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no.{ BHE/PW/PUR/RGFGD-MECH-DUCT/2798} dt. {…….}
This letter is to confirm that:

1) The undersigned is authorized official/ representative of the company to participate in RA and to sign the related documents.
2) We have studied the Reverse Auction guidelines (as available on www.bhel.com), and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
4) We also confirm that, in case we become L1 bidder, we will FAX/ email the price confirmation & break up of our quoted price as per *Annexure - 6* within **two** working days (of BHEL) after completion of RA event, besides sending the same by registered post/ courier both to M/s. BHEL and M/s. {*Service provider.}*

We, hereby confirm that we will honor the Bids placed by us during the auction process.

With regards

Signature with company seal
Name:
Company / Organization:
Designation within Company / Organization:
Address of Company / Organization:

Sign this document and FAX/ email it to M/s *{Service provider}* at *{……..}* prior to start of the Event.

ANNEXURE – 5

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

1	NAME OF THE BIDDER	
2	NAME & DESIGNATION OF OFFICIAL	
3	POSTAL ADDRESS (COMPLETE)	
4	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

ANNEXURE – 6

Reverse Auction price confirmation and breakup
(To be submitted by L1 bidder after completion of Reverse Auction)

To
- M/s. *Service provider*
- *Postal address*

CC: M/s BHEL *POWER SECTOR WESTERN REGION, Nagpur*

Sub: **Final price quoted during Reverse Auction ~~and price breakup~~**

Dear Sir,

We confirm that we have quoted.

Rs. _____(in value) &

_____(in words)

for item(s) covered under tender enquiry No. BHE/PW/PUR/RGFGD-MECH-DUCT/2798

~~Total price of the items covered under above cited enquiries is inclusive of {*Packing & forwarding, GST, E.D., C.S.T., freight and insurance charges up to {……..} District,{……..} State and Type Test Charges etc., (exclusive of service tax), other as per NIT*}~~

as our final landed prices as quoted during the Reverse Auction conducted today {*date* } which will be valid for a period ~~of {___ **in nos. & in words** ___} days~~. as mentioned in the subject tender.

Yours sincerely,
For _____
Name:
Company:
Date:
Seal:

ANNEXURE – 7

INTEGRITY PACT

Between

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

and

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

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for **Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of Flue Gas Desulphurization System (FGD) Erection and Commissioning of Ducting Works from Unit 4, 5 & 6 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets AT 3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana *(ETS no.: BHE/PW/PUR/RGFGD-MECH-DUCT/2798*).** The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

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

Section 1- Commitments of the Principal

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

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

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

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

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

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

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

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

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

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

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

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

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

Section 4 - Compensation for Damages

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

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

Section 5 - Previous Transgression

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

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

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

6.1 The 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 /Subcontractors

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

Section 8 -Independent External Monitor(s)

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

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

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality 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 meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 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 organisation.

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 bidders 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 Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.

10.2 Changes and supplements as well as termination notices need to be made in writing.

10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.

10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact 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 Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.

10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of

the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

Vivek Jaiswal

For & On behalf of the Principal

(Office Seal)

Place Nagpur

Date 07/06/2023

For & On behalf of the Bidder/ Contractor

(Office Seal)

Witness:_____

(Name & Address) _____

Witness:_____

(Name & Address) _____

ANNEXURE – 8

UNDERTAKING

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

To,

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: BHE/PW/PUR/RGFGD-MECH-DUCT/2798

I/We, _____ declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render us ineligible for participation in this tender.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:
Date:

Annexure-9

DECLARATION

Date:_____

To

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Sub: **Details of related firms and their area of activities**

Dear Sir/ Madam,

Please find below details of firms owned by our family members that are doing business/ registered for same item with BHEL,_____ (NA, if not applicable).

1	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
2	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
……		

Note: I certify that the above information is true and I agree for penal action from BHEL in case any of the above information furnished is found to be false.

Regards,
(_____)

From: M/s _____
Supplier Code: _____
Address: _____
_____
_____

Annexure-10

DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH JUNE, 2020 AND SUBSEQUENT ORDER(S)

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,
GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref : 1) NIT/Tender Specification No: BHE/PW/PUR/RGFGD-MECH-DUCT/2798,
2) All other pertinent issues till date

We hereby certify that the items/works/services offered by…… *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for **'Class-I local supplier' / 'Class II local supplier' **** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____
3. _____ 4. _____

…

Thanking you,
Yours faithfully,

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

****** - *Strike out whichever is not applicable.*

Note:

1. Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.)

Annexure-11

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017

Ref : 1) NIT/Tender Specification No: BHE/PW/PUR/RGFGD-MECH-DUCT/2798,
2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ *(specify the name of the organization here)*,

(a) is not from such a country / ☐
(b) has been registered with the Competent Authority *(attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT))*; ☐

and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. *(attach relevant valid registration, if applicable)*

I hereby certify that we fulfil all requirements in this regard and is eligible to be considered.

Thanking you,
Yours faithfully,

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

Note: Bidders to note that in case above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and for taking further action in accordance with law and as per BHEL guidelines.

Annexure-12: 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:
GM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, Floor No. 5 & 6, 345 KINGSWAY, NAGPUR 440001, INDIA

Following are the concerned BHEL officials to whom bidders can contact in case of any difficulty:
Manager Purchase, Email: vivekjha@bhel.in :9429198214
Manager Purchase, Email: tapishkhandelwal@bhel.in Ph: +91-9010903666
DGM/Purchase, email: kamleshbhel@bhel.in,
GM Purchase, Email: rmalhotra@bhel.in. Ph: +91 – 712 – 2858 – 633

1. **Refer the abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' which is available at www.bhel.com on "supplier registration page" at the following link:** https://www.bhel.com/sites/default/files/suspension_guidelines_abridged.pdf

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

3. **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"

4. **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."**

5. **"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".

6. **The following clause is added under clause 1.10 Security Deposit in Vol-1C:**

Clause No 1.10.8 of Vol-IC General Conditions of Contract: Timely Submission of Security Deposit for Execution of the contract: "Bidder agrees to submit Security Deposit required for execution of the contract within the time period mentioned. In case of delay in submission of Security Deposit, enhanced Security Deposit which would include interest (Base rate of SBI +6%) for the delayed period, shall be submitted by the bidder. Further, if Security Deposit is not submitted till such time the first bill becomes due, the amount of Security Deposit due shall be recovered as per terms defined in NIT/contract, from the bills along with due interest."

7. 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".

8. 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:

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) **(https://www.bhel.com/guidelines-reverse-auction-2021)** for this tender. RA shall be conducted among the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

Note:-

1. No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com against works contract.

2. In case of enquiry through e-procurement the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.

~~**9. 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**~~

10. **Clause no. 2.24 of GCC PERFORMANCE GUARANTEE FOR WORKMANSHIP:** The guarantee period shall commence from the date of Completion of contract as certified by BHEL Engineer.

11. Void

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. Clause 2.17.6 of GCC : PRICE VARIATION COMPENSATION is amended as below

Existing clause 2.17.6 of GCC : PRICE VARIATION COMPENSATION	**Amended clause**
Base date shall be calendar month of the 'last date of submission of Tender'.	Base date shall be calendar month of the "date start of work duly certified by BHEL engineer."

Bid Security Declaration Form(Annexure-13)

(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/Madam,

Sub: Bid Security Declaration

Ref: NIT/Tender Specification No: **BHE/PW/PUR/RGFGD-MECH-DUCT/2798**

SCOPE OF WORK: PACKAGE: Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of Flue Gas Desulphurization System (FGD) Erection and Commissioning of Ducting Works from Unit 4, 5 & 6 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets AT 3x200MW + 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana"

1. I/We Mr/ Ms…… authorised person to sign the bid documents for tender pertaining to the captioned scope do hereby declare that I/We have gone through the entire tender documents including terms and condition mentioned in the tender documents and undertake to comply with them.

2. I/We further declare that we will not withdraw our bid or modify our offer during the period of validity of the bid after the deadline for submission of such documents.

3. If I/we withdraw or modify the bids during the period of validity, or if I/We are awarded the contract and fail to sign the contract, if applicable or to submit security deposit as defined in the tender document/LOA, we will be suspended for the period of time as specified in the tender document from being eligible to submit bids/proposals to BHEL.

Signature of the Authorised Signatory
(With Name, Designation and Company seal)

Place:

2798

TECHNICAL CONDITIONS OF CONTRACT (TCC)

CONTENTS

1. Project Information

The proposed site is located at a Latitude of 18^0 44' 50'' North to 18^0 45' 29'' North and Longitude of 79^0 28'5.35'' East to 79^0 28' 37'' East near Ramagundam village, Karimnagar district of Telangana State. The site is approximately 51 km from district headquarter Karimnagar and about 1 km from Ramagundam. The nearest railway station, Ramagundam is about 5 km from the plant which lies on the main Kazipet - Balharshah broad gauge railway line of South Central Railway. The area is accessible by SH-1 Hyderabad-Mancherial Road popularly known as Rajiv Rahadari. The nearest commercial airport is at Hyderabad approximately at an aerial distance of 210 km. Environmental setting of the site is given in **Table-1.** The study area map of 10 km radius is shown in **Figure-1.**

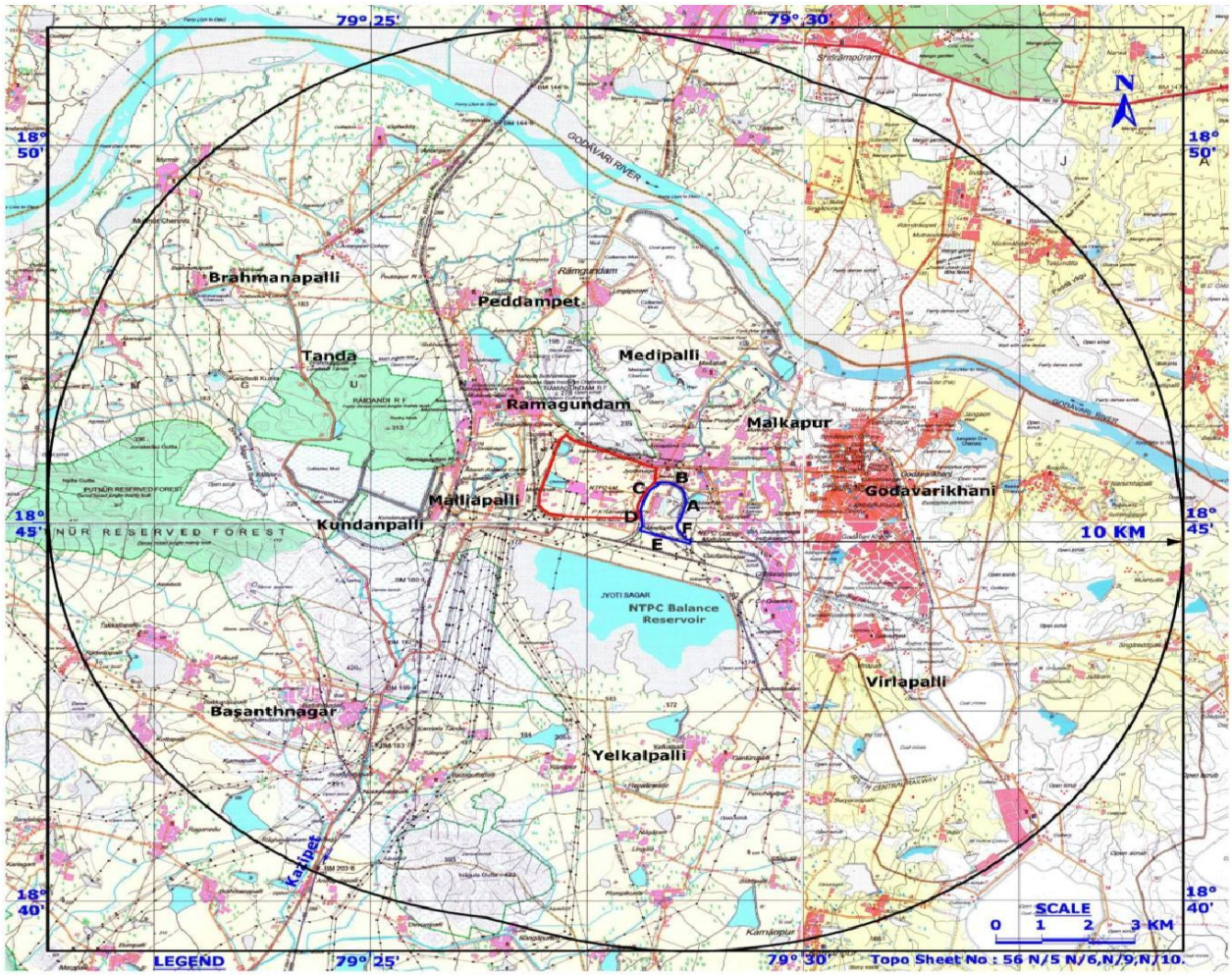
Table-1

Sr. No.	**Particulars**	**Details**		
1	Plant location	Ramagundam, Karimnagar district, Telangana State		
2	Topo sheet No.	56 N/5, 56 N/6, 56 N/9 and 56 N/10		
3	Site Coordinates			
			Proposed Plant Site Coordinates	
		Corner	**Latitude**	**Longitude**
		A	18^0 45' 17.4'' N	79^0 28' 37'' E
		B	18^0 45' 29'' N	79^0 28' 30'' E
		C	18^0 45' 27'' N	79^0 28' 12'' E
		D	18^0 45' 05'' N	79^0 28' 5.35'' E
		E	18^0 44' 50'' N	79^0 28' 18'' E
		F	18^0 44' 57.2'' N	79^0 28' 31'' E
4	Climatic conditions	(IMD, Ramagundam)		
a)	Maximum temperature	41.7 ^{0}C		
	Minimum temperature	14.0 ^{0}C		
b)	Annual rainfall (total)	1147.7 mm		
c)	Relative humidity	Maximum- 83 % (August)		
		Minimum- 35 % (March)		
d)	Predominant wind directions	Annual:- NW, NE, SE, S and SW		
	Wind Velocity, Avg in last 10 years/Max			
		Pre-Monsoon:- SE, S, SW and SSE		
		Monsoon:- NW, W and SW		
		Post Monsoon:- NW, NE, E and SE		
		Winter:- NE, SE and S		
		Wind Velocity, Avg: 2.5 km/hr		
		Max: 3.8 km/hr		

Sr. No.	Particulars	Details
5	Plant site elevation above MSL	RL 152.50 m
6	Plant site topography	Plain
7	Present land use at the site	Land use pattern is notified for industrial use
8	Nearest highway	Rajiv Rahadari SH-1 (Hyderabad-Mancherial road)-0.4
		km, N
9	Nearest railway station	Ramagundam RS- 5.0 km, WNW
10	Nearest Airport	Hyderabad, 210 km, SSW
11	Nearest major water bodies	· Godavari River- 4.0 km, NE
		· Jyothi Sagar (NTPC Balance Reservoir) - 0.9 km, S
12	Water source for the project	Yellampally Barrage,14.0 km, NW
13	Nearest town/City	Godavarikhani, 3.0 km, E
14	Nearest village	Malyalapalli, 2.5 km, W
15	Archaeologically important places	None in 15 km radius
16	Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, national parks Wildlife sanctuaries, community and conservation reserves)	Nil
17	Reserved / Protected Forests	As per toposheet no. 56 N/5, 56 N/6, 56 N/9 and 56
		N/10
		· Ramagundam RF- 0.6 km, NNW
		· Putnur RF- 3.0 km, W
		· Raidandi RF- 4.0 km, WNW
		· Indaram RF- 9.3 km, NE
18	Defence Installations	Nil
19	List of Industries in 10 km radius	NTPC Ramagundam STPP, 2600 MW (Adjacent)
		· Fertilizer Corporation of India, (not in
		Operation)- 1.7 km, SE
		TSGENCO, 62.5 MW- 2.1 km, NW
		· SCCL OCP-IV – 2.9 km, N
		· RG Coal Washery- 3.5 km, SE
		· 18 MW Singareni Power House at
		Godavarikhani- 3.7 km, ENE
		· SCCL OCP-III - 4.5 km, SE
		· Kesoram Cements Ltd, Basanth nagar- 7.3 km
20	Seismicity	Seismic Zone-II as per IS 1893 (Part I): 2002

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

Figure-1



Proposed Plant Site Coordinates		
Corner	Latitude	Longitude
A	18° 45′ 17.4″ N	79° 28′ 37″ E
B	18° 45′ 29″ N	79°28′ 30″ E
C	18° 45′ 27″ N	79° 28′ 12″ E
D	18° 45′ 05″ N	79° 28′ 5.35″ E
E	18° 44′ 50″ N	79° 28′ 18″ E
F	18° 44′ 57.2″ N	79° 28′ 31″ E

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:

"Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of **Flue Gas Desulphurization System (FGD)** Erection and Commissioning of Ducting Works from Unit 4 & 5 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets, Application of Thermal Insulation"

Package-A:

Scope of Work: Complete ducting Works from Unit 4, 5 & 6 including tapping point for bypass damper upto Booster Fan inlet Gate **at 3x200MW+ 3X500 MW NTPC Ramagundam FGD Project, Stage- I & II, Telangana.**

Terminal Point of ducting: Booster Fan inlet Gate for ducting

&

Scope of Work Common System: ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets etc **at 3x200MW+ 3X500 MW NTPC Ramagundam FGD Project, Stage- I & II, Telangana.**

2.1 The scope of work will include Erection, testing, commissioning, trial run and handing over of ducting and common system required for FGD system 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.

The scope of work under these specifications for Erection, testing, commissioning, trial operation & handing over of FGD system(Mechanical i.e. ducting for Unit 4 & 5 and common system), fire protection system and ECW system of 3x200MW+ 3X500 MW NTPC Ramagundam, Stage- I & II, Telangana

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 Erection, Testing, Assistance for commissioning & Trial Operation including supply & application of final painting and Handing Over of **Flue Gas Desulphurization System (FGD)** Erection and Commissioning of Ducting Works from Unit 4, 5 & 6 including tapping for Bypass Dampers up to Booster Fan inlet Gate, Erection of Common Systems incl. ACW System for FGD Auxiliaries, DMCW System for FGD Auxiliaries, Instrument Air Piping, Service Air Piping, ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane, Wet Ball Mill & Aux, Chemical Dosing System, Fire Protection System, NaOH System, Gypsum De-Watering System, Bag filter at top of LS day silo, Air canon/Air blaster, 2 nos DG Sets, Application of Thermal Insulation, etc.

2.2.2 **Tapping off of Duct from existing Flue Gas Duct up to Booster Fan inlet gate with related supports. 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) in Unit 4 and Unit 5

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 <u>The above work should be completed within 20 days from date of shutdown. Separate payment shall be made as per payment terms.</u>

<u>Note: Unit # 4 & 5 tapping off of Duct from existing Flue Gas Duct with related supports and Bypass damper work has been completed and are excluded from the scope of work.</u>

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 relevant Chapter 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. Contractors 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 from the contractor, if any, for such works will be dealt as per conditions of contract and payments will be released as per provision of contract.

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 may be located within the plant boundary or ouside of 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.

2.2.18 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.

2.2.19 **Site Organization :** 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 fulfillment of labour laws and other statutory obligations.

2.2.20 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.

2.2.21 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.

2.2.22 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.

2.2.23 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.

2.2.24 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.

2.2.25 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

2.2.26 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.

2.2.27 **Fire Protection system**: Necessary civil works for the fire protection system includes (trenches/ pedestals/ foundations /sheds/sand filling) 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 including supply of wrapping and protective coating. Further, above ground piping painting shall be in the scope of contractor including supply of painting material.

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.

Brief Description of the FGD System:

Flue Gas Section:

1. **Ducts:** Ducting of FGD system will be provided as mentioned below:
   - The duct from FGD Tapping point duct (ID Fan Common discharge duct to Chimney) up to Booster fan inlet
   - The duct from Booster fan outlet to Absorber inlet
   - The duct from Absorber outlet to New
   - Thermal insulation of lightly Resin Bonded rock wool for duct work along with Aluminium Cladding materials.

2. **Gates and Dampers:** The following Guillotine Gate and dampers along with applicable actuators as mentioned below will be provided. The sizes of Dampers have been considered based on flue gas volume flow:

Sl no	Location	Type	Actuator
1	FGD Inlet	Guillotine Gate	Electrical
2	Booster Fan outlet	Guillotine Gate	Electrical
3	FGD Bypass Damper	Biplane Damper	Pneumatic
4	FGD Outlet	Guillotine Gate	Electrical

3. **Booster Fan: The** total gas pressure loss in the FGD plant is compensated by two (2) numbers of Booster Fans. FGD Booster Fan shall be of double suction simply supported radial fan.

4. **Absorber Internal and Auxiliary equipment:**

- One number of Absorber system complete with internals Spray Pipes, Spray Nozzles, Jet Air Sparger (JAS), Agitator will be provided.
- 2 stages Mist eliminator will be provided with suitable washing arrangement for periodic cleaning of mist eliminator to avoid clogging.
- Absorber Recirculation Pumps for each absorber will be provided to spray the slurry inside the absorber achieve required SO2 removal efficiency.
- The Absorber Recirculation Tank will be
- Agitators for thorough mixing of recirculation slurry
- These Mechanical Agitators are used during the FGD Bypass condition to keep the Gypsum slurry in suspension.
- Oxidation Air Blowers for each absorber will be provided for oxidation of Calcium sulphite to Calcium sulphate
- Oxidation air nozzles/Jet air Spargers (JAS) nozzles will be provided inside the absorber to mix/agitate the gypsum slurry with the excess oxygen supplied from oxidation blowers to form gypsum.
- One number of Passengers cum Goods Elevator shall be provided with adequate landings for absorber.

5. Emergency Quenching System:

- Emergency Quenching system is designed to protect the FGD and all other sensitive downstream equipment against high flue gas temperatures arise from situations like electrical blackout, failure of absorber recirculation pumps etc.
- The emergency Quenching system is designed by considering maximum excursion temperature as 300 Deg Centigrade for 10 minutes.
- Emergency quenching spray nozzles are located just above wet dry washing system for automatic spray of quenching water at the inlet to the absorber, in case the gas temperature exceeds the design temperature due to failure of upstream equipment.
- For emergency quenching, the water will be supplied from an elevated tank (Emergency quench tank) installed on top of the absorber.

6. Absorber Area Sump & Pumps:

- The absorber area sump will be provided near each absorber.

- It is provided to collect drain discharged during shut-off operation of absorber recirculation pumps, dumping operation of the gypsum slurry in the absorber and recirculation pipe.
- This sump is used as relay sump to transfer slurry in the absorber system and to the emergency storage tank.
- Vertical slurry pumps will be provided for each absorber sump. Pumps will also be used for evacuating the absorber tank.

7. Limestone Handling Plant: Limestone of would be received by trucks and pile would be formed. The limestone would then be dozed into the proposed limestone reclaim hoppers with grizzly. The limestone dozed into the hoppers shall be conveyed to the crusher house through belt conveyor, Vibro feeders, associated equipment like rack & pinion.
Tramp iron shall be separated by inline magnetic separator. The tramp iron picked up by the inline magnetic separator shall be discharged outside the crusher house where the inline magnetic separator is located through tramp iron chute.

Similarly, ferrous and non-ferrous metals shall be detected by metal detector. The metal detector shall identify the ferrous and non-ferrous metals and trip the respective conveyor on which it is located. Inline conveyor scale shall be provided on conveyor to continuously measure the rate of conveying on this conveyor.

In crusher house limestone will be fed to respective hammer mill crusher where it will be crushed. Crushed limestone then shall be fed to the respective bucket elevator through belt feeder. From respective bucket elevators limestone shall be fed to the respective belt feeders located in limestone silo building and from there limestone shall be fed to reversible belt weigh feeders in limestone silo building.

8. Ball Mill System:

- Limestone is stored and crushed in Limestone handling area. Crushed Limestone is conveyed till the inlet of Limestone storage silo hoppers.
- Numbers/ capacity of storage silo are decided for storage of crushed limestone for 24 hours requirement.
- The Limestone storage silo is made up of carbon steel and the hopper cones will be provided with SS lining
- Bunker outlet chute with motorized shut off gate will be provided for feeding limestone to the feeder
- Gravimetric feeders will be provided under each hopper.
- Wet Ball Mill System along with complete accessories will be provided for grinding of Limestone.

9. Limestone Slurry Storage System:

- Limestone Slurry tank designed for a storage capacity of 12 hours continuous limestone requirement
- The Slurry Tank will be provided with center mounted Agitator
- The Slurry Tank will be provided with Limestone slurry pumps

10. Gypsum Dewatering System:

- Gypsum dewatering system consisting primary stage of sets of hydro-cyclones and secondary stage of vacuum belt filters for dewatering of Gypsum.
- Gypsum bleed pumps from all absorbers, discharge the slurry to Primary hydro cyclone feed tank. Primary hydro cyclone feed pumps will be provided for each primary hydro cyclone feed tank to discharge the slurry to Primary hydro cyclone in Gypsum dewatering building.
- The underflow of Primary hydro cyclone is sent to vacuum belt filter.
- The overflow of primary hydro cyclones will be fed to Secondary Hydro cyclone feed tank.
- For maintenance of secondary hydrocyclone, a bypass line will be provided to divert the flow from primary hydrocyclone over flow to filtrate water tank.
- There will be vacuum Belt Filters for Gypsum dewatering.
- Secondary Hydro cyclone pumps will feed the slurry from Secondary hydro cyclone feed tank to secondary hydro cyclones. The underflow is fed to the filtrate water tank. The overflow is fed to the waste water tank.
- Neutralization tank is provided to control pH of waste water slurry
- The Gypsum cake from the belt filter will be discharged to Gypsum storage shed

11. Process Water System:

- Process water tanks will be provided as common to cater FGD process water requirement of all units.
- Each Process water tank is sized to supply the complete water requirement of FGD system of all units including common systems.
- Each tank will be provided with pumps and all pump will be connected to single header, from common header branches of designed size will be provided to all the required areas of FGD system.

Process water is used for the following purposes:

a. **Absorber Make-Up Water**: The process water is used for absorber make-up water to control the Absorber Tank level.
b. **Wet/Dry Interface Washing**: The inside walls of the Absorber (wet/dry interface zone) has interface washing pipes mounted at the Absorber inlet. These interface

washing pipes periodically shower water against the Absorber walls to clean off any buildup of soot or other residues from the flue gas.

c. **Washing of Mist Eliminator**: The Mist eliminator is washed intermittently by water fed from the processor water Tank. Inside of the process water Tank is pressurized to supply washing water to the Mist Eliminator.
d. **JAS washing:** JAS nozzles will be washed continuously to avoid scaling/clogging of JAS nozzles.
e. **Emergency Quenching Water**: Emergency Quenching Water is supplied from the Overhead Emergency Quench Tank.
f. **Cake & Belt Filter Washing**: Gypsum Cake and Cloth wash of Gypsum belt filter is washed. The water in the Belt filter washing tank is used for both cake and cloth washing.
g. **Feed water to limestone grinding area**: Feed water to the limestone grinding area will be used to supply the water to mill for grind the limestone and also to mill circuit tank to maintain 30% limestone slurry concentration.

12. Air System (Instrument and Service Air System): Instrument air is used for instrumentation or to control equipment for the Absorber Section, the Gypsum Dewatering Section, and the Limestone Preparation Section.

13. Absorber Sump & Pumps: The absorber area sump will be provided near each absorber. It is provided to collect drain discharged during shut-off operation of absorber recirculation pumps, dumping operation of the gypsum slurry in the absorber and recirculation pipe. This sump is used as relay sump to transfer slurry in the absorber system and to the emergency storage tank. Slurry pumps will be provided for each absorber sump. These pumps will also be used for evacuating the absorber tank.

14. Auxiliary Absorbent Tank & Pump: Auxiliary absorbent tank will be provided to stock the gypsum slurry stored in the absorber tank. The tank has the capacity to hold slurry of Absorber. Absorbent Tank will be provided with slurry Pumps to feed the gypsum slurry back to absorber tank.

15. Other Sump System: Gypsum Area Drain Sump with pumps will be provided in gypsum dewatering building. It is used for collecting drain from the dewatering area. Limestone Area Drain Sump with pumps is used for collecting drain from the Ball Mill System.

16. Fire Protection system (Common):

a. **Hydrant System:** Hydrant system consists of (pipe, hydrant valves, landing valves, water monitors, hoses, branch pipes and nozzles etc)
b. HVW & MVW Spray System (High Velocity and Medium Velocity): It shall consists of water mains network, deluge valves, isolation valves, Y type strainers, spray nozzles/ projectors, spray nozzles piping network.

17. **Diesel Generator Set:** For emergency power supply DG sets (2 no) with integral piping, exhaust support structure, exhaust piping, tank, enclosure etc.

18. **Pump House for LHP & GHP Stage-I & II**: It shall consist of pumps for LHS & GHP, piping, valve etc

Tentative List of Major Equipment/ Structure Mechanical Package:

Sl no	Equipment / Structure description	Remarks
A	**Ducting per Unit**	
1	Ducting From ID Fan common duct to Booster Fan # A & B including 2 nos gates and duct supporting structure	
2	Ducting From Booster Fan # A & B to Absorber inlet including 2 nos gates and duct supporting structure	Excluded from Scope
3	Seal Air blower with associated piping and valves	
4	Ducting From Absorber outlet to New Chimney and duct supporting structure	Excluded from Scope
5	1 no FGD bypass damper in ID Fan common duct to Old chimney and supporting structure	
B	**Booster Fan # A & B- 2 nos per Unit**	
1	Booster Fan # A & B- 2 nos	Excluded from Scope
2	Booster Fan # A & B lub oil system - 2 nos	Excluded from Scope
3	Lub oil piping	Excluded from Scope
C	**Wet Limestone Based Absorber per Unit**	
1	Absorber Tank along with structure	Excluded from Scope
2	Piping with valve for Mist eliminator system including	Excluded from Scope
3	Absorber Tank agitator -2 nos	Excluded from Scope
4	Jet Air Sparger- 2 nos with associated piping and valves	Excluded from Scope
5	Emergency quench tank (Horizontal type) including associated piping and valves	Excluded from Scope
D	**Limestone slurry recirculation Pump and Oxidation Blower House per Unit**	Excluded from Scope
1	Structural work of Limestone slurry recirculation Pump and Oxidation Blower House	Excluded from Scope
2	Limestone slurry recirculation Pump- 5 nos	Excluded from Scope

3	Piping with valve for Limestone slurry recirculation Pump with motor	Excluded from Scope
4	Oxidation air blower- 2 nos	Excluded from Scope
5	Piping with valve for Oxidation air blower	Excluded from Scope
E	**Gypsum bleed pump-2 nos per Unit**	
1	Gypsum bleed pump with motor	Excluded from Scope
2	Piping and valves for Gypsum bleed pump with motor	Excluded from Scope
F	**Auxiliary Absorbent Tank**	
1	Auxiliary absorbent tank-1 no (Common System)	Excluded from Scope
2	Aux Absorbent Tank agitator -3 no	
G	**Auxiliary absorbent tank transfer pump- 2 nos (Common System)**	
1	Aux absorbent tank transfer pump with motor	
2	Piping with valve for Aux absorbent tank transfer pump with motor	
H	**Absorber area drain sump- 1 no per Unit**	
1	Absorber area drain sump pump- 2 nos with motor	
2	Absorber area drain sump agitator- 1 no with motor	
3	Piping with valve for Absorber area drain sump pump- 2 nos with motor	
I	**Limestone Handling System (Common System)**	
1	Structural work Limestone Transfer Point-1 (LTP-1)	Excluded from Scope
2	Structural work Limestone Belt Conveyer-1A/1B (LBC-1A/1B)	Excluded from Scope
3	Structural work VGTU of Limestone Belt Conveyer-1A/1B (LBC-1A/1B)	Excluded from Scope
4	Structural work Crusher House	Excluded from Scope
5	Structural work of Bucket Elevator (BE-1/2)	Excluded from Scope
6	Structural work of Limestone storage silo supporting structure	Excluded from Scope
7	Limestone storage silo (CS + SS liner)	Excluded from Scope
8	Structural work of Bucket Elevator (BE-3/4)	Excluded from Scope
9	Structural work of Limestone storage day silo	Excluded from Scope
10	Limestone storage day silo (CS + SS liner)	Excluded from Scope
11	Shut-off gate-2 nos	Excluded from Scope

12	Weigh belt feeder # 1 & 2- 2 nos	Excluded from Scope
J	**Ball Mill Building and Wet Limestone Ball Mill (Common System)**	
1	Structural work Ball Mill Building	Excluded from Scope
2	Wet ball mill-2 nos & Aux	
3	H. P. Trunion Lub oil pump- 4 nos	
4	L. P. Trunion Lub oil pump- 4 nos	
5	Lub oil reservior-2 nos	
6	Lub oil hydrocyclone vertical type- 2 nos	
7	Lub oil piping	
8	Gravimetric Feeder -2 nos and Shut- Off Gate-2 nos with Aux	
K	**Mill Separator Tank (Common System)**	
1	Mill Separator Tank & Aux- A/B :2 nos	
2	Mill separator transfer pump- 4 nos	
3	Piping and valves of Mill circuit transfer pump	
4	Mill Separator Tank-A/B agitator- 2 nos	
L	**Limestone Slurry Storage Tank (Common System)**	
1	Limestone Slurry Storage Tank- 2 nos (Common System)	Excluded from Scope
2	Limestone slurry transfer pump from slurry storage tank- 8 nos (Common System)	
3	Piping and valves of Limestone slurry transfer pump	
4	Limestone area drain sump-1 no (Common System)	Excluded from Scope
5	Limestone area drain sump pump-2 nos	
6	Piping and valves for Limestone area drain sump pump	
7	Limestone area drain sump agitator- 1 no	Excluded from Scope
M	**Gypsum Dewatering Building cum Compressor House (Common System)**	
1	Structural work Gypsum dewatering building	Excluded from Scope
2	Primary hydrocyclone-2 no	
3	Piping and valves for Primary hydrocyclone	
4	Secondary hydrocyclone-2 no	
5	Piping and valves for Secondary hydrocyclone	
6	Neutralization tank-2 no with 4 nos agitator	
7	Piping and valves for Neutralization tank	
8	Vacuum belt filter-2 nos	
9	Vacuum receiver-2 nos	
10	Piping and valves for Vacuum receiver	

11	Vacuum pump-2 nos	
12	Piping and valves for Vacuum pump	
13	Belt filter wash tank-2 no	
14	Piping and valves for Belt filter tank	
15	Belt filter pump- 2 nos	
16	Piping and valves for Belt filter pump	
17	Clarified water tank- 1 no	
18	Piping and valves for Clarified water tank	
19	Clarified water pump-2 nos and Filter water agitator-1 no	
20	Piping and valves for Clarified water pump with motor	
21	Primary hydrocyclone feed tank-1 no	Excluded from Scope
22	Piping and valves for Primary hydrocyclone tank	
23	Primary hydrocyclone pump-2 nos	
24	Primary hydrocyclone agitator-1 no	Excluded from Scope
25	Piping and valves for Primary hydrocyclone pump with motor	
26	Secondary hydrocyclone feed tank-1 no	Excluded from Scope
27	Piping and valves for Secondary hydrocyclone tank	
28	Secondary hydrocyclone pump-2 nos	
29	Secondary hydrocyclone agitator-1 no	Excluded from Scope
30	Piping and valves for Secondary hydrocyclone pump with motor	
31	Filter water tank- 1 no	Excluded from Scope
32	Piping and valves for Fitter water tank	
33	Filter water pump-2 nos	
34	Filter water agitator-1 no	Excluded from Scope
35	Piping and valves for Filter wate pump with motor	
36	Waste water tank-1 no	Excluded from Scope
37	Piping and valves for waste water tank	
38	Waste water pump-2 nos	
39	Waste water agitator-1 no	Excluded from Scope
40	Piping and valves for Waste water pump with motor	
41	Gypsum Area Drain Sump-1 no	Excluded from Scope
42	Gypsum area sump pump with motor-2 nos	
43	Gypsum area sump agitator with motor-1 no	

44	Piping and valves for gypsum area sump pump with motor	
N	**Gypsum storage shed (Common System)**	
1	Structural work of Gypsum storage shed	Excluded from Scope
O	**FGD Control room building (92.5m x 30m) (Common System)**	
1	Structural work of Control room building (92.5m x 30m)	Excluded from Scope
P	**Pipe rack & cable rack (Common System)**	
1	Structural work of Pipe rack & cable rack	Excluded from Scope
Q	**Piping**	
1	Instrument air piping	
2	Service air piping	
3	Process water piping	
4	DM Water Cooling Piping	
5	ACW Piping	
6	Fire Water Piping	
R	**FGD ACW & DMCW Pump Shed (Common System)**	
1	Structural work FGD ACW & DMCW Pump Shed	Excluded from Scope
2	ACW (9 nos) & DMCW (8 nos) Pump	
3	PHE (8 nos)	
4	Piping and valves for ACW Pumps, DMCW Pumps and PHE	
S	**Process water Tank (Common System)**	
1	Process water Tank- 2 nos	Excluded from Scope
2	Process water Pump- 4 nos (Common System)	
3	Piping and valves for Process water Pump with motor	
T	**Electric Hoist, Single Girder Crane**	
1	Booster Fan Motor	
2	Limestone slurry recirculation Pump and Oxidation Blower House	
3	Lime stone ball mill building	
4	Gypsum Dewatering Building cum Compressor House	
5	FGD ACW & DMCW Pump house	
6	FGD Control room building	
7	33 KV FGD Switchgear Room	
U	**Chemical Dosing System (Common System)**	
1	Bucket Elevator (with surge Hopper, Vibrating Feeder etc)	
2	Lime Silo (with manual & motorized gates, rotary feeder, Platform, Support steel structure, railings, ladder, for complete Lime Dosing system)	
3	Bag filter for Lime Silo (with Blower)	

4	Screw Conveyor	
5	Neutralisation Tank (With Agitator)	
6	Lime Dosing Pumps	
V	**NaOH Dosing System (Common System)**	
1	NaOH Dosing Skid	
W	**500 KVA DG Set (Common System)**	
1	500 KVA DG Set-1 no	
2	750 KVA DG Set-1 no	
Note:		
1	**All slurry pipes having Material of construction carbon steel and rubber lined. End connections are bolted flanged connections**	
2	**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**	Excluded from Scope
A	Crusher	-Do-
B	Gypsum Conveyor	-Do-
C	Limestone Conveyor	-Do-
D	Gypsum Shed	-Do-
E	Limestone TP-1	-Do-
F	Storage Silo (4 nos)	-Do-
G	Storage Silo Structure	-Do-
H	Gypsum Dewatering Building and Equipment with compressor house	-Do-
I	FGD Control Room	-Do-
J	Mill Building	-Do-
K	FGD ACW & DMCW Pump Shed	-Do-
L	Miscellaneous Structure	-Do-
M	Pipe Rack Stage- I & II	-Do-
N	Limestone Day Silo **(Fabricated segment of limestone day Silo shall be dispatched to site. All segments shall be welded as per Limestone day Silo site fabrication drawings)**	-Do-
O	Day Silo Structure	-Do-
3	**The scope of work also includes Fabrication, Erection, Fit-up/ Alignment, Welding/ Bolting, NDT of Structure Steel works for the following buildings / structures of Flue Gas Desulphurization (FGD) Systems**	-Do-
A	Storage Silo (4 nos)	-Do-
B	Storage Silo (4 nos) SS linear	-Do-

Important information for the Erection Work of FGD system under this tender specification:

a. **Wet Ball Mill:** 2nos Wet Ball mill

- Wet Ball mill will be supplied at site without internal lining
- Erection, Alignment of wet ball mill shall be in the scope of contractor.
- Wet ball mill internal lining will be carried out at site. Supply and application of lining is in the scope of BHEL-Hyderabad. Manpower assistance for lining of Wet Ball Mill is in the contractor scope.

b. Elevators: 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 be carried out by the BHEL vendor /system supplier/OEM of the system.

- Absorber Elevator
- Day Silo Elevator
- FGD Control Room Elevator

c. Fire detection and Protection system: Separate hydrant and spray header available in plant area for tapping required for hydrant and spray system for FGD system.

Package: Collection of materials from BHEL/client's stores/storage yard; transportation to site; erection, testing & assistance for commissioning, trial operation, PG Test and handing over of the following system:

1. **BHEL- Ranipet supplied Stage-II (Unit # 4):** Duct, Duct supporting structure from Satge-II (Unit # 4) tapping point including bypass damper etc upto Booster Fan inlet Gate. **Terminal Point of ducting:** Booster Fan inlet Gate for ducting Stage-II (Unit # 4) **(As per Customer no: G509)**
2. **BHEL- Ranipet supplied Stage-II (Unit # 5):** Duct, Duct supporting structure from Satge-II (Unit # 4) tapping point including bypass damper etc upto Booster Fan inlet Gate. **Terminal Point of ducting:** Booster Fan inlet Gate for ducting Stage-II (Unit # 4) **(As per Customer no: G510)**
3. **BHEL- Piping Centre supplied piping (Common System):** ACW System for FGD Auxiliaries**,** DMCW System for FGD Auxiliaries, Instrument Air, Service Air
4. **BHEL-PEM supplied (Common System):** ACW Pumps, ESW Pumps, Self Cleaning Strainers, Conical Strainer, PHE, Control Valves, Flow Orifices, Rotameters, Electric Hoists, Single Girder Crane
5. **BHEL-Hyderabad supplied (Common System):** Wet Ball Mill & Aux
6. **BHEL-PEM supplied (Common System):** Chemical Dosing System
7. **BHEL- PE & SD supplied (Common System**): Fire Protection System
8. **BHEL-PEM supplied (Common System):** NaOH System
9. **BHEL-PEM supplied (Common System):** Gypsum De-Watering System
10. **BHEL-Bhopal supplied motor (Common System:** Ball Mill
11. **BHEL-Hyderabad supplied (Common System):** Bag filter at top of LS day silo, Air canon/Air blaster.
12. **BHEL-ISG supplied (Common System):** 2 nos DG Sets

Tentative Weight in MT for Package:

Sl no	Description	UOM	Package A			
			Stage II - Unit 4	Stage II - Unit 5	Stage II - Unit 6	Common system for all 4 Units
1	Str	MT	650.85	690.06	768.90	0.00
2	NPP	MT	1549.37	1304.36	1352.60	290.36
3	RMC	MT	0.00	0.00	0.00	518.94
4	Piping	MT	0.00	0.00	0.00	0.00
a	CS Piping	MT	0.00	0.00	0.00	269.00
b	SS Piping	MT	0.00	0.00	0.00	15.62
c	GI Piping	MT	0.00	0.00	0.00	38.84
5	Insulation	MT	152.00	152.00	152.00	0.80
6	H & S	MT	0.00	0.00	0.00	12.85
	Total	MT	**2352**	**2146**	**2274**	**1146**
	Package Weights (in MT)	MT	**7918.56**			

Note: 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. Any claim related to such issues or variation during execution of the contract shall not be entertained.

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 **Note:** There can be more than one location of open storage yard, Closed shed/ Semi Closed shed. Bidder shall make his establishment accordingly
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	

Sl. No	Description Part I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.2	**Electricity**			
3.2.1	Electricity for construction purposes only of Voltage 415/440 V, 3 phase, 50Hz	Yes		Chargeable. The charges for the actual energy consumed by the Contractor shall be Recovered by BHEL based on the prevalent rate of DISCOM.
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 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	
3.2.3	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	

Sl. No	Description Part I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.3	**Water Supply**			
3.3.1	For construction purposes:			
a	Making the water available at single point		**Yes**	Contractor shall make all arrangements himself for supply of construction water as well as potable water for labour and other personnel at the work site/ colony. However, drawl of construction/potable water from bore-well shall be permitted if found suitable. Any statutory clearance required shall be obtained by the contractor.
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	Contractor shall make all arrangements himself for supply of construction water as well as potable water for labour and other personnel at the work site/ colony. However, drawl of construction/potable water from bore-well shall be permitted if found suitable. Any statutory clearance required shall be obtained by the contractor.
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	

Sl. No	Description Part I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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	
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	

Sl. No	Description Part I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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		
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

Sl. No	Description Part II 3.9 Erection Facilities	Scope / to be taken care by		Remarks
		BHEL	Bidder	
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/bed		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.

3.14 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 BHEL will only provide only special type of electrode/ filler wire which is required for Absorber cladding strip welding and ducting (from absorber to chimney). This special type of electrode/ filler wire will be supplied by BHEL manufacturing units. All other electrodes/ filler wire including stainless steel electrodes/ filler wire required for site welding shall be arranged by the contractor at his cost. The bidder shall use the Customer approved quality welding electrodes/ filler wire only. The utilization of the welding wires/ electrode 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/ electrode 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.

List of Tool & Plants to be deployed by the contractor – The following minimum major Tools & Plants (T&P) shall be arranged by the Contractor within the quoted rate for execution of this contract (for each of Pkg-A & Pkg-B):.

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
1	Tyre mounted / mobile crane (Telescopic boom, Hydraulically operated with turret function)	40 MT	02 Nos	To be deployed as per instruction of BHEL Engineer.
~~2~~	~~Tyre mounted / mobile crane (Telescopic boom, Hydraulically operated with turret function)~~	~~75 MT~~	~~01 No~~	~~To be deployed as per instruction of BHEL Engineer.~~
3	New generation Pick & carry type tyre mounted mobile crane. (Farana). **Hydra is not allowed.**	12/14/18 MT	04 Nos	To be deployed as per instruction of BHEL Engineer.
4	Mixer for Grouting of equipment foundations			**As per requirement**
5	Suitable capacity of Hydraulic test pumps and Fill Pump for testing of piping			**As per requirement**
~~6~~	~~Plasma Cutting Machine~~	~~Suitable to cut plate thickness upto 25mm~~	~~02 nos~~	~~**As per requirement**~~
7	Trailer with prime mover	20 MT	02 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 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.

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
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	Upto 56 MM	As required	To be deployed as per instruction of BHEL Engineer.
14	Tube expander	As required	1 No	**As per requirement**
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	
23	Radiography arrangement with radioactive isotope source	Iridium-192	As required	
24	Theodolite of required accuracy	To ensure verticality of structural columns.	As required	
25	Self-drilling cum tapping machine for screws of roof sheets	As required	As required	
26	Electro-hydraulic pipe bending machine	Up to 2" NB and 12 mm thick pipes	As required	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
27	Radiography film viewer	As required	As required	
28	Hydraulic pipe bending machine (manual)	For bending of pipes up to 50 mm nb size	As required	
29	Pipe chamfering machine /Tube Cutting	4-14”	As required	
30	Pipe chamfering machine /Tube Cutting	14-20”	As required	
31	Pipe cutting & beveling machines		Adequate nos.	
32	Chain pulley blocks of various & Suitable capacities		As Required	As per the instructions of BHEL Engineer
33	Baking oven with thermostat and temperature gauge for welding electrodes	As required	As Required	
34	Baking & Holding oven with thermostat and temperature gauge for welding electrodes	As required	As Required	
35	Portable oven for welding electrodes	As required	As Required	
36	Electric winch	2/3/5/10/ 15 ton capacity	As Required	
37	Hand winch	0.5 ton capacity	As Required	
38	Scaffolding materials with clamps.	Suitable for working at various heights	As required	For Alignment, welding & Insulation works
39	Profile making M/c	For aluminium sheet cladding work	as required	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
40	Nibbling M/c	For refractory and other required activities	as required	
41	Shearing M/c		as required	
42	Portable grinding M/c	As required	as required	
43	Portable drilling M/c	As required	as required	
44	Hoisting and pulley devices/pulleys	As required	As required	
45	Fire retardant tarpaulins	As required	As required	
46	Fire extinguisher	As required	as required	
47	Hydraulic Jacks	10/20/50/ 100 MT	as required	
48	Dewatering pumps		as required	
49	Various sizes of clamps/ fixtures for assembling		as required	
50	Magnetic particle testing equipment-Dry & Wet Type		as required	
51	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		as required	
52	Spectrometer for metal testing		as required	
53	Alco meter for paint thickness checking		as required	
54	Hand Operated Megger 500 / 1000 V		as required	
55	Tong Tester 10, 20 Or 50 Amp + / - 3 % Accuracy		as required	
56	Digital and Analogue Multimetres		as required	
57	U Tube Manometer 0-2000 mm		as	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
	Water Column		required	
58	Inclined Manometer 0-50 mm Water Column		as required	
59	Calibrated Pneumatic Torque wrench		4 nos.	
60	Bolt Tension Calibrator		as required	
61	Safety Net		As required	**To be deployed from begining**
62	Man lifter for bolted structure bolt tightening		As required	As per the instructions of BHEL Engineer
63	Plate rolling/bending machine		As required	As per the instructions of BHEL Engineer (For fabrication)
~~64~~	~~PUG machine~~		~~As required~~	~~As per the instructions of BHEL Engineer (For fabrication)~~
~~65~~	~~Shot blasting arrangement with consumable~~		~~As required~~	~~As per the instructions of BHEL Engineer (For fabrication)~~

4.1 All the T&Ps required for this scope of work, except the Tools & Plants provided by BHEL are to be arranged by the contractor with in the quoted rates.

4.2 **The age of the contractor deployed cranes/hydras mentioned above in SN No 1, ~~2~~ & 3 should be within 15 years as on date of deployment. Contractor has to provide documentary evidence/ proof for age of the crane at the time of deployment to BHEL Engineer.**

4.3 The contractor to furnish a list of Tools and plants including tractors / trailers/ trucks etc. which contractor proposed to deploy for this work.

4.4 Fill pumps shall be arranged by the contractor, wherever required.

4.5 For testing LP lines necessary Hydraulic Test pumps/ Hand pumps are to be arranged by the contractor.

4.6 For handling at store and transportation, contractor shall make his own arrangement.

4.7 For transportation, material handling, loading& unloading of all components / equipments, the contractor has to make his own arrangements at his own cost. BHEL will not provide any crane / T&Ps for unloading the above components. All necessary T&P

such as, Trailers, Cranes Winches, Welding generators, Slings, Jacks, Sleepers, Rails etc. are to be arranged by the contractor.

4.8 All the T & P, lifting tackles including wire ropes, slings, shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use. Test certificates obtained from the statutory authority should be submitted before their usage.

4.9 All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.

4.10 All instruments, measuring tools etc. are to be calibrated periodically as per the requirement of BHEL and necessary calibration certificates are to be submitted to BHEL before use.

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

4.12 Also Refer Chapter-V in connection with BHEL T & Ps V of this booklet.

4.13 Other Relevant clauses shall be referred in Special Conditions of Contract (SCC)

4.14 **All above T&Ps are to be deployed by contractor as and when required as per instruction of BHEL engineer. 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.**

Measuring and Monitoring Equipments (MMEs): 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. 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.
2. Depending upon the nature of work and availability of facilities locally, contractor may have to arrange for a temporary workshop for facilitating uninterrupted progress of work.
3. Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be to Contractor‘s account.
4. 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.
5. **Considering operational safety, the use of material handling equipment “HYDRA” is banned, agencies has to deploy the Pick & Carry cranes (Farana) of required capacity.**

6. 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

7. 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.

8. If the work related to T & Ps mentioned above is completed then, BHEL can release that T & P during contract period / extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager for releasing the T&P.

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	Cranes of Capacity above 40 MT.	As decided by BHEL	All cranes (except Contractor scope) required for the contracted scope of work will be arranged by BHEL as per requirement.
2	Industrial Air Blower and accessories with power cable	20,000 m^3/hr	For ATT of ducts and absorber

5.1 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.

5.2 Contractor shall make necessary arrangements like laying of special sleeper beds and steel plates ~~(all arranged by contractor),~~ assembly and dismantling of heavy lift attachment, boom, jib etc for movement and operation of the crane. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work. Contractor shall also make necessary arrangements like laying of special sleeper beds and steel pates ~~(all arranged by contractor)~~ for movement and operation of the crane. Levelled area in FGD area will be provided by BHEL/customer for the cranes. Consolidation of the ground, if required, and preparation (including civil work with material) for placing crane for operation shall be done by the contractor, at his cost. ~~Necessary plates / sleepers required for marching operation shall also be provided by the contractor within quoted rates. Required numbers of mild steel plates of 40/45/50 mm thick and 12 metre length x 3 metre width (around 6 numbers) for the above purpose is to be arranged by contractor within his quoted rate.~~

5.3 Contractor shall provide the fuel, lubricants and consumables for BHEL provided cranes (hired/owned) for his use.

5.4 Cranes provided by BHEL will be on sharing basis with other agencies / contractors of BHEL. The allocation of cranes shall be the discretion of BHEL engineer, which shall be binding on the contractor. Cranes will be deployed at appropriate time as decided by BHEL for suitable duration and intended purpose.

5.5 Above T&P and cranes will be used for erection of all units including common system and Duct erection also on sharable basis

5.6 <u>Cranes are only for erection purpose and shall not be available for material handling or transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.</u>

5.7 **Contractor has to provide his 40 MT (as per site requirement) crane free of cost for Assembly of BHEL cranes.**

5.8 Above T&P will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use. The decision of BHEL Engineer in-charge/CM on this will be final and binding.

5.9 Suitable capacity cranes, if required, for erection will be provided by BHEL free of hire charges.

5.10 Operator for BHEL owned crane will be arranged by BHEL.

5.11 Necessary electrical / water / air connection required for operation of any of the BHEL's T & Ps shall be Contractor's account. All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections shall have to be arranged by the contractor at his cost.

5.12 The contractor at his cost shall arrange for grouting of anchor points of T & Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.

5.13 The Contractor shall be responsible for the safe and proper use of the above equipments issued to his. Day-to-day maintenance and operation of equipment's shall be the contractor's responsibility and shall be as per instructions / standard practice of BHEL Engineer

5.14 Apart from the above mentioned tools, any other tools and plants required for satisfactory completion of the work has to be arranged by the contractor

5.15 Monthly utilisation report of the above equipment shall be furnished by contractor for cost analysis purpose.

5.16 In case of non-availability of the above, due to any unavoidable reason, like breakdown, overhaul etc., contractor shall make arrangement at his own cost to meet the erection schedules. No extra claim will be admitted due to the non-availability of any of the above equipment. No delay in execution of work shall be accepted on this account.

5.17 The contractor shall return the T & P issued to him by BHEL in good working condition as and when so desired by BHEL. (Completion or reduction in work load) for diversion for other work. If such return is delayed by contractor due to his fault without written consent of BHEL, hire charges as applicable according to BHEL policy will be levied from such time it was requisitioned by BHEL to the time of actual return and the amount so decided and arrived at, will be recovered from the contractor's bill.

5.18 Contractor shall have at all times experienced operators and technicians for routine and breakdown maintenance of the equipment. Any delay in rectification of defects will warrant BHEL rectifying the defect and charging the cost to the contractor.

5.19 If at any time it is noticed that contractor is not using any of the T & P or equipment properly according to the instructions of BHEL, BHEL will have the right to withdraw all such equipment and any cost due to this shall be contractor's account.

5.20 All the T & P would be issued only at BHEL stores and it shall be the responsibility of the contractor to take delivery from BHEL stores, transport the same to site and return the same to BHEL stores in good condition after use.

5.21 Contractor shall make good any loss or damage to the equipments supplied to him and day to day maintenance and operations of equipments shall be borne by the contractor including all consumables like petrol, oil and air filters etc.

5.22 Any Loss / Damage of tools by the contractor, the same shall have to be replaced by the contractor or otherwise cost thereof shall be recovered from the contractor.

5.23 Any loss / damage to any or part of the above equipments shall be to contractor's account and the expenditures on these accounts will be recovered from contractor's bills in case contractor fails to make good the loss.

6.1 TIME SCHEDULE

6.1.1 The entire work as detailed in the Tender Specification shall be completed from the date of "Start of Contract period" at site, for the mentioned scope of work shall be completed within **13 (Thirteen)** months from the date of "Start of Contract period" at site, for the Package.

6.1.2 VOID.

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 Pre-Assembly/fabrication of Ducts. 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.

6.1.6 **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 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.

6.2 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:

Month		1	2	3	4	5	6	7	8	9	10	11	12	13
	Package													
1	Unit # 4 (Ducting Package)	Erection Start				Readiness of ducting	Completion of ATT		Readiness of ducting for Gas in					Completion of Facilities
2	Unit # 5 (Ducting Package)	Erection Start				Readiness of ducting	Completion of ATT		Readiness of ducting for Gas in					Completion of Facilities
3	Unit # 6 (Ducting Package)		Erection Start						Readiness of ducting	Completion of ATT	Readiness of ducting for Gas in			Completion of Facilities
4	Common System	Erection Start				Readiness of ACW/DMCW system		Readiness of Ball Mill & Aux						Completion of Facilities

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.

6.3 CONTRACT PERIOD

The contract period for completion of entire work under scope for each of the packages shall be 13 Months from the "COMMENCEMENT OF CONTRACT PERIOD" as specified earlier for completion of the entire work.

6.4 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. Intermediate Milestone for Package-A and Package- B is given below:

Package-A		
Milestones	**Activities**	**To be completed by**
M1	Readiness of ducting of Stage-II (Unit # 4) ducting	5th Month from the date of Start
M2	Readiness of Ball Mill & its Aux	7th Month from Date of start

Note 1:

1. Refer **clause no 12 of IMPORTANT INFORMATION of the NIT (Annexure-12)** regarding modalities against provision of penalty in case of slippage of Intermediate Milestones. 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.

7.1 Terms of payment (Part A1)

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

7.1.1 Progressive Payment against monthly running bills will be made upto 85% of the value of the erected Pro-rata as per Cl no 7.1.1.1 to 7.1.1.7 of the following table.

Sl no	**Contract (Main Package) Identification ----->**	**Structure**	**Non Pressure Parts**	**Rotating Machine**	**Hanger & Support**	**Insulation**	**Piping**
	Rate schedule Identification ------->	**Structure 1A**	**Non Pressure Parts (Ducts/dampers, etc) 2A**	**Rotating Machine etc 3A**	**H & S 6A**	**1. Iron Components 5A 2. Wool mattresses - 5A 3. Aluminum sheeting – 5A**	**1. CS piping 4A 2. GI Piping 4C 2. SS piping 4B**
	Pro Rata Payments (85%)						
7.1.1.1	On Pre-assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position)	20%	20%	20%	15%	--	15%
7.1.1.2	Placement in position	20%	20%	20%	25%	50%	15%
7.1.1.3	Alignment	20%	10%	20%	15%	15%	10%
7.1.1.4	Welding/ Bolting/ Fixing	20%	25%	20%	30%	20%	20%
7.1.1.5	Completion of Non - Destructive examination & Stress relieving/ Heat	5%	10%	5%		--	15%

	treatment (if not applicable, then this portion to be paid along with welding)						
7.1.1.6	Hangers & Supports etc wherever necessary as per drg	--	--	--	--	--	5%
7.1.1.7	Hydraulic Test or Pneumatic Test	--	--	--	--	--	5%
	Total for Pro Rata Payments (Total 85%)	**85%**	**85%**	**85%**	**85%**	**85%**	**85%**

7.1.2 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.

7.1.2	**Stage/ Milestone Payments (15%)**	**% Payment**
7.1.2.1	Completion of air & gas tightness test for Ducts	2%
7.1.2.2	Total Water-run Test of Absorber	2%
7.1.2.3	Trial run of RC Pumps	1%
7.1.2.4	Trial run of Booster Fans	1%
7.1.2.5	Trial run of Oxidation Blower	1%
7.1.2.6	Commissioning of FGD system	2%
7.1.2.7	Back-wash Charging	2%
7.1.2.8	Area cleaning, temporary structures cutting/removal and return of scrap	1%
7.1.2.9	Punch List points/pending points liquidation	1%
7.1.2.10	Material Reconciliation	1%
7.1.2.11	Completion of Contractual Obligation	1%
	Total for Stage /Milestone Payments (15%)	**15%**

~~Dismantling: Rate Scheudle identifier **7D** -100% on dismantling~~
~~Re-erection: Rate schedule ID - **1A**~~

12.3 : Payment towards installation and commissioning of DG set shall be done as follows (Rate Schedule – 9A)

Lump-sum rate shall be derived as per tonnage allocated to DG set as per BOQ given in Chapter-IX-9.13. Lum sum shall be divided by 2 to derive lumpsum rate for each DG set. Following % payment shall be applicable per DG set.

7.3	**Description of activity**	% Payment
7.3.1	Preparation of foundation, erection, placement in position, leveling, grouting, and completion etc of DG set, Fuel day tank, exhaust support structure.	40%
7.3.2	Internal fuel oil piping and complete exhaust piping completion	25%
7.3.3	Alignment of Engine with Generator, Completion of erection, welding of accessories viz. Pipes, Structural, cable laying, connections/ terminations, pre-commissioning tests	20%
7.3.3	Testing, trial run and commissioning.	15%

7.4 Payment towards works of Tap-off duct work shall be done as per follows

7.4	**Description of activity**	% Payment
7..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%
7.4.2	Erection, Alignment, Welding and NDT of tap off ducts, gates and dampers including insulation	50%
7.4.3	Shifting of removed Insulation materials & removed duct plates from erection site to BHEL/NTPC yard.	15%

8.0 TAXES, DUTIES, LEVIES (Rev 14 dated 09/10/2020)

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. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.

   If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.
6. 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

7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. **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.

13. 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.

14. **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.**

15. **TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.**

16. **TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions**
    i. Buyer shall be as per clause (a) of section 206C- (1H)
    ii. Seller shall be as per clause (b) of section 206C- (1H)

iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

For TCS claim, vendor has to submit relevant documents required as per Income Tax Act.

17. 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:

Sl no	Description	UOM	Package A			
			Stage II - Unit 4	Stage II - Unit 5	Stage II - Unit 6	Common system for all 4 Units
1	Str	MT	650.85	690.06	768.90	0.00
2	NPP	MT	1549.37	1304.36	1352.60	290.36
3	RMC	MT	0.00	0.00	0.00	518.94
4	Piping	MT	0.00	0.00	0.00	0.00
a	CS Piping	MT	0.00	0.00	0.00	269.00
b	SS Piping	MT	0.00	0.00	0.00	15.62
c	GI Piping	MT	0.00	0.00	0.00	38.84
5	Insulation	MT	152.00	152.00	152.00	0.80
6	H & S	MT	0.00	0.00	0.00	12.85
	Total	MT	**2352**	**2146**	**2274**	**1146**
	Package Weights (in MT)	MT	**7918.56**			

9.1 Material Supplied by BHEL- Piping Centre Chennai:

Project	PGMA	PGMA Description	Weight in Kg	Remarks
P1/7443	80-933	H & S For LP Piping	2940	Common system for Stage I & II
P1/7443	80-463	TG Aux Cooling Water	190320	
P1/7443	80-610	Service Air/ Instrument Air-Compressor suction and discharge to receiver	16290	
		Total Weight (Kg)	209550	
		Total Weight (MT)	**209.55**	

PGMA Description:

PROJECT TITLE: 3X200MW+3X500MW RAMAGUNDAM STPP CUST :7443														
Sl. No.	**LINE DESCRIPTION**	**PIPE MATERIAL**	**PIPE**			**BENDS / ELBOWS**		**REDUCERS**		**TEES**		**Location**	**Rate schedule identifier**	**Remarks**
		SPECIFICATION	**NB (mm)**	**PIPE WEIGHT**	**FIT WEIGHT**	**SIZE (NB)**	**No**	**SIZE (NB)**	**No**	**SIZE (NB)**	**No**			
A	**ACW SYSTEM FOR FGD AUXILIARIES**													
1.0	FROM CW BLOW DOWN LINE TO ACW PUMP SUCT. HEADER	CARBON STEEL AS PER IS:2062 GR.B	300	70560	7060	300	50			300X300	1	CW B/D HEADER CONSIDERED NEAR CW P/H OF STAGE-II OF PLANT	CS Piping 4A	Common system
2.0	ACW PUMP SUCT. HEADER INSIDE PUMP HOUSE	CARBON STEEL AS PER IS:2062 GR.B	300	710	80	300	0	300X250	1			INSIDE ACW & DMCW PUMP HOUSE	CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	200X150	1				CS Piping 4A	Common system
3.0	ACW INDIVIDUAL SUCTION	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	1090	110	150	10	150X PUMP SUC. DIA	8	300X150 250X150 200X150	2 2 2		CS Piping 4A	Common system

4.0	ACW INDIVIDUAL DISCHARGE	-DO-	150	1090	110	150	10	150X PUMP D/S. DIA	8	300X150 250X150 200X150	222		CS Piping 4A	Common system
5.0	ACW PUMP RECIRCULATION	-DO-	80	100	10	80	5			300X80	2		CS Piping 4A	Common system
6.0	ACW DISCHARGE HEADER TO PHE	CARBON STEEL AS PER IS:2062 GR.B	300	1180	120	300	12	300X250	1				CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	200X150	1				CS Piping 4A	Common system
7.0	ACW DISCHARGE HEADER TO PHE (INDIVIDUAL LINE)	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	870	90	150	15	150X PHE SUC.. DIA	7	300X150 250X150 200X150	222		CS Piping 4A	Common system
8.0	ACW PHE INDIVIDUAL DISCHARGE	-DO-	150	870	90	150	15	150X PHE D/S. DIA	7	300X150 250X150 200X150	222		CS Piping 4A	Common system
9.0	ACW PHE DISCHARGE HEADER INSIDE PUMP	CARBON STEEL AS PER IS:2062 GR.B	300	1420	150	300	5	300X250	1			INSIDE ACW & DMCW PUMP HOUSE	CS Piping 4A	Common system
			250	400	40	250	0	250X200	1				CS Piping 4A	Common system

	HOUSE		200	320	40	200	0	200X150	1				CS Piping 4A	Common system
10.0	PHE DISCHRGE HEADER FROM PUMP HOUSE TO PROCESS WATER FOR FGD UNIT #1 TO 6	CARBON STEEL AS PER IS:2062 GR.B	300	14120	1420	300	15			300x150	3		CS Piping 4A	Common system
			250	1980	200	250	5			200x150	2		CS Piping 4A	Common system
			200	1580	160	200	5	200x150	2	200x100	3		CS Piping 4A	Common system
		CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	6510	660	150	20						CS Piping 4A	Common system
			100	1460	150	100	5						CS Piping 4A	Common system
B	**DMCW SYSTEM FOR FGD AUXILIARIES**													
1.0	FROM NORMAL & EMERGENCY MAKEUP FROM TP AT C-ROW TO ECW O/H TANK (2 LINE)	SS (ASTM A312 GR.304)	50	13600	1360	50	100			50X40	2		SS Piping 4B	Common system
2.0	FROM ECW O/H TANK TO SUCTION HEADER OF PUMPS		100	260	30	100	10			300x100	1		SS Piping 4B	Common system
3.0	NaOH DOSING		40	130	20	40	8			40x40 300x40	1 1		SS Piping 4B	Common system
4.0	FROM ECW TANK TO		80	130	20	80	5			80x50	1		SS Piping 4B	Common system

	HYDROSTATIC SEAL		50	60	10	50	5						SS Piping 4B	Common system
5.0	DMCW SUCTION HEADER INSIDE PUMP HOUSE	CARBON STEEL AS PER IS:2062 GR.B	300	950	100	300	6	300X250	1			INSIDE ACW & DMCW PUMP HOUSE	CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	200X150	1				CS Piping 4A	Common system
6.0	DMCW INDIVIDUAL SUCTION	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	1090	110	150	10			300X150 250X150 200X150	222		CS Piping 4A	Common system
7.0	DMCW RECIRCULATION		80	50	10	80	0			300X80	2		CS Piping 4A	Common system
8.0	DMCW INDIVIDUAL DISCHARGE		150	1090	110	150	10			300X150 250X150 200X150	222		CS Piping 4A	Common system
9.0	DMCW DISCHARGE (COMMON HEADER)	CARBON STEEL AS PER IS:2062 GR.B	300	710	80	300	4	300X250	1				CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	200X15	1				CS	Common

								0					Piping 4A	system
10.0	DMCW COMMON HEADER TO PHE INLET	CARBON STEEL AS PER IS:2062 GR.B	300	480	50	300	3	300X250	1				CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	200X150	1				CS Piping 4A	Common system
11.0	DMCW TO PHE INDIVIDUAL SUCTION	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	1090	110	150	10	150X PHE SUC.DIA.	7	300X150 250X150 200X150	222		CS Piping 4A	Common system
12.0	DMCW PHE INDIVIDUAL DISCHARGE		150	1090	110	150	10	150X PHE D/S.DIA.	7	300X150 250X150 200X150	222		CS Piping 4A	Common system
13.0	DMCW PHE DISCHARGE HEADER INSIDE PUMP HOUSE	CARBON STEEL AS PER IS:2062 GR.B	300	710	80	300	5	300X250	1			INSIDE ACW & DMCW PUMP HOUSE	CS Piping 4A	Common system
			250	280	30	250	0	250X200	1				CS Piping 4A	Common system
			200	230	30	200	0	250X150	1				CS Piping 4A	Common system
14.0	DMCW BYPASS LINE		300	710	80	300	6			300X300	2		CS Piping	Common system

													4A	
15.0	DMCW SUPPLY FROM ACW/ DMCW PUMP HOUSE TO: IA/SA COMPRESSOR & FGD AUXILAIRIES UNIT-1TO 6 (COMMON HEADER)	CARBON STEEL AS PER IS:2062 GR.B	300	9410	950	300	15			300X300	2		CS Piping 4A	Common system
			250	1980	200	250	5	300X250	1				CS Piping 4A	Common system
			200	1580	160	200	5	250X200	1				CS Piping 4A	Common system
16.0	INDIVIDUAL LINE TO ALL FGD AUX.(STAGE I & II)	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	4340	440	150	10	200X150	1	200X150	1		CS Piping 4A	Common system
			100	4360	440	100	20			250X100 300X100	41		CS Piping 4A	Common system
17.0	DMCW RETURN TO ACW/ DMCW PUMP HOUSE FROM:	CARBON STEEL AS PER IS:2062 GR.B	300	9410	950	300	15			300X300	2		CS Piping 4A	Common system
			250	1980	200	250	5	300X250	1				CS Piping 4A	Common system

	IA/SA COMPRESSOR & FGD AUXILAIRIES UNIT-1TO 6 (COMMON HEADER)		200	1580	160	200	5	250X200	1				CS Piping 4A	Common system
18.0	DMCW RETURN LINE(INDIVIDUAL) FROM ALL FGD AUX.(STAGE I & II)	CARBON STEEL AS PER IS:1239 (HEAVY GRADE)	150	4340	440	150	10	200X150	1	200X150	1		CS Piping 4A	Common system
			100	4360	440	100	20			250X100 300X100	41		CS Piping 4A	Common system
C	**INSTRUMENT AIR/SERVICE AIR**													
1.0	IS/SA COMMON HEADER	GALVANISED AS PER IS:4736 & SHALL BE CONFIRM TO IS:1239(HEAVY GRADE)	100	13060	1310	100	50			100X100	10		GI Piping 6A	Common system
2.0	IS/SA INDIVDUAL LINE		25	1740	180	25	60			100X25	25		GI Piping 4C	Common system
						150NB	6	250X150	1	250X150	2		GI Piping 4C	Common system

Summary Sheet:

Summary Sheet Mechanical Package BHEL- PC, Chennai (Piping)				
Sl no	**Description**	**UOM**	**Total Weight**	**Remarks**
A	CS Piping	MT	174.7	Common System
B	SS Piping	MT	15.62	Common System
C	GI Piping	MT	16.29	Common System
5	Insulation	MT	0	Common System
6	H & S	MT	2.94	Common System
	Total		**209.55**	

9.2 Material Supplied by BHEL- PEM

SR. NO	**PACKAGE DESCRIPTION**	**QUANTITY FOR STATION (Nos)**	**WEIGHT**		**Rate Schedule Identifier**	**Remarks**
			PER EQUIPMENT (In Tonnes)	**TOTAL FOR STATION (In Tonnes)**		
MSE						
1	ACW PUMPS (Hor)	9	0.85	7.65	RMC 3A	Common System
2	ECW PUMPS (Hor)	8	0.85	6.8	RMC 3A	Common System
3	SELF CLEANING STRAINERS	2	1.5	3	CS Piping 4A	Common System
4	CONICAL STRAINERS	8	0.3	2.4	CS Piping 4A	Common System
5	PHE	8	2	16	CS Piping 4A	Common System
	Total Weight in MT			**35.85**		

TENTATIVE SCHEDULE OF WEIGHT AND DIMENSION						
SR. NO	**PACKAGE DESCRIPTION**	**QUANTITY (NOS)**	**DIMENSION**	**WEIGHT**	**Rate Schedule Identifier**	**REMARKS**
				TOTAL (Kg)		
1	Control Valves	1		400	CS Piping 4A	Common system
2	Flow Orifices	11		1210	CS Piping 4A	Common system
3	Rotameters	44		5750	CS Piping 4A	Common system

	Total weight			7360		
	Total weight in MT			**7.36**		

SR. NO	PACKAGE DESCRIPTION	QUANTITY FOR STATION (Nos)	WEIGHT TOTAL FOR STATION (In Tonnes)	Location	Rate Schedule identifier	Remarks
1	ELECTRIC HOISTS	5	3	ACW Pump house-1 no FGD Control room for Electrical Panel-2 nos 33 KV Switch Gear Room-1 no FGD Control Room Elevator- 1 no	NPP 2A	Common System
2	SINGLE GIRDER CRANE	1	6	Gypsum dewatering cum compressor house building	NPP 2A	Common System
	Total Weight in MT		**9**			

Summary Sheet Mechanical Package BHEL- PEM (Piping, Valve, Instruments, Pumps, PHE, Crane)				
Sl no	**Description**	**UOM**	**Total**	**Remarks**
1	NPP	MT	9	Common System
2	RMC	MT	14.45	Common System
A	CS Piping	MT	28.76	Common System
	Total		**52.21**	

9.3 Material Supplied by BHEL- Hyderabad

Tentative Weight details of Wet Ball Mill					
Sl. No.	**Description**	**Weight in Tons**	**Quanity per Mill**	**Rate Schedule Identifier**	**Remarks**

1	Grith Gear -HALF	7	2	RMC 3A	Common System
2	Main pinion Shaft	3	1	RMC 3A	Common System
3	Main reducer	5	1	RMC 3A	Common System
4	Inching reducer	2	1	RMC 3A	Common System
5	Agitator assembly	2	1	RMC 3A	Common System
6	Mill Shell	32	1	RMC 3A	Common System
7	Losse items	30	1	RMC 3A	Common System
8	Mill Slurry pump	3	2	RMC 3A	Common System
9	Dischrage trunion assembly	2	1	RMC 3A	Common System
10	Grinding Balls	135	1	RMC 3A	Common System
11	Mill Liners	50	1	RMC 3A	Common System
12	Slurry tank	5	1	RMC 3A	Common System
13	Bearing housing	4	2	RMC 3A	Common System
14	Foundation items	15	1	RMC 3A	Common System
15	Hydroc-cyclone	8	1	RMC 3A	Common System
16	Belt Feeder	5	1	RMC 3A	Common System
17	Piping	30	1	RMC 3A	Common System
18	Misc.	40	1	RMC 3A	Common System
19	Platforms and ladders	25	1	RMC 3A	Common System
	Total Weight in MT	**403**			

Sl no	**Description**	**UOM**	**Common system for Stage I & II Package B**
1	RMC	MT	403
	Total in MT		**403**

9.4 Material Supplied by BHEL- Ranipet:

Sl No	Cust	PGMA	PGMA Description	Ducting Package	Rate Schedule Identifier
1	G509	57583	DAMPER FGD BYPASS	35.56	NPP 2A
2	G509	FW232	DUCT SUP BYP & BUF/GGH	308.77	NPP 2A
3	G509	FW238	HOOK UP DUCT WITH STRUCTURE	33.03	NPP 2A
4	G509	FW251	EXPNSN JNT METALLIC	47.664	NPP 2A
5	G509	FW255	DUCT BYP & BUF/GGH/ABS	1165.06	NPP 2A
6	G509	FW280	FOUNDATION MATL FOR DUCT STRUC	19.248	Str 1A
7	G509	FW238	HOOK UP DUCT WITH STRUCTURE	4.49	NPP 2A
8	G509	57141	SEAL AIR HAG AND ID FAN OUTGAT	15.6	NPP 2A
9	G509	57209	MTG BKT FOR CL DAMPER AIR CYL	1.6	NPP 2A
10	G509	57466	PLATFORMS AND LADDERS	12	Str 1A
11	G509	57491	BLOWER WITH MOTOR	10.4	NPP 2A
12	G509	57497	KNIFE GATE VALVE	14	NPP 2A
13	G509	57566	PLATFORMS AND LADDERS-FGD GD	6	NPP 2A
14	G509	57577	ELECT ACTUATOR FOR GATE,DAMPER	9.32	NPP 2A
15	G509	57578	ELECTRICAL ITEMS FOR GATE,DAMP	0.08	NPP 2A
16	G509	FW207	OUTLET GUIDE VANE	16	NPP 2A
17	G509	FW252	EXPNSN JNT NON METALLIC	4.8	NPP 2A
18	G509	FW260	DUCT STR BYP & BUF/GGH/ABS	645	Str 1A

19	G509	FW267	INSULATION MATERIALS FOR DUCT	64	Insulation 5A
20	G509	FW268	FIXING COMP FOR DUCT	64	Insulation 5A
21	G509	FW269	CLADDING SHEET FOR DUCT	24	Insulation 5A
22	G509	FW297	PLATFORM FOR DUCT	4.8	Str 1A
23	G509	FW298	PLATFORM FOR G&D	4.8	Str 1A
24	G509	FW373	HSFG BOLT-DUCT STRU	16	Str 1A
25	G509	FW612	GALLARIES AND RAILINGS FOR DAM	24	Str 1A
26	G509	FW613	GALLARIES AND RAILINGS FOR DUC	24	Str 1A
			Total Weight (MT)	**2574**	

Sl No	Cust	PGMA	PGMA Description	Ducting Package Weight (Wt)	Rate Schedule Identifier
1	G510	57583	DAMPER FGD BYPASS	35.56	NPP 2A
2	G510	FW232	DUCT SUP BYP & BUF/GGH	294.65	NPP 2A
3	G510	FW238	HOOK UP DUCT WITH STRUCTURE	33.03	NPP 2A
4	G510	FW251	EXPNSN JNT METALLIC	44.104	NPP 2A
5	G510	FW255	DUCT BYP & BUF/GGH/ABS	1045.73	NPP 2A

6	G510	FW280	FOUNDATION MATL FOR DUCT STRUC	18.464	Str 1A
7	G510	FW238	HOOK UP DUCT WITH STRUCTURE	4.49	NPP 2A
8	G510	57141	SEAL AIR HAG AND ID FAN OUTGAT	15.6	NPP 2A
9	G510	57209	MTG BKT FOR CL DAMPER AIR CYL	1.6	NPP 2A
10	G510	57466	PLATFORMS AND LADDERS	12	Str 1A
11	G510	57491	BLOWER WITH MOTOR	10.4	NPP 2A
12	G510	57497	KNIFE GATE VALVE	14	NPP 2A
13	G510	57566	PLATFORMS AND LADDERS-FGD GD	6	Str 1A
14	G510	57577	ELECT ACTUATOR FOR GATE,DAMPER	9.32	NPP 2A
15	G510	57578	ELECTRICAL ITEMS FOR GATE,DAMP	0.08	NPP 2A
16	G510	FW207	OUTLET GUIDE VANE	16	NPP 2A
17	G510	FW252	EXPNSN JNT NON METALLIC	4.8	NPP 2A
18	G510	FW260	DUCT STR BYP & BUF/GGH/ABS	645	Str 1A
19	G510	FW267	INSULATION MATERIALS FOR DUCT	64	Insulation 5A
20	G510	FW268	FIXING COMP FOR DUCT	64	Insulation 5A
21	G510	FW269	CLADDING SHEET FOR DUCT	24	Insulation 5A
22	G510	FW297	PLATFORM FOR DUCT	4.8	Str 1A
23	G510	FW298	PLATFORM FOR G&D	4.8	Str 1A

24	G510	FW373	HSFG BOLT-DUCT STRU	16	Str 1A
25	G510	FW612	GALLARIES AND RAILINGS FOR DAM	24	Str 1A
26	G510	FW613	GALLARIES AND RAILINGS FOR DUC	24	Str 1A
			Total Weight (MT)	**2436**	

Sl No	Cust	PGMA	PGMA Description	Ducting Package	Rate Schedule Identifier
1	G511	57583	DAMPER FGD BYPASS	35.56	NPP 2A
2	G511	FW238	HOOK UP DUCT WITH STRUCTURE	33.03	NPP 2A
3	G511	FW251	EXPNSN JNT METALLIC	46.144	NPP 2A
4	G511	FW255	DUCT BYP & BUF/GGH/ABS	1066.07	NPP 2A
5	G511	FW280	FOUNDATION MATL FOR DUCT STRUC	19.808	Str 1A
6	G511	FW238	HOOK UP DUCT WITH STRUCTURE	4.49	Str 1A
7	G511	57141	SEAL AIR HAG AND ID FAN OUTGAT	15.6	NPP 2A
8	G511	57209	MTG BKT FOR CL DAMPER AIR CYL	1.6	NPP 2A
9	G511	57466	PLATFORMS AND LADDERS	12	Str 1A
10	G511	57491	BLOWER WITH MOTOR	10.4	NPP 2A
11	G511	57497	KNIFE GATE VALVE	14	NPP 2A
12	G511	57566	PLATFORMS AND LADDERS-FGD GD	6	Str 1A
13	G511	57577	ELECT ACTUATOR FOR GATE,DAMPER	9.32	NPP 2A
14	G511	57578	ELECTRICAL ITEMS FOR GATE,DAMP	0.08	NPP 2A
15	G511	FW207	OUTLET GUIDE VANE	16	NPP 2A
16	G511	FW232	DUCT SUP BYP & BUF/GGH	100	NPP 2A

17	G511	FW252	EXPNSN JNT NON METALLIC	4.8	NPP 2A
18	G511	FW260	DUCT STR BYP & BUF/GGH/ABS	645	Str 1A
19	G511	FW267	INSULATION MATERIALS FOR DUCT	64	Insulation 5A
20	G511	FW268	FIXING COMP FOR DUCT	64	Insulation 5A
21	G511	FW269	CLADDING SHEET FOR DUCT	24	Insulation 5A
22	G511	FW297	PLATFORM FOR DUCT	4.8	Str 1A
23	G511	FW298	PLATFORM FOR G&D	4.8	Str 1A
24	G511	FW373	HSFG BOLT-DUCT STRU	24	Str 1A
25	G511	FW612	GALLARIES AND RAILINGS FOR DAM	24	Str 1A
26	G511	FW613	GALLARIES AND RAILINGS FOR DUC	24	Str 1A
			Total Weight (MT)	**2274**	

9.5 Material Supplied by BHEL- PEM

Equipment Size[B] & Weight[B] for Lime Dosing system - (3x200+3x500) MW Ramagundam St-I & II FGD						
SN	**Item description**	**Quantity for Station**	**Location[A]**	**Wt[B] of Individual Equipment/System (MT)**	**Rate Schedule Identifier**	**Remarks**
1	Bucket Elevator[C] (with surge	2 Nos	From Ground Floor of GDW	17	NPP 2A	Common System

	Hopper, Vibrating Feeder etc)		Building to Lime Silo Top			
2	Lime Silo (with manual & motorised gates, rotary feeder, Platform, Support steel structure, railings, ladder, for complete Lime Dosing system)	2 Nos	Lime silo will be supports on platform above neutralisation tank. Platform will be supports on GF of GDW building.	11	NPP 2A	
3	Bag filter for Lime Silo (with Blower)	2 Nos	Bag filter is to be placed on lime silo platform	0.6	NPP 2A	
4	Screw Conveyor	2 Nos	Interconnects lime silo rotary feeder to Neutralisation tank	1.8	NPP 2A	
5	Neutralisation Tank (With Agitator)	2 Nos	Separate foundation/floor mounted as per civil design, at ground Floor of GDW Building	2.5	NPP 2A	
6	Lime Dosing Pumps	2 Nos	At ground Floor of GDW Building, foundation as per civil design.	0.25	RMC 3A	
	Total Weight in MT			**22.15**		

Summary Sheet Mechanical Package BHEL- PEM, (Lime Dosing system/Chemical Dosing)				
Sl no	**Description**	**UOM**	**Common system for Stage I & II**	**Remarks**
2	NPP 2A	MT	21.9	Common System
3	RMC	MT	0.25	Common System
	Total		**22.15**	

9.6 Material Supplied by BHEL- PE & SD

FGD FPS (WEIGHT IN MT)

SL NO	ITEM	PGMA	Weight in MT	Rate Schedule Identifier	Remarks
1	MS PIPES	38601	51.68	CS Piping 4A	Common System
2	GI PIPES	38601	22.55	GI Piping 4C	Common System
3	CI GATE VALVES	38603	2.27	CS Piping 4A	Common System
4	CI BUTTERFLY VALVES	38603	0.22	CS Piping 4A	Common System
5	GUN METAL GATE VALVE	38603	0.01	CS Piping 4A	Common System
6	GUN METAL AIR RELEASE VALVE	38737	0.04	CS Piping 4A	Common System
7	Y-STRAINERS	38608	0.12	CS Piping 4A	Common System
8	BW FITTINGS	38602	2.11	CS Piping 4A	Common System
9	FORGED FITTINGS	38605	1.1	CS Piping 4A	Common System
10	FLANGES	38604	1.75	CS Piping 4A	Common System
11	GASKETS	38606	0.15	CS Piping 4A	Common System
12	STUD NUTS, U-BOLTS	38607	0.88	CS Piping 4A	Common System
13	ANCHOR FASTENERS	38607	0.43	CS Piping 4A	Common System
14	MS THREADED ROD (SWIVEL HANGERS)	38619	0.72	H & S 6A	Common System
15	MS PIPE CLAMPS (SWIVEL HANGERS)	38619	0.14	H & S 6A	Common System
16	STRUCTURAL STEEL	38618	9.05	H & S 6A	Common System
17	HYDRANT VALVES	38692	0.84	CS Piping 4A	Common System
18	FIRE HOSE WITH COUPLING	38729	1.02	CS Piping 4A	Common System
19	HOSE BOX	38728	0.64	CS Piping 4A	Common System
20	TRIPPLE PURPOSE NOZZLE	38731	0.42	CS Piping 4A	Common System
21	WATER MONITOR	38727	0.24	CS Piping 4A	Common System
22	DELUGE VALVES	38693	1.22	CS Piping 4A	Common System
23	QBD	38734	0.05	CS Piping 4A	Common System
24	SPRAY NOZZLES	38733	0.35	CS Piping 4A	Common System
	Total Weight in MT		**98**		

Summary Sheet Mechanical Package BHEL- PE & SD, Hyd (Fire Protection System)

Sl no	**Description**	**UOM**	**Common System for Stage I & II**	**Remarks**
1	Piping			Common System
a	CS Piping 6A	MT	65.54	Common System
b	SS Piping	MT	0	Common System
c	GI Piping	MT	22.55	Common System
2	Insulation	MT	0	Common System
3	H & S	MT	9.91	Common System
	Total in MT		**98**	

9.7 Material Supplied by BHEL- PEM

S. No.	**System**	**Total no. of skids/FGD project**	**Approx. weight (Empty)/ Erection Weight (Kg)**	**Rate Schedule Identifier**	**Remarks**
1	NaOH Dosing System	1 No.	1000	NPP 2A	Common System
	Total Weight in MT		**1**		

Summary Sheet Mechanical Package BHEL- PEM (NaOH System)				
Sl no	**Description**	**UOM**	**Common System for all Stage I & II**	**Remarks**
1	NPP 2A	MT	1	Common System
	Total		**1**	

9.8 Material Supplied by BHEL- PEM

Package		**Gypsum Dewatering System**					
Sl. No.	**Item description**	**Quantity for Station (nos)**	**Location**	**Wt of Individual Equipment/ System in Tons**	**Total Wt of Individual Equipment/ System in Tons**	**Rate Schedule Identifier**	**Remarks**
1	Cake Wash Pump with Motor	2	at 0.0 m floor (FFL) of GDW Building	0.6	1.2	RMC 3A	Common System
2	Belt/Cloth Wash Pump with Motor	2	at 0.0 m floor (FFL) of GDW Building	0.6	1.2	RMC 3A	Common System
3	Vacuum Pump	2	at 0.0 m floor (FFL) of GDW Building	16.08	32.16	RMC 3A	Common System
4	Motor of Vacuum Pump	2	at 0.0 m floor (FFL) of GDW Building	5.04	10.08	RMC 3A	Common System
5	Filtrate Extraction Pump along with its Motors	4	at 0.0 m floor (FFL) of GDW Building	1.8	7.2	RMC 3A	Common System
6	Secondary Hydrocyclone & Accessories	2	at 10.0 m floor of GDW Building	2.12	4.24	NPP 2A	Common System
7	Vacuum Belt Filter & Accessories	2	at 10.0 m floor of GDW Building	70	140	NPP 2A	Common System
8	Vacuum Receiver	2	at 10.0 m floor of GDW Building	4.2	8.4	NPP 2A	Common System
9	Primary Hydrocyclone & Accessories	2	at 18.5 m floor of GDW Building	2.21	4.42	NPP 2A	Common System
10	Foundation Materials	2	as required	10	20	NPP 2A	Common System
11	Platforms for VBF & Hydrocyclones	2	as required	15	30	NPP 2A	Common System

12	Miscellaneous	2	as required	20	40	NPP 2A	Common System
	Total Weight in MT				**298.9**		

Summary Sheet Mechanical Package BHEL- PEM (Gypsum De-Watering System)				
Sl no	**Description**	**UOM**	**Common System for Stage I & II**	**Remarks**
1	NPP 2A	MT	247.06	Common System
2	RMC	MT	51.84	Common System
	Total		**298.9**	

9.9 Material Supplied by BHEL- Bhopal

Sl no	**Item description**	**Qty**	**Unit**	**Total weight in MT**	**Common System**	**Rate Schedule Identifier**
A	**Motors**					
1	Wet Ball Mill Motor	2	No.	18.4	18.4	RMC 3A
	Total Weight in MT				**18.4**	

Summary Sheet Material Supplied by BHEL- Bhopal Mill Motor

Sl no	Description	UOM	Common system for Stage I & II
	Total		**18.4**

9.10 Material Supplied by BHEL- Hyderabad (Equipments)

Sl no	Description	Total Weight MT)	Rate Schedule Identifier	Remarks
1	Bag filter at top of LS day silo- 2 Nos.	4	NPP 2A	Common System **Package B**
2	Air canon/Air blaster- 2 set	4	NPP 2A	Common System **Package B**
	Total Weight in MT	**8**		

Summary Sheet Mechanical Package BHEL- Hyd (Bag Filter, Air Cannon)				
Sl no	**Description**	**UOM**	**Weight in MT**	**Remarks**
1	NPP	MT	8	Common System **Package B**
	Total		**8**	

9.13 Material Supplied by BHEL- ISG (DG Sets- Common System) - Rate Schedule 9A

1*500 KVA DG SET					
UNLOADING AND LOADING WEIGHTS					
S NO.	**ITEMS**	**QUANTITY**	**WEIGHT (in MT)**	**Rate Schedule Identifier**	**Remarks**
	1*500 KVA DG SET				

1	UNLOADING , STORAGE AND SHIFTING OF THE FOLLOWING MATERIALS FROM STORES TO SITE. 1. DG SET WITH 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	17		Common System
ERECTION INPUTS					
2	PLACEMENT OF DG SET WITH INTEGRAL ACOUSTIC ENCLOSURE ON FOUNDATION.	1 SET	12	RMC 3A	Common System
3	ERECTION OF SILENCER, EXHAUST PIPING (MS Class 125 NB pipes, CLASS-B), SUPPORT STRUCTURE	1 SET	1	NPP 2A	Common System
4	INSTALLATION OF DG AMF PANEL, DISTRIBUTION BOARD, BATTERY CHARGER AND BATTERY ON DG FOUNDATION , INSIDE THE ACOUSTIC ENCLOSURE.	1 SET	2	RMC 3A	Common System
5	INSULATION AND ALUMINIUM CLADDING OF EXHAUST PIPING AND STACK	1 SET	0.3	Insulation	Common System
6	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 (COST OF FIRST FILL OF FUEL BY ISG).	1 SET	0.5	NPP 2A	Common System
7	DRAINING OF OLD OIL AND FILLING OF NEW LUBE OIL AND COOLANT IN THE ENGINE AT THE TIME OF COMMISSIONING.	1 SET	100 LITRES LUBE OIL AND 250 LITRES COOLANT.		Common System
8	INSTALLATION OF TERMINAL BOX, PROTECTION CTs AND TERMINATIONS	1 SET	0.2	NPP 2A	Common System

9	CONTROL CABLE LAYING AND TERMINATION BETWEEN THE DG AMF PANEL, BATTERY CHARGER, AND DISTRIBUTION BOARD AND BATTERY.	1 SET		Excluded from Scope	Common System

1*750 KVA DG SET					
UNLOADING AND LOADING INPUTS					
S NO.	**ITEMS**	**QUANTITY**	**WEIGHT**	**Rate Schedule Identifier**	**Remarks**
	1*750 KVA DG SET				
1	UNLOADING , STORAGE AND SHIFTING OF THE FOLLOWING MATERIALS FROM STORES TO SITE. 1. DG SET WITH ACOUSTIC ENCLOSURE 2.990 LTRS FUEL TANK AND PIPING 3.SILENCERS AND EXHAUST PIPES AND ACCESSORIES 4. EXHAUST SUPPORT STRUCTURE 5.CABLES AND ACCESSORIES 6.CONTROL PANELS, DBs, BATTERY CHARGER, BATTERY 7.CONSUMMABLES - LUBE OIL, COOLANT AND FILTERS 8 MANDATORY SPARES	1 SET	20 TONS		Common System
ERECTION INPUTS					
2	PLACEMENT OF DG SET WITH ACOUSTIC ENCLOSURE ON FOUNDATION	1 SET	15	RMC 3A	Common System
3	ERECTION OF SILENCER, EXHAUST PIPING (MS Class 250 NB pipes, CLASS-B), SUPPORT , AND STACK (MS Class 200 NB pipe- CLASS B)	1 SET	1	NPP 2A	Common System
4	INSTALLATION OF DG AMF PANEL, DISTRIBUTION BOARD, BATTERY CHARGER AND BATTERY ON DG FOUNDATION , INSIDE THE ACOUSTIC ENCLOSURE.	1 SET	2	RMC 3A	Common System
5	INSULATION AND ALUMINIUM CLADDING OF EXHAUST PIPING AND STACK	1 SET	0.5	Insulation	Common System
6	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 (COST OF FIRST FILL OF FUEL BY ISG).	1 SET	0.5	NPP 2A	Common System

7	DRAINING AND FILLING OF LUBE OIL AND COOLANT IN THE ENGINE AT THE TIME OF COMMISSIONING.	1 SET	100 LITRES LUBE OIL AND 200 LITRES COOLANT.		Common System
8	INSTALLATION OF TERMINAL BOX, PROTECTION CTs AND TERMINATIONS	1 SET	0.2	NPP 2A	Common System
9	CONTROL CABLE LAYING AND TERMINATION BETWEEN THE DG AMF PANEL, BATTERY CHARGER, AND DISTRIBUTION BOARD AND BATTERY.	1 SET		Excluded from Scope	Common System

Summary Sheet Mechanical Package BHEL- ISG (DG Set)				
Sl no	**Description**	**UOM**	**Weight in MT**	**Remark**
2	NPP 2A	MT	3	Common System
3	RMC 3A	MT	31	Common System
5	Insulation	MT	1	Common System
	Total		**35**	

Note:

1.1 To meet the Project schedule, or otherwise, BHEL at its discretion, may withdraw 15% of awarded work or may awards additional 15% of the awarded work from other packages within the premises to the bidder after due notice of a period of 7 days' by BHEL. Package A vendor may be asked to execute part work of other Packages within the premises and vice versa.

1.2 The bidders have to execute the additional work of other package by deploying additional resources and without impacting their original schedule at the same rate & terms and Conditions.

1.3 Applicability of this clause shall not entitle bidder for compensation under Quantity variation clause.

2. 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 General Conditions of Contract.

3. 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.

4. 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.

5. 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.

6. 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.

7. In case of Piping category, payment rates will be derived on actual type of material received/used at site. Example- If a material falls under SS Category as per Tech Bid. However, if actual material supplied is of CS, then payment will be made under CS rate category and vice versa.

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 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 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 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.

10.1.51 **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**

10.1.52 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.

10.1.53 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.

10.1.54 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.

10.1.55 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"

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

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

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

11.4 Tenderers have to furnish a list of Tools and Plants including cranes, Tractor / Trailers etc., which they propose to deploy for this work.

11.5 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.

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

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

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

a. Colour Progress photographs to accompany the report should be submitted.
b. Erection progress in terms of tonnage and welding joints, radiography and stress relieving 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, mill wright fitters, welders, riggers, khalasis, grinder-men,

gas-cutters, electricians, crane operators and helpers. Data will be spilt up under the work area of Main Steam, hot Reheat, Cold Reheat, HP Bypass, LP Bypass lines, LP Piping, tanks and vessels, pumps etc.

e. Data on categories of labour like mill wright fitters, and shall be shown in detail. Data shall be split up under the work areas like
f. Consumables report giving consumption of all types of gases and electrodes during the previous month.
g. Availability report of cranes
h. Safety implementation report in the format
i. Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

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

11.10 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.

12 Foundations, Grouting and Civil Works

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

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

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

12.3 The contractor at his cost shall arrange for grouting of foundation bolt holes of column and equipment as specified in the drawings / specification or as advised by the Engineer of BHEL after preparing the foundation top surface for grouting, all the materials for grouting (sand, gravel & cement including special Cement) shall be arranged by the contractor. The grouting has to be done upto basement level. The required consumables like Portland cement, gravel, sand etc., have to be provided by the contractor at his cost. The required special cement like conbextra, GP1, GP2, PAGAL, shrinkomp etc., or its equivalent as approved by BHEL if required shall be arranged by the contractor at his cost.

12.4 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 25 mm for obtaining proper face for packer plates/shims, and may be required for the erection of the equipment/plants will have to be carried out by the contractor without extra cost.

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

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

12.7 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary

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

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

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

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

12.11 Shims and packer plates required for temporary use are to be arranged by the contractor within the quoted rate.

12.12 The contractor at his cost shall arrange for grouting of anchor points of T & Ps issued to him. Necessary grout materials are to be arranged by the contractor at his cost.

12.13 Non shrink cementitious flowable grout shall be used for grouting of pockets and under pinning work below base plate of columns. Nominal thickness of grout shall be 50 mm. Non shrink cum plasticizer admixture shall be added in the grout. Crushing strength of the grout shall be generally be one grade higher than that of the base concrete. Minimum grade of grout shall be M30.

12.14 However, for Equipment Foundations, high strength (Minimum Characteristic Compressive Strength of 60 N/mm2 at 28 days) ready mixed non-shrink, Chloride free, Cement based, free flowing, non-metallic grout as recommended by Equipment manufacturer shall be used. The ready mix grout shall be of reputed make as approved by the customer. Total grouting of the columns/equipments including pocket grouting, grouting at the gap between foundation and base plates top surface of column/equipments is in the scope of the contractor. The quoted rate shall inclusive of the same.

12.15 Generally the tolerance on column pedestal elevation is -20 mm & + 30 mm. Tolerance between individual columns centre is ± 5 mm. The tolerance between the first row of column to the last row of columns is ± 15 mm. Tolerance on diagonal dimensions is 25 mm (maximum-cumulative) and 10mm maximum for adjacent columns. The tolerance of pitch distances of the foundation bolts is ± 3 mm. These are general guidelines and documents available with BHEL to be referred before taking up the work.

12.16 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost including any miscellaneous expenditure for this activity. BHEL will not pay any service and incidental charges for arranging the supplier representative. The contractor to take note of this aspect and quote accordingly.

12.17 All equipment bases and structural steel bases and foundations pockets shall be grouted and finished as per these specifications after surface preparation unless otherwise recommended by the equipment manufacturers. The surface preparation includes soda washing of the foundations to remove oil, grease etc. to ensure proper grouting.

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

12.19 All the materials required for grouting including special cements as approved by BHEL and other materials like Portland cement, sand, chips, gravel, etc., are to be arranged by the contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.

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

12.21 Providing & grouting of pocket holes, pipe sleeves and under base plate of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. with non-shrink cementitious flowable grout as per specification using non-shrink cum plasticizer admixture. Crushing Strength of the

grout shall be one grade higher than that of the base concrete (however grade of grout shall be minimum M30 to max M35 grade).

12.22 Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work / machinery / pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with Conbextra GP-1 / Conbextra GP-2 or its equivalent.

12.23 **Procedure for Grouting** :

Contractor has to carry out the grouting as per the work instructions for grouting available at site or the grouting is to be carried out as per the supplier's recommendation/ IS standard. Copy of those recommendations is to be submitted to BHEL for records.

12.24 **Civil Works**

12.24.1 **The major civil works like excavation, compaction, sand filling & etc. for the buried piping identified in this contract are excluded from the scope of this work.** However the widening of the trench at the weld joint area for giving free working space on each side of the pipe is included in the scope of this work. This type of incidental works are to be carried out by the contractor within quoted rates. The required coordination with civil and other agencies shall be extended by the contractor to ensure smooth execution of works.

12.24.2 Box cutting and excavation of earth up to the required depth and width, concreting etc., are not covered in the scope of works of this tender and shall be carried out by others on phased manner as per the site requirement and decided by BHEL site in-charge. As and when the clearance for erection of piping is given, contractor shall carry out erection work promptly without any delay and release for further civil in a phased manner as instructed be site in-charge.

12.24.3 **Necessary excavation for buried pipe and backfilling with earth is excluded from the scope of bidder and shall be done by BHEL. BHEL will release excavated clear front to bidder for erection of buried pipe. Dewatering with all necessary arrangement required like pumps after handing over of excavated front is under the scope of bidder.** Foxholes (cutting of earth below pipe joint) for welding will be in bidder's scope. No separate payment shall be made on account of fox holes, dewatering, as detailed above and the erection and commission rate as per price schedule of River/Canal Water piping shall be inclusive of the same. Concrete bedding / encasing is excluded from scope of work.

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	**Absorber Erection Sequence**
13.7	Below mentioned erection sequences 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.	4th stage casing panel installation
12.	Scaffolding and Structure up to 35.4 Mtr. and spary pipe installation
13.	5th stage casing panel installation
14.	Scaffolding and Structure up to 39 Mtr.
15.	6th stage casing panel installation
16.	Scaffolding and Structure up to 43 Mtr.
17.	7th stage casing panel installation
18.	Scaffolding and Structure up to 47 Mtr. and remaining structure erection
19.	Ceiling panel installation
20.	2 mm C276 strip welding
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	1. 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 2. Lift Spray Pipe up to the same height as absorber nozzle. 3. Insert the tip of Spray Pipe into the absorber, and unload the tip of Spray Pipe onto the temporary support. 4. Insert Spray Pipe into the absorber by using of chain block. 5. 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. 6. 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. 7. 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	1. Modify the scaffolding for installation of Spray Nozzle. 2. 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. 4. 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	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. 7. 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 Piping

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

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

13.62.1 Handling at site stores / storage yard, transporting to site, inspection, preassembly, erection, alignment, welding, NDT, fixing of hangers & supports, chemical cleaning / pickling, oil flushing, water flushing, hydro testing & steam blowing, surface finish, supply & application of primer & finish paints including labelling & flow direction on the piping over insulation & hangers and supports, pre-commissioning, commissioning, trial operation & handing over to customer of piping and its associated items / systems , hangers and supports, valves and other miscellaneous equipments.

13.62.2 Brief list of system / sub system, approximate weight of pipes and accessories to be erected by the contractor mentioned in the Bill of Quantity and number of joints mentioned in Erection Welding Schedule of this tender specification are meant for giving general idea to the tender only about magnitude of the work involved. The piping components are sent in parts for convenient transportation / layout requirements. They are to be cleaned, pre-assembled in stage by stage, welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.

13.62.3 The work on piping systems (air, water, oil, steam, gas etc.,) will include laying, edge preparation, fixing and welding of the elbows / fittings / valves etc., welded on the lines, fixing and adjustment of supports / hangers / shock absorbers and carrying out all other activities / works to complete the erection and also carrying out all pre-commissioning / commissioning operations mentioned in the specification as per BHEL Engineer's instructions and / or as per approved drawings / documents.

13.62.4 Pre Assembly joints to be marked in isometrics drawings in consultation with BHEL Engineers and submit to BHEL before starting work. Contractor to maintain Line History sheet (LHS) of all Pipe lines as per BHEL Format and submit before HT to BHEL/Customer for getting HT Clearance.

13.62.5 Carrying out erection of piping 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.

13.62.6 Erection of all drains / vents / relief / escape / safety valve, piping to various tanks/ sewage / drain canal / flash box / flash tank / condenser / sump / atmosphere etc. from the stubs on the piping to the equipments erected by the contractor is completely covered in the scope of work.

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

13.62.8 Pipes shall not be dropped to avoid impact or bump.

13.62.9 Normally weld neck valves will have prepared edges for welding. But if it becomes necessary the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like tees, weld

neck flanges, reducers, elbows, flanges, inserts etc., shall be suitably edge prepared and matched with pipes for welding. No extra cost shall be paid for this.

13.62.10 Attachment, welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and control valves etc., shall be the responsibility of the contractor and the same shall be done as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor‘s responsibility even if, the Items are supplied by an agency other than BHEL if they are integral to the scope envisaged under this package.

13.62.11 All the valves will have to be checked, cleaned, lapped or overhauled in full or in parts before erection, after chemical cleaning and during commissioning. The contractor, at his own cost, shall arrange experienced technicians for the above work, including required consumables.

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

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

13.62.14 In case of any class of work for which there is no such specifications as laid down in the contract such us blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.

13.62.15 In the case of structural members, pipes, plates, ducts etc, in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connect the joints within the quoted rates / prices.

13.62.16 All the tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. Pipes below 2" diameter, shall be sponge cleaned with air flushing. After cleaning is over, the end caps shall be put back in tube openings till such time they are welded to other tubes. Required compressors shall be arranged by the contractor at his cost.

13.62.17 All the equipments / material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever

necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joint assemblies and other components as per instruction of BHEL Engineer during erection at the quoted rate. The necessary compressor for air cleaning is to be arranged by contractor at his cost.

13.62.18 Fine fittings, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. In case any minor modifications are required in these pipelines after completion to meet the system requirements, the same shall be carried out by the contractor within the quoted rate.

13.62.19 Erection of platform and supporting structures around the equipments / valves / filters etc., is covered in the scope of contract and shall be erected by the contractor as per accepted tonnage rate for —Hangers and Supports.

13.62.20 Additional platforms for approaching different equipments as per the site requirement, which may not be indicated in drawings, shall be assembled and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate for —Hangers and Supports. The steel materials required for these works shall be supplied by BHEL free of cost and the contractor will have to install them to suit the requirement.

13.62.21 The Contractor shall carry out the reaming and honing of coupling holes with his own reamers, honing machine and honing accessories etc at his own cost.

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

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

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

13.62.25 Before erecting the valves and other mountings, check for the tag for correct rating with valve schedule. Ensure correct flow direction. Ensure easy accessibility for operation and maintenance of valves.

13.62.26 All the drain lines should have sufficient slope towards drain. Slope of 1:500 shall be maintained towards drain point unless otherwise specified. Expansion loops shall be provided in all the vents and drains as per the drawings.

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

13.62.28 All the valve packing with asbestos base to be lubricated once in 6 months till handing over. Necessary gland packing will be supplied by BHEL.

13.62.29 Fabricated pipes are sent in standard length and will 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 less than or equal to NB 65 mm will have to be fabricated at site adopting specified heat treatment procedures, wherever required at no extra cost.

13.62.30 All the oil & gas piping flanges, wherever provided are to be blue matched using surface plates for at least 80% contact area to attain leak proof of joints.

13.62.31 All piping supplied in running meter has to cut and edge prepare as per the standards / drawings and as per the instruction of BHEL Engineer within the quoted rate.

13.62.32 Wherever drawings indicate site routing and site fabrication, such pipes (in general equal to and less than 2” dia) will be issued in running meters as straight length. These are to be cut and edge prepared at site to required length to suit layout as given in the erection drawing. In some cases attachments like lugs, stoppers, cleats etc., will be supplied as loose items and to be cut and welded to the pipes at site as per erection drawing necessary drilling of holes on main pipe for welding stubs shall also be done at site by the contractor.

13.62.33 Certain extra lengths of portions / parts of various site fabricated components / parts / bellows / piping etc. are provided as erection allowance and they shall have to be cut to suit site conditions and layout. Certain small length of portions / components / bellows / piping casing etc., may have to be added to suit conditions and layouts. Preparing edges afresh and adopting specified heat treatment procedure, are in the scope of work. No extra payment will be admitted for such works.

13.62.34 For any mismatch while matching the joints in tubes, the cutting, adjusting, re welding, addition of spool pieces shall be done by the contractor to match site conditions without any extra payment.

13.62.35 Fittings like bends, tees, elbow, mitre bends, reducers, flanges, thruster blocks, etc., will be supplied as loose items and edge preparation if required shall be carried out by the contractor.

13.62.36 Certain adjustments in length may be necessary while erecting pipelines. Removing / adding extra lengths / to suit the final layout, preparing edges afresh and adopting specified heat treatment procedure are in the scope of work.

13.62.37 For pipes nominal size 2''and below routing shall not be shown in piping layouts or in isometrics and the same to be routed / connected as shown in schematics. For the above sizes if the routing is shown in layouts it is only for guidance and the same shall be routed and supported as per site requirement / convenience as per site engineer's advice.

13.62.38 Piping below size 2'', valves, flanges, fittings etc. shall be supplied as commercially available. Hence fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.

13.62.39 Contractor should fabricate bends of </=2'' diameter size at site from running meters of piping for the above and cut, edge prepare and lay the piping as per BHEL Engineer's instructions.

13.62.40 Minor adjustment like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified heat treatment procedure shall be carried out by the contractor within the quoted rate.

13.62.41 Contractor shall use only bolted clamps for achieving alignment of piping. Wherever "L" shaped stoppers and wedges are to be used for aligning piping and equipments, the same shall be subject to the approval of BHEL Engineer. Contractor shall remove the bridge, stopper etc., by grinding / gouging and not by hammering. Any burrs left on the equipments / piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.

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

13.62.43 The surface of the pipes to be joined shall be suitably prepared as per instructions of BHEL Engineers. Edge preparation shall be done by chamfering machine, whenever required and all welding surfaces must be cleaned thoroughly. All works due to the mistake of the contractor shall be repaired / redone at contractor's cost. Instrumentation drains, stubs which are sent in loose from manufacturing units are to be welded at site as per BHEL Engineer's instructions.

13.62.44 Flame cutting of piping and other equipment shall be strictly done as per BHEL Engineer's instructions and in his presence only.

13.62.45 All the weld joints on equipments and piping shall be ground or filed after completion of welding and before radiography as per instructions of BHEL Engineer so as to achieve smooth surface to avoid of ripples, undulations etc.,

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

13.62.47 Flow nozzles, orifice, spray nozzles etc., shall be mounted / erected after chemical cleaning / flushing / or steam blowing at site.

13.62.48 Erection of Flow nozzles, flow switches, steam traps, filters, flow meters, other metering elements, spray nozzles, steam traps, flow orifices, flow indicators, control valves, aux. control valves, CRH NRV, HPBP Valve and suction strainers of BFP, CEP & Booster pumps etc forming part of the system (under this scope of work) irrespective of the suppliers is also to be carried out by the agency without any extra cost after chemical and / or steam blowing / oil flushing at site. This will include collecting from BHEL / Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

13.62.49 Erection of Flow nozzles, flow orifices, flow switches, flow meters, flow indicators, spray nozzles, steam traps, filters, suction strainers, other metering elements, control valves, NRVs, servomotors etc forming part of the system (under this scope of work) irrespective of the suppliers is also to be carried out by the agency without any extra cost after chemical and / or steam blowing/ oil flushing at site. This will include issue and collecting the same from BHEL stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

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

13.62.51 The contractor has to fabricate stainless steel orifice plate within the quoted rate. No extra payment will be made for fabrication of above orifice plates. The required stainless steel plate will be supplied by BHEL.

13.62.52 Fixing, fitting, welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc., on different lines / equipments (which will be supplied by BHEL) is within the scope of work. Fixing of Pick-Ups, Probes & Accessories for vibration monitoring system is the scope of this specification.

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

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

13.62.55 **The contractor shall also weld all thermo wells, small length of pipes to all pressure, flow and level tapping points, isolating valves and root valves on all equipment under scope of erection of this contract.** All embedded temperature measuring elements provided in the bearings will have to be terminated at the junction box by the contractor. Thermo wells tapping point connections incorporated shall be plugged during the pressure testing and steam blow out of piping systems. Upon completion of blow out operation all thermo wells and flow elements with branch pipes be installed and welded.

13.62.56 Suspension for piping etc., will be supplied in running lengths and shall be cut to suitable sizes and adjusted as required. Hangers' components which are being supplied in loose shall be assembled at site and erected as part of the work.

13.62.57 For hangers and supports the instruction given in the drawings and documents must be followed for handling, erection and setting of cold / hot values and locking etc.

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

13.62.59 The hangers and supports for pipelines and pressure parts may be supplied in dismantled / knocked down condition. It is the responsibility of the contractor to assemble them as per approved drawings and install them in position as per site engineer instructions.

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

13.62.61 Contractor has to fabricate and erect temporary spool pieces wherever required due to non- receipt of valves in time and after receipt of valves the spool pieces are to be

replaced with regular valves at free of cost. For spool pieces materials will be supplied free of cost by BHEL.

13.62.62 Plate / Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc., shall be supplied by BHEL duly bent and threaded. Assembly and necessary cutting work etc. shall be carried out at site by contractor within the quoted rate.

13.62.63 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.

13.62.64 The piping components are sent in parts for convenient transportation /layout requirements. They are to be cleaned, pre-assembled in stage by stage, welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.

13.62.65 Welding, non-destructive testing and heat-treatment as prescribed in BHEL Welding / Heat treatment manual is to be carried out by the contractor. The contractor shall conduct non-destructive tests like radiography, ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc. on weld joints, castings, valve bodies and other equipments etc. as per BHEL Engineer‘s instructions within the quoted rate.

13.62.66 **Contractor should obtain the formal clearance from Inspectorate of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection hydraulic test etc. is in the scope of contractor, and necessary drawing / details only will be given by BHEL. Inspection fee, if any shall be paid by BHEL.**

13.62.67 Contractor shall arrange all equipments, alignment bolts, tools, Consumables like welding electrodes in their scope (all types except those supplied by BHEL), 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. Only filler wires as stipulated by manufacturing units and identified in relevant shipping list will be supplied to the contractor free of cost. Any excess requirement shall be arranged by the contractor / BHEL at contractor‘s cost. Argon / Nitrogen gas for stainless steel tubes purging during welding to be arranged by contractor within the quoted rates.

13.62.68 The Matching Pieces / Nozzles / Reducers (including the reducers to be connected with HP Heaters) supplied for connecting BFP discharge piping with the Heaters are forming part of the systems and are also in the scope of work including issue, transportation, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

13.62.69 Cutting and removal of dummies for all the shop welded stubs (irrespective of the equipments supplier for the above) for all the terminal points and preparation of edge

where the piping is to be terminated is also in the scope of the contractor without any extra payment.

13.62.70 The contractor shall fabricate piping, install lub oil systems, if any and carry out the acid cleaning of fabricated piping. The contractor shall also service the lub oil system; carry out the hydraulic test of oil coolers. etc.,

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

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

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

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

13.62.75 The actuators / motors of valves may be supplied in loose parts, contractor shall have to match / assemble and align at site as per instructions of BHEL Engineer including placement on foundation.

13.62.76 The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered.

13.62.77 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.

13.62.78 Pipelines shall be cleaned off welding slag and burrs by hand files, wire brushes and flexible grinders wherever required and using cloth.

13.62.79 Contractor has to arrange required fire retardant covering material at their cost to protect the machined components, assembled parts and insulation materials drawn from BHEL before and after erection.

13.62.80 Any fixtures, scaffolding materials, approach ladders, concrete block supports, steel structures required for temporary supporting, pre assembly, checking, welding, lifting & handling during pre-assembly and erection shall be arranged by the contractor at his cost.

13.62.81 Prior to erection of any components, inspection to be done for any foreign materials and damages and they are to be removed / attended as per instructions of BHEL engineer.

13.62.82 The temporary structures / items welded to permanent members / pipes are to be cut and removed without any damage. In case of any damage, the same has to be made good by the contractor at his cost.

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

13.62.84 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision / clarification of BHEL Engineer will have to be followed.

13.62.85 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, inspection, edge preparation if required, 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.

13.62.86 Normally the high pressure valves will have prepared edges for welding. But, if it becomes necessary the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like ‘T‘pieces, weld neck flanges, reducers etc., shall be suitably matched with pipes for welding.

13.62.87 Erection of all the piping systems supplied along with PEM / Bhopal / BAP supplied auxiliaries covered in this contract, is to be erected by the contractor as per the accepted tonnage rate.

13.62.88 The contractor shall provide any fixtures, concrete blocks / wooden sleepers, etc., which are required for temporary supporting / preassembly of the components at site.

13.62.89 Normally the valves will have prepared edges for welding. But if it becomes necessary the contractor shall prepare new edges or recondition the edges by grinding or chamfering to match the corresponding tubes and pipes. All fittings like "T" pieces, weld neck flanges, reducers, elbows, flanges, inserts etc., shall be suitably edge prepared and matched with pipes for welding. No extra cost shall be paid for this.

13.62.90 The valves will have to be checked, cleaned or overhauled in full or in part before erection, after chemical cleaning and during commissioning. All the valves, after chemical cleaning, have to be checked, cleaned or over hauled in full or part before erection if called for as part of scope.

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

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

13.62.93 Fixing / Fitting / welding of thermo wells, stubs, hoses, tapping points, root valves and instruments etc., on different lines / equipments (which will be supplied by BHEL) is within the scope of work. Fixing of Pick-ups, Probes & Accessories for vibration monitoring system for the erected equipments / pipe lines are covered in the scope of this specification.

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

13.62.95 The contractor shall conduct non-destructive tests like radiography ultrasonic test for weld defects etc., ultrasonic test for finding thickness, dye penetrant tests, magnetic particle test etc., on weld joints, castings, valve bodies and other equipments etc., as per BHEL Engineer's instructions.

13.63 Utility Points

13.63.1 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 B O M to BHEL for approval.

13.63.2 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.

13.64 Galvanised Steel Piping

13.64.1 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.

13.64.2 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.

13.64.3 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.

13.64.4 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.

13.64.5 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.

13.65 Buried Piping

13.65.1 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.

13.65.2 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.

13.65.3 Free access is to be provided for the welding of the circumferential joints by increasing the width and depth of the trench at these points. There should be no obstruction to the welder from any side so that good welded joint is obtained. This type of incidental works are to be carried out by the contractor within quoted rates.

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

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

13.65.6 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.

13.65.7 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.

13.66 Rubber Lined Piping: All the rubber – lined pipes are flange joined and the flanges are also rubber lined. No welding is allowed on these pipes. If any damages occurred / notices in the above pipe lines during erection / transportation / commissioning of rubber lined pipes, the same has to be rectified by the contractor at his cost.

13.67 Erection - Fire Protection System

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

13.67.1 GALVANISED STEEL PIPING

13.67.1.1 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.

13.67.1.2 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.

13.67.1.3 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.

13.67.1.4 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.

13.67.1.5 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.

13.67.2 Buried Piping

13.67.2.1 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.

13.67.2.2 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.

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

13.67.2.4 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.

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

13.67.2.6 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.

13.67.2.7 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

13.67.2.8 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.

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

13.67.2.10 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.

13.67.3 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 Service: DG Sets

13.68.1 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.

13.68.2 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.

13.68.3 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.

13.68.4 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.

13.68.5 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

13.68.6 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.

13.68.7 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.

13.68.8 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.

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

13.68.10 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.

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

13.68.12 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.

Note:

- Brief list of equipments / sub-assemblies to be erected by the contractor & approximate weight and size of individual heavy components are given under the (Bill of quantity) and is meant for giving general idea to the tender only about magnitude of the work involved. The components are sent in parts for convenient transportation. They are to be cleaned, assembled in stage by stage, fastened / welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL Engineers.
- 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.
- All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include equipment for checking, cleaning, servicing and site fabrication.

  I. Scaffolding and rigging operations
  II. Flame / electric cutting, grinding, welding, radiography and stress relieving & wrap inspection by HOLIDOY equipment.
  III. Fitting, fettling, filing, straightening, chamfering chipping, Scrapping, reaming, cleaning, checking, leveling, blue matching, Aligning and assembly.
  IV. Surface grinding, drilling, doweling, shaping.
  V. Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication

- The temporary structures/ items welded to permanent members/pipes are to be cut and removed without any damage. Any damage so to permanent members/ pipes to be made good by the contractor at his cost.
- Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and restack the materials kept at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

- Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.
- Fine fittings and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.
- It shall be the responsibility of the contractor to provide ladders for all pipe trenches for erection purpose. Rollers to be provided for the pipe to be welded for easy work. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.
- Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.
- All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.
- No separate payment will be made for the edge preparation of pipes, Standard fittings such as bends, Tees etc.,
- Contractors has to carryout fabrication works such as welding of stubs /nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.
- Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from, all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity.
- The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.
- 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.

- All fittings like elbows, tees, reducers, weld neck flanges, inserts etc., shall be matched with pipes for welding which may require re-edge preparation, grinding etc., No extra cost shall be paid for this.
- The valves will have to be cleaned, checked, lapped or overhauled in full or in parts before erection, during commissioning. Any special tools required for lapping only will be arranged by BHEL.
- Adjustment like removal of ovalities in pipes and opening or closing of the fabricated bends by process of heat correction or any other method approved by BHEL Engineer to suit the layout, with specified NDT, heat treatment procedure shall be carried out by the contractor within the quoted rate.
- Contractor shall remove the bridge, stopper etc., by gouging/ grinding and not by hammering. Any burrs left on the equipments / piping, after welding, shall be ground off or any scar or cavity made good by welding and grinding. NDT tests shall be carried out if necessary to detect surface and sub-surface cracks in these ground areas.
- All erectable gaskets, fasteners and other hardware shall be supplied by BHEL free of cost if any.
- The piping, valves etc will be provided by BHEL free of cost. However dismantling of the piping, valve etc, its cleaning and edge preparation, for its reuse, if required, will have to be done by the contractor without any extra claim.
- All pipes including Canal water / Raw water piping (underground and over ground) shall be supplied by BHEL in fabricated condition in tentatively 6 mtr to 12 mtr length. Fittings like tees, reducers, elbows, manholes, mitre bends, flanges etc shall be supplied by BHEL in fabricated condition. Cutting of tees, elbows / reducers to suit the pipe fitting / erection as required, is to be done without any extra claim.
- The contractor may have to carry out fabrication of mitre bends, tees, reducer of sizes NB 250 and above for LP piping systems. Pipes will be supplied in running meters by BHEL free cost. Required number of mitre bends, tees is to be fabricated by the LP piping erection contractor. Payment shall be made as per applicable item of price schedule.
- Erection & welding, of all valves, misc fittings required to complete the system but not specifically mentioned in relevant chapter of tender is covered in the scope of contract and payment will be made as per applicable piping item of mechanical price schedule. All such materials will be supplied by BHEL. The erection activity of valve also includes cleaning, servicing and final painting of valves. All counter flanges, bolts, nuts, washer, gaskets etc shall be supplied by BHEL loose (free issue).
- Any other connected material supply which is not covered in BOM but required to complete the system shall be erected by the vendor and payment in this case shall be made as per applicable item rate.

- Bidders to exercise utmost care while doing execution and commissioning work for this package so that no damage is caused to the existing plant at site. Any such damage will be back charged to bidder.
- Protection of pipeline against floatation during the contract period shall be the responsibility of the contractors. Should any section of the pipe line float due to their negligence etc. the entire cost of laying it again to the correct line and level shall be to the contractor's account.

Material Handling, Transportation and Site Storage:

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

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

- Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment, placement on respective foundation / location, fabrication yard, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks/ slings/ tools and tackles / labour including operators, fuel, lubricants etc. for loading & unloading of materials will be in the scope of contractor.
- Loading at storage yard and transporting to site, unloading at site / pre assembly area or at working area, is in the scope of work. Required cranes for loading & unloading of materials, trailor shall be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, sandbags which are required for temporary supporting of the components at site. **Store / storage yard located at approx. 3.0KM away from erection site.**
- Contractor shall plan and transport equipments, components from storage yard 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.
- The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.
- Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.
- Materials shall be stacked neatly, preserved and stored in the contractor's shed / work area in an orderly manner. In case it is necessary to shift and restack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

14.1 Micro Grading: After the completion of structural work the entire fabrication area shall be fairly levelled by the contractor to achieve the ground profile at no extra cost. The extra material/wastage including contractor's own site office/storage yard etc debris, so generated shall be disposed outside of plant premises at approved location without any extra cost.

14.2 Structural Works Related to Following Services:

1. **Fabrication and Erection of Structural steel including all interfacing works**. The nature of works shall include columns, beams, splicing of steel works as required as per drawings, bracings, purlins, trusses, sheeting work, struts, walkways, galleries, stairs, steps, ladders, handrails, sag rods, Floor gratings, Stub columns, Chequered plate work, equipment supporting beams, pipe supports, silencer supports and all other structures required for successful completion of structural works of the project.
2. Hard stand required for erection of heavy structures.
3. Any temporary activities required to complete the work.
4. Structural platforms, monorail beams, walkways, crossovers, handrails etc for miscellaneous equipment, piping etc.
5. Contractor has to submit drawing for approval .Field office and construction of stores has to be developed by the contractor of its own and the Client shall only identify the space on as in where is basis. All the infrastructure facilities required by contractor for carrying out the above work which include roads, approaches, drainage system, pavements etc. shall be developed & provided by the contractor of its own. No extra payment will be entertained under this.

~~**14.3 The work will involve:** All works required to complete structural works including Fabrication and erection of structural steel work involving rolled section, semi-rolled sections, sections fabricated out of plates, chequered plates, grating, hand rails, shot blasting, primer and final painting for all steel structural works, low hydrogen quality electrodes for welding, non-destructive testing etc complete as per Field Quality Plan/Customer requirements. All field quality checks for welds like radiography, NDT, etc are in the scope of work and bidder should quote accordingly. Supply of all consumables required for fabrication and erection.~~

~~**14.4 Scope: Structural Works:** The important works covered under this package are as below:~~

~~14.4.1 **Preparation of complete fabrication detailed drawings and erection marking drawings** required for all the structures covered under the scope of this contract based on design drawings furnished by BHEL.~~

~~14.4.2 Submission of **revised fabrication drawings** with calculation in case any substitution of designed sections is made. The scope would also include **submission of calculations of joints & calculations.**~~

14.4.3 **Preparation and submission of detailed bill of materials**, drawing office despatch lists, bolts lists etc required in connection with the fabrication and erection structural works as directed by the Engineer for his checking and approval.

14.4.4 The fabrication/erection work would include **straightening** of material by mechanical means or localized heating with temperature not exceeding 600° C; cutting by all means; **planning of edges**; **making holes**; **assembly at shop or erection site**; getting **welding sequence** approved; **peening** by suitable tools; **lacing bars**; **separators**; **bearing plates**; providing **architectural clearances**; **shop connections and shop painting** etc.

14.4.5 All Steel structures shall be cleaned to **near white metal surface conforming to SA 2-1/2** standard before application of shop primer. All arrangements for **shot blasting** such as compressor of required capacities, Diesel/electric generator, GI Sheets, support frames for structural members, Scaffolding pipes for construction of semi closed shed, hose pipe, shed for storage of abrasive materials/paints etc and spray guns/brushes etc shall in the scope of contractor. Any other arrangements that may have to be done to ensure smooth operations of shot blasting shall be in the scope of contractor. The work shall be done as per BHEL specifications/ Customer Specifications/applicable standards.

14.4.6 All fabricated steel work shall be **shop painted** complete as per customer specifications.

14.4.7 **Transportation of fabricated steel structures from fabrication yard to storage yard/erection site** including handling, rigging, assembling, bolting, welding and satisfactory installation of all fabricated steel materials in proper location according to approved erection drawings. If necessary suitable approaches may have to be built for transportation of steel structures. The item rate quoted shall be inclusive of such incidental works.

14.4.8 **Checking centre lines**, level of all foundation pedestals, position of all bolts/pockets and aligning, plumbing, levelling, bolting, welding and securely fixing the erected steel structures in accordance with drawings. The members erected shall be tied with each other using suitable tie beams/bracing etc or using guys as per directions of engineer in charge.

14.4.9 **Removal of bends, kinks and twists etc** of parts damaged during transportation/handling etc shall be made good by the contractor at no extra cost.

14.4.10 Cutting, chipping, filling, grinding, reaming of holes, re-fabrication of parts damaged beyond repair during transportation/handling and drilling holes which have either not been drilled or wrongly drilled are all included in the scope of works without any extra cost.

14.4.11 **Fabrication/erection tolerances** shall be as per approved FQP/ Customer specifications.

14.4.12 **All welding works shall be done through qualified welders**. Such welders shall be duly qualified by BHEL/ Customer engineer based on welder test conducted at site as per IS-817. Process Qualification (if required) shall be arranged by contractor through their qualified quality engineer. All samples for the Welder qualification test shall be arranged by

contractor. Quoted rates shall be inclusive of all costs towards testing of welders for destructive/non-destructive tests, testing and approval of welders. All welded joints shall be subject to the acceptance of BHEL/ Customer engineer. All the welded joints shall be cleaned of slag etc by way of peening complete as per BHEL/ Customer specifications.

14.4.13 The type of electrode, welding sequence, and pre heat and post heat requirements (if required) shall be approved by BHEL/ Customer engineer.

14.4.14 **All the welds shall be visually checked for size, length of weldment and external defects**. **Weld gauges** shall be used for checking of welds. **Non Destructive tests** shall be conducted as per approved FQP/ Customer Specifications. In case of defects observed during such NDT tests, the joints shall be again back gauged, joints re prepared and re welded. The contractor shall do such repair works at no extra costs.

14.4.15 The fabrication of structural steel members shall be such that the sequence of welding will avoid distortion and minimize shrinkage stresses in the closing welds of rigid assembly. All multiple layers of weld shall be peened with light blows from hammer/round nose tool after the weld has cooled to room temperatures. Care shall be taken to prevent scaling/flaking of weld and base metal from peening.

14.4.16 **All fillet welds** shall be brought practically closer as far as possible and in no case shall be more than 4 mm. **All butt welds** shall be carefully aligned and mis-alignments greater than 3 mm shall be corrected. All works shall be positioned for flat welding wherever practicable.

14.4.17 **The electrodes shall be stored in properly designed racks,** separating different types of electrodes in different compartments. They shall be kept in dry and warm condition by way of heating in mother ovens. A separate room shall be constructed and marked as electrode room manned by dedicated engineer. Complete record shall be made in registers each batch wise complete as per directions of engineer.

14.4.18 **Bolts, nuts & washers and other fastening materials** shall be stored on racks above ground and suitably covered with **protective oil**.

14.4.19 Suitable marking, bundling, loading/unloading and transport of all fabricated materials to site for further erection works. **The scheme for erection works shall be approved before start of work** by the BHEL Engineer.

14.4.20 **Taking delivery of Structural steel including chequered plate etc from BHEL stores/storage yard for** utilisation in construction work under this package.

14.4.21 **Supply** of all types of electrodes required for fabrication shop and erection welding etc including instruments and personnel for conducting necessary tests at site as specified/as directed by the Engineer.

14.5: General Scope

14.5.1 **Furnishing all labour, materials, supervision, construction plans, equipment, supplies, transport, to and from the site, fuel, compressed air, and all other incidental items and temporary works not shown or specified but reasonably implied** or necessary for the proper completion, maintenance and handling over the works, except in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by the engineer during the course of works.

14.5.2 **Furnishing samples of all materials** required by the engineers for **testing/inspection and approval** for use in the works. The samples may be retained by the engineer for final incorporation in the works.

14.5.3 **Furnishing test reports** for the products used or intended to be used, if called for the specifications or if so desired by the engineer.

14.5.4 Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that is required for all works including temporary works.

14.5.5 Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.

14.5.6 The contractor shall establish a suitable yard at an approved location for fabrication of steel material and storage of steel material. The yard shall have facilities like drainage, lighting, suitable access for large cranes, trailers etc. The yard shall be fenced all around with barbed wire and shall have suitable security arrangement with security guards etc. The Contractor shall also make covered store for storage of connection materials, paints, electrodes, shot blast material etc.

14.5.7 The contractor shall cover intermediate floors with planks if so required in case of other works at floors below/ground at no extra cost.

14.5.8 Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.

14.5.9 **Arranging for joint checking** (with BHEL/ Customer) of all site construction activities Preparation of joint protocols for each & every activity and maintaining quality records for audit/inspection.

14.5.10 The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably imply and necessary for completion of the job as a whole all as desired and as directed by the engineer.

14.5.11 The detail scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual construction requirements as per RFC Drawings

Note: Contractor should make him well conversant with the Customer specification. In case of ambiguity between BHEL and customer specification, customer specification shall prevail**.**

14.6 Preamble for the Schedule Of Quantities/BOQ

14.6.1 Details of the items in this Schedule shall be read in conjunction with the M/s Customer specifications, drawings, technical specifications and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.

14.6.2 The work shall be carried out as per construction drawings, specifications, the description of the items in this schedule and/or Engineer's instructions, Drawings enclosed with these documents are only indicative giving some idea of the type of work involved. The layout, sizes and details of the building, structures and foundations shown in tender drawings may vary at a large extent during actual construction. Final drawings will be issued progressively during the execution of the work.

14.6.3 Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.

14.6.4 Unless specifically mentioned otherwise in the contract, the bidder shall quote his rates for the finished items and shall provide for the complete cost towards fuel, tools, tackle, equipment, constructional plant , temporary works, labour materials, levies , taxes , transport, layout, repairs, rectification, maintenance till handing over, supervision, shops, establishments, services, temporary roads, revenue expenses, contingencies, overhead, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the works according to the contract.

14.6.5 The rate quoted shall be inclusive of cleaning the site of any vegetation, dressing and levelling etc., required for commencement of site activities. The rates shall also be inclusive of final micro grading before handing over. No separate payment will be made towards the same these works.

14.6.6 The quantities of the various items mentioned in the schedule are approximate and may vary up to any extent or be deleted altogether. The overall variation in contract value on execution shall be dealt as per GCC.

14.6.7 Rates shall be quoted both in figures and in words in clear legible writing. No over writing is allowed. All scoring and cancellation should be counter signed by the bidder. In case of illegibility, the interpretation of the engineer shall be final. All entries shall be in English language.

14.6.8 Engineer's decision shall be final and binding on the contractors regarding clarification of items in this schedule with respect to the other section of the contract.

14.6.9 In case of any discrepancy between item description, relevant drawing and/or specification clarification shall be sought at tender stage itself. Otherwise it shall be assumed that the bidder has quoted for the more stringent requirement.

14.6.10 Any reference in the customer specifications regarding mode of measurements/methodology of measurements shall not be applicable.

14.7 Field Quality Assurance: The contractor shall be responsible for day-to-day quality checks of fabrication, erection and welding works during the progress of work. All quality records and log sheets shall be maintained as per the requirement of BHEL/ Customer and **as per Field Quality Plan** approved by **BHEL/ Customer**. Cutting plans, Fabrication protocols, erection protocols, welding protocols, DP test protocols etc shall be made on regular basis as per approved formats. During erection, alignment of various members shall be checked as per approved erection tolerances with the help of suitable tools to the extent possible.

14.8 Reconciliation of steel issued by BHEL (free of cost):

14.8.1 **General Notes**

a. All steel like **structural steel, ~~MS rods, and MS Rails~~, MS/GI/SS handrails** as specified in relevant BOQ shall be issued free of cost by BHEL for use in the work covered in this contract from BHEL stores/storage yard. The contractor shall collect these materials from BHEL stores/storage yard at specified places at his own cost and store the same at his stores as per standard norms. Materials issued will be used only for construction of permanent works. ~~Procurement, supply, fabrication, erection and painting of MS/GI/SS handrails as applicable shall be in contractor's scope.~~

b. BHEL reserves the right to recover from the contractor any loss arising out of damage/ theft or any other causes or during verification/stacking or at any time under the custody of the contractor.

c. The contractor shall take care of material issued by BHEL and shall protect the same from damage and weathering.

d. The contractor shall in no case be entitled for any compensation on account of any delay in supply or non-supply thereof for all or any such materials. However in case of non-availability of any specific section(s) which delays the completion of work, such cases shall be recorded separately in monthly planning format (F 14) and shall be considered for time extension of contract.

e. Contractor will have to make his own arrangement at his own cost for procurement of any other materials except as mentioned above/ BOQ, as required for the works and of such quality as acceptable to BHEL.

f. The contractor shall maintain proper store account for all the BHEL issued materials and shall give **monthly-computerized reconciliation statement** of such account showing total receipt, consumption and balance at site to the BHEL. BHEL Engineer's certification for the

reconciliation of steel shall be final. The detailed reconciliation (dia. Wise or as required) shall be done **every month before submission of Monthly Running Bill (RAB)**.

g. Contractor shall also carryout in complete association with BHEL, the material management functions and execution like day-to-day update of materials, issued to contractor, accounting for surplus/scrap material returned etc. These functions shall also be carried out through computerized system utilizing suitable software. Contractor shall engage experienced software personnel to associate on dedicated basis for efficient discharge of the same in time.

h. The contractor shall solely be responsible for the safety & security of material after it is handed over and issued to contractor by the BHEL.

i. BHEL issued materials, shall not be under any circumstances whatsoever, and shall be taken out of the project site unless otherwise permitted by BHEL for outside job.

14.9 Handling of materials issued by BHEL:

14.9.1 Materials shall be issued by BHEL based on the weighment basis/linear measurements & sectional weight. However on specific request of the contractor **"as a special case to expedite the job"** the consignment received at BHEL stores can directly be diverted to the work site following issuance procedure of BHEL. Such direct issues shall be as per the Challan/dispatch document/LR received with the consignment. In such cases, contractor shall do unloading of materials from trucks/lorry at their own cost.

14.9.2 All materials issued by BHEL shall be stacked, stored above ground level **by use of concrete or wooden sleepers. No materials shall remain on ground at any time**. All concrete or wooden sleepers required for stacking the materials shall be arranged by contractor at his own cost within the quoted rates. All other equipment like winches, D-Shackles, slings of various sizes, max puller, pulley blocks, jacks, trucks, trailers etc required for such handling of steel from BHEL stores/storage yard etc shall be arranged by contractor within quoted/accepted rates.

14.9.3 Open land for storage purposes shall be provided by BHEL on free of cost/as available basis. Temporary barbed wire fencing of the open storage yard is to be done by the contractor and is included under the scope of his work. Contractor shall also remove grass, bushes, trees etc wherever required off the land provided to him and shall make proper continuous up keeping of the open yard /land by removing grass, bushes trees etc and same is included under the scope of his work & No extra payment shall be made to the contractor in this regard. The bidder shall make complete arrangement of necessary security personnel's to safeguard all such materials in his custody. Materials issued will be used only for construction of permanent works. The contractor shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering. Excessive rusting of steel in custody of agency/contractor must be avoided. **In case, due to any cause attributable to the contractor, such rusting of steel occur rendering the same unusable, then such quantity of steel shall be recovered from the interim payment at the penal rate specified in the tender.**

~~**14.10 Issue of steel**~~

14.10.1 The steel shall be issued to the contractor on the following basis:

a. Structural Steel: Weighment basis (Unit–MT)
b. Reinforcement Steel and Earthing **MS Rod**: Weighment basis (Unit-MT)
c. GI Gratings: Weighment Basis (Unit-MT/As Received from manufacturering Unit)
d. MS Rails: Weighment Basis (Unit-MT)

14.10.2 All the steel (structural, reinforcement, MS Rod, GI Grating, Foundation bolts, MS Rails) issued by BHEL shall be properly accounted for. The total quantity of steel required for the work will be calculated from the approved Bar Bending schedule, fabrication drawings, approved laps, chairs and lugs etc. The measurement for payment as well as for accounting shall be based on the sectional weights as indicated in the following IS/BS/EN specifications.

SN	**Name of Standard**	**Name of Section**
1	**IS: 808-1964**	Beams, Channels and Angles
2	**IS: 1730-1961**	Plates, Sheets and Strips/Flats
3	**BS4-1: 1993**	UB/UC sections
4	**IS: 12778/equivalence with EN-19-57**	For NPB sections
5	**IS: 12778/equivalence with EN-53-62**	For HE/WPB sections
6	**IS: 1786 or grade -1 of IS432 (Part-I)**	Rounds including deformed high yield strength bars.

In case any such sectional weights are not available in the above documents, the manufacturer recommendation shall be binding.

14.10.3 The steel issued to the contractor shall be mainly in standard length and sections as received from the supplier. However, the contractor shall be bound to accept the steel in length as available in the project stores, no claims for extra payment because of issue of non-standard length will be entertained.

14.10.4 The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.

14.10.5 The contractor shall submit to BHEL, a statement indicating estimated quantity of steel required during a quarter. In addition, the contractor shall also furnish the estimated requirement of steel during a month by the third week of the previous month indicating his requirement.

14.10.6 Following shall be limit for the maximum quantity of BHEL issue materials that would be with the contractor at any point of time when work is in progress (excluding what has already been incorporated in the works).

~~SN.~~	~~Issue of materials~~	~~Max Quantity in Contractors Store~~
~~01~~	~~**MS Rod**/GI Flat, GI Grating, Foundation Bolts, **MS Rails**~~	~~One Month~~
~~02~~	~~Structural Steel~~	~~One Month~~

~~14.10.7 Bidders shall ensure that no lamination material is taken over by them from BHEL.~~

~~14.10.8 **The contractor must note that cement and steel required for the contractor's enabling job like store/ site office/ batching plant/ temporary work etc shall be arranged by the contractor at his own cost.**~~

14.11 Return of Materials

14.11.1 Return of Reinforcement Steel and Structural Steel including Scrap: All surplus steel and all wastage materials will be taken back on weighment basis. Surplus, unused and untampered steel shall be sorted section-wise and returned separately at a place directed by BHEL Engineer within the project area. Return of such materials will not be entitled for any handling and incidental charges. All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be returned to the stores in consultation with BHEL Engineer and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any transportation and incidental charge. Scrap for reinforcement steel and structural steel shall be returned separately.

14.12 Scrap & Serviceable Materials:

14.12.1 All structural steel of length above 2 M except M.S Plate shall be considered as **serviceable materials** provided the materials are free from any physical damage, good condition and un-welded. Structural steel of length less than 2 M shall be treated as scrap.

14.12.2 Plates having both side greater than 1 Meter OR if any side is less than 1 M but greater than 0.5 M and the total area is equal or greater than 2 sq. Meter shall be considered as **serviceable materials**.

14.12.3 All pipe measuring 2 M and above in length shall be treated as serviceable materials provided they are free from any physical damage, good condition and un-welded. Pipe in less than 2 M length shall be treated as Scrap.

14.13 Steel Consumption and Wastage:

~~**14.13.1 MS Rod and MS Rails Consumption:** The theoretical consumption of various sections and/or diameter of reinforcement and earthing rod steel shall be based on approved construction drawing and bar bending schedule. Weight shall be calculated considering the sectional weights as per Indian standards. No extra cost shall be payable to the contractor for any deviation in weights for the different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.~~

~~a. Actual consumption = Issue – Surplus.~~

b. Surplus = **untempered, unused, uncut quantity of steel including serviceable materials returned by the contractor to BHEL store**.

c. Wastage = Actual consumption – Theoretical consumption.

14.13.2 MS Rod and MS Rails Wastage:

Allowable Wastage: (+3%) of the theoretical consumption shall be considered as allowable wastage.

Wastage and scrap shall be as per actual weighment basis.		
Sl no	**Reinforcement steel & MS earthing rod**	**Basis of issue & penal recovery**
R-1	Theoretical consumption (without considering wastage and scrap or loss)	Free
R-2	Wastage limited to **plus THREE** percent (+3%) of aforesaid theoretical consumption (R-1) towards allowable wastage.	Free
R-3	Wastage beyond **THREE** percent (+3%) of the theoretical consumption above (R-1).	Penal rate

14.13.3 Structural Steel (Rolled Sections and Plates etc) Consumption: The theoretical consumption of various sections shall be based on approved drawings. Weights shall be calculated considering the sectional weights as per Indian standard. No extra shall payable to the contractor for any deviation in weights for the two different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.

a. Actual consumption = Issue – Surplus.

b. Surplus = **untempered, unused, uncut quantity of steel including serviceable materials returned by the contractor to BHEL store**.

c. Wastage = Actual consumption – Theoretical consumption.

14.13.4 Structural Steel Wastage:

Allowable wastage: +4% (Four percent) of the theoretical consumption shall be considered. Wastage shall be considered as cut pieces and scrap material, measured as per actual weighment basis. Invisible wastage, if any, shall be considered to be included in the specified 4 % allowable wastage.

Sl no	**Structural steel including SS plate**	**Basis of issue & penal recovery**
S-1	Theoretical consumption (without considering any wastage, scrap	Free

	or loss) as per specification &drg.	
S-2	Wastage limited to **plus four percent** (+4%) of the aforesaid theoretical consumption (S-1) towards allowable wastage.	Free
S-3	Wastage beyond **four percent** (4%) of the aforesaid theoretical consumption (S-1).	Penal rate

14.14 Reconciliation of Materials:

14.14.1 The contractor shall submit a reconciliation statement of steel issued to the contractor with each RA Bill.

14.14.2 At the time of submission of bills, the contractor shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance material are available in the contractor custody at site.

14.14.3 At the time of submission of bills, if it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then, BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.

14.14.4 The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings prepared by the BHEL and drawings approved by BHEL for fabrication works and such other drawings approved by BHEL.

14.15 Recovery of Materials (Penal Rates): If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA Bills as per following penal rates:

SN	**Item**	**Penal rate (Rs)**
P-2	MS rod	55,000 per MT
P-3	Chequered Plates, MS plates	60,000 per MT
P-4	MS Flats, beams, channel, angles etc. (Rolled Sections)	60,000 per MT
P6	Stainless Steel	224000 Per MT

Welding, Heat Treatment, Radiography and NDT (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified)

15.1 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.

15.2 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.

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

15.4 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.

15.5 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.

15.6 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.

15.7 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.

15.8 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.

15.9 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.

15.10 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.

15.11 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.

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

15.13 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).

15.14 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

15.15 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.

15.16 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.

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

15.18 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.

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

15.20 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.

15.21 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.

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

15.23 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.

15.24 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.

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

15.26 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.

15.27 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.

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

15.29 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.

15.30 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.

15.31 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.

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

Application of Insulation (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified)

16.1 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.

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

16.3 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.

16.4 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.

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

16.6 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.

16.7 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.

16.8 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.

16.9 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.

16.10 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.

16.11 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%

16.12 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.

16.13 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.

16.14 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.

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

16.16 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.

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

16.18 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.)

17.1 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.

17.2 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.

17.3 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.

17.4 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.

17.5 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.

17.6 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

17.7 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).

17.8 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.

17.9 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.

17.10 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.

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

17.12 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.

17.13 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.

17.14 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)

18.1 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.

18.2 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.

18.3 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.

18.4 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)

18.5 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.

18.6 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.

18.7 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.

18.8 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.

18.9 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.

18.10 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.

18.11 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.

18.12 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.

18.13 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.

18.14 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.

18.15 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.

18.16 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.

18.17 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.

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

18.19 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.

18.20 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.

18.21 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.

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

18.23 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.

18.24 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.

18.25 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.

18.26 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.

18.27 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.

18.28 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.

18.29 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.

18.30 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 pre-commissioning and commissioning programs made to achieve the schedule agreed with customer.

18.31 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.

18.32 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.

18.33 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.

18.34 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.

18.35 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.

18.36 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.

18.37 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.

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

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

18.40 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.

18.41 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.

18.42 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.

18.43 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-XIX EXCLUSION

Exclusions: The following works are specific exclusions from the scope of work under erection, testing & commissioning of tender specification-

19.1 Sub-delivery items and electrical components such as push-buttons, junction boxes etc.

19.2 E&C work of cable trays, cables and earthing etc

19.3 Control panels, MCC etc.

19.4 Electrical & C&I items of handling system

19.5 All electrical and control & instrumentation items except those specified elsewhere in these specifications.

19.6 Civil works except to the extent specifically indicated elsewhere in this tender.

19.7 Pneumatic copper tubing and fittings thereof. .

19.8 Electrical and C&I items of Variable Frequency Drives as provided elsewhere in these specifications.

19.9 **Elevators:** 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 be carried out by the BHEL vendor /system supplier/OEM of the system.

- Absorber Elevator
- Day Silo Elevator
- FGD Control Room Elevator

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XX INCLUSION

Specific Inclusions: The following works are specific inclusions in the scope of work under erection, testing & commissioning of tender specification-

20.1 Primer & Paints including thinner as per painting specification shall be arranged by contractor within the quoted price.

20.2 The contractor shall also weld all thermo wells, small length of pipes to all pressure, flow and level tapping points, isolating valves and root valves on all equipment under scope of erection of this contract.

20.3 Supply and application of Wrapping and coating material for buried piping shall be arranged by contractor within the quoted price.

20.4 Contractor has to provide his 40 MT (as per site requirement) crane free of cost for Assembly of BHEL cranes.

20.5 Wet ball mill internal lining will be carried out at site. Supply and application of lining is in the scope of BHEL-Hyderabad. Manpower assistance for lining of Wet Ball Mill is in the contractor scope.

20.6 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.

Tentative Manpower Deployment Planning																	
Sl no	Description	Per Month Manpower Required for completion of work															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	**Package-A: Unit # 4, 5 & 6 (Ducting Package) including common system**																
a	Total Manpower (Skilled+Semi Skilled+ Unskilled)	63	104	177	198	240	271	292	281	229	219	156	146	104	52	34	2565
b	Total nos of supervisor required	4	7	12	13	16	18	19	19	15	15	10	10	7	3	2	171
c	Safety Officer	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	9
d	Total nos of Safety Supervisor	1	1	2	2	2	3	3	3	2	2	2	1	1	1	0	26
e	Total nos of Engineer/ Supervisor	1	2	4	4	5	5	6	6	5	4	3	3	2	1	1	51
f	Planning/Quality Engineer/Supervisor	1	1	2	3	3	3	3	3	3	3	3	2	2	2	1	35
g	Store Keeper	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	30
h	Construction Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
	Total	**74**	**119**	**200**	**223**	**269**	**304**	**326**	**315**	**258**	**246**	**178**	**165**	**119**	**63**	**42**	**2902**

Note:

1. Manpower mentioned above for Mechanical Package is tentative.
2. It is the prime responsibility of the contractor to augment the manpower on the actual requirement based on front availability and to fulfill the commissioning schedule of the FGD Project
3. 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.

Month		1	2	3	4	5	6	7	8	9	10	11	12	13
	Package													
1	Unit # 4 (Ducting Package)	Erection Start				Readiness of ducting	Completion of ATT		Readiness of ducting for Gas in					Completion of Facilities
2	Unit # 5 (Ducting Package)	Erection Start				Readiness of ducting	Completion of ATT		Readiness of ducting for Gas in					Completion of Facilities
3	Unit # 6 (Ducting Package)		Erection Start						Readiness of ducting	Completion of ATT	Readiness of ducting for Gas in			Completion of Facilities
4	Common System	Erection Start				Readiness of ACW/DMCW system		Readiness of Ball Mill & Aux						Completion of Facilities

23.0: Annexures:

Following technical Specifications and Drawings shall be integral part of this tender

1. FGD Plant Layout
2. GA FGD Duct layout
3. Painting Schedule BHEL- Ranipet
4. NTPC Standard for Mechanised Material Handling

Note: This is to be noted that the drawings and the documents furnished along with this specification are the sole property of BHEL. It must not be used directly or indirectly in any way detrimental to the interest of the company**.**

Above documents have been uploaded as Vol IE- Technical Specifiaction

SN	DESCRIPTION OF WORK	Qty	Unit	Weightage
1	Structure	2,109.81	MT	0.2469141239
2	Non Pressure Parts	4,496.70	MT	0.5621942744
3	Rotating Machines	518.94	MT	0.0499003764
4	CS Piping + GI Piping	307.84	MT	0.0775318618
5	SS Piping	15.62	MT	0.0098249175
6	H & S	12.85	MT	0.0021282253
7	Insulation- Wool Mattress	182.60	MT	0.0175608861
8	Insulation- Iron Parts	182.60	MT	0.0219882294
9	Insulation- Aluminium Cladding Sheets	91.00	MT	0.0119571052
	Total (FGD System Package - A)			1.0000000000

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 " 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 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.