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NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited

Ref: **BHEL/NR/SCT/JHAJJAR/MRS/991**

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NOTICE INVITING TENDER (NIT)

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

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To

Dear Sir/Madam

Sub : NOTICE INVITING TENDER

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

1.0 Salient Features of NIT

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	**BHEL/NR/SCT/JHAJJAR/MRS/991**	
ii	Broad Scope of job	**Erection, Commissioning, Trial Run and Handing Over of "Balance Work of Mill Reject System for Unit#1,2&3 at 3X500 MW IGSTPP Jhajjar Project "**	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	Issue of Tender Documents	***1. Sale from BHEL PS Regional office at :*** ***Start : 24/03//2015, Time : 0900 Hrs (IST)*** ***Closes: 24/03//2015, Time : 1200 Hrs (IST)*** **2. From BHEL website (www.bhel.com)** Tender documents will be available for downloading from website till due date of submission	*Applicable*
v	DUE DATE & TIME OF OFFER SUBMISSION	***Date : 24/03//2015, Time : 1500 Hrs (IST)*** ***Place : BHEL-PSNR-Noida***	*Applicable*
vi	OPENING OF TENDER	***Date : 24/03//2015, Time : 1530 Hrs (IST)***	*Applicable*

		Notes: *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender*	
vii	**EMD AMOUNT**	*Rs 1,50,000/-*	*Applicable*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	*Date: **19/03//2015*** *Along with soft version also, addressing to undersigned & to others as per contact address given below*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**		*Not Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) **and not in the newspapers**. Bidders to keep themselves updated with all such information	

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

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

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

5.0 **Procedure for Submission of Tenders**: The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:

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

6.0 The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. **(All pages to be signed and stamped)**

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

	PART-I B	
	ENVELOPE – II superscribed as: PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK :	

	PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**:-	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender **OR** Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender 2. Cost of Tender (Demand Draft or copy of Cash Receipt as the case may be)	

	PART-II	
	PRICE BID consisting of the following shall be enclosed	
	ENVELOPE-III superscribed as: PART-II (PRICE BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: **CONTAINING THE FOLLOWING**	
i	Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I	
ii	Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)	

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

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

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

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

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

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

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

i). Total number of Packages
Total number of Packages in hand = P
Where

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

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

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

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

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

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

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

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

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

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

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

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

Sl no	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No of similar packages for all Regions = $\mathbf{P_T}$ ie Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment for corresponding similar Package (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	---
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{S_T}$

ii) Calculation of Overall 'Performance Rating' (**R_{BHEL}**) in case 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

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

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

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

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

Sl no	Overall Performance Rating (R_{BHEL})	Corresponding value of 'L'
1	=60	NA
2	> 60 and ≤ 65	0.4
3	> 65 and ≤ 70	0.35

4	> 70 and ≤ 75	0.25
5	> 75 and < 80	0.2
6	≥ 80	NA

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

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

IV. **Explanatory note**:

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

b) Identified Packages (Unit wise)

Table-1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23.0 **Not Used**

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

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

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

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

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

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

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

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

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

Type under MSE	SC/ST owned	Others
Micro		
Small		

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

MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3 where deemed validity of EM-II certificate of five years has expired) applicable for the relevant financial year (last audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer. .

30.0 Order of Precedence

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

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

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure

01. Annexure-1: Pre Qualifying criteria.
02. Annexure-2: Check List.
03. Annexure-3: Modification / Deletions in Standard Clause of General Conditions of Contract (GCC) or Special Conditions of Contract (SCC)
04. Annexure-4: Chartered Accountant certificate for MSMED
05. Annexure-5: General terms and conditions of Reverse Auction (RA)
06. Annexure-6: Authorization of representative who will participate in the online Reverse Auction Process
07. Annexure-7: FeedBack Form

PRE QUALIFYING REQUIREMENTS ANNEXURE – 1

JOB	**Erection, Commissioning, Trial Run and Handing Over of "Balance Work of Mill Reject System for Unit#1,2&3 at 3X500 MW IGSTPP Jhajjar Project "**
TENDER NO.	**BHEL/NR/SCT/JHAJJAR/MRS/991**

SL. NO.	Name And Description Of Qualifying Criteria	Bidders claim in respect of fulfilling the PQR Criteria
A	**Submission of Integrity Pact duly signed** (Note: To be submitted by Prime Bidder & Consortium/ Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	Not Applicable
B	**Technical**	Applicable
B.1	**Bidders who wish to participate should have:** Experience of having successfully completed similar work during last seven years ending last day of the month previous to the one in which applications are invited, AND Should be either of the following :	
B.1.1	Three (03) similar completed works costing not less than the amount equal to Rs 22.40 Lacs.	
	Or	
B.1.2	Two (02) similar completed works costing not less than the amount equal to Rs 28.00 Lacs.	
	Or	
B.1.3	One (01) similar completed work costing not less than the amount equal to Rs 44.80 Lacs.	
C	**Financial**	
C-1	**TURNOVER** Bidder should have achieved an average annual financial turnover (Audited) of Rs 16.80 Lakhs or more over the last three Financial years (FY) i.e. (2011-12, 2012-13, 2013-14). Bidder shall submit audited annual accounts (balance sheets and profit & loss account) in support of this. In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.	Applicable

C-2	**NET WORTH** Net worth of bidders based on the latest audited accounts, as furnished for C-1 above, should be positive. Net worth = Paid up share capital* + Reserves. (Net worth is required to be evaluated in case of companies)	Applicable
C-3	**PROFIT** Bidder must have earned cash profit in any one of the three financial years as applicable in last three years defined in C-1 above based on latest Audited accounts. PROFIT: Shall be NET profit (PAT + Non cash expenditure viz. depreciation) earned during any one of the three financial years as in C-1 above.	Applicable
D	Assessment of capacity of Bidder to execute the work as per sl. no 9 of NIT	Applicable(BY BHEL)
E	Approval of customer	Applicable
F	Consortium Criteria	Not Applicable

Explanatory Notes:

1. Relevant documents, meeting above requirements shall be submitted by bidders.
2. "Completed" means, the bidder should have completed the work specified in the Technical criteria of PQR.
3. If the qualifying work is completed in the Seven (7) years period specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.
4. The word "work of similar nature/similar work" means - **Erection and commissioning of Positive Pressure Pneumatic conveying system of capacity 5 TPH or more in any project/ Industry.**
5. **Share capital*-** Share Capital 'or' Partnership Capital 'or' Proprietor Capital, as the case may be.

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 OREDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

ANNEXURE - 2

CHECK LIST

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

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

18	Tie Ups/Consortium Agreement are submitted as per format	~~Applicable~~/Not Applicable	YES/NO
19	Power of Attorney for Submission of Tender/Signing Contract Agreement	Applicable/~~Not Applicable~~	YES/NO
20	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

ANNEXURE – 3

MODIFICATION/ DELETION OF GCC & SCC CLAUSES

- **Modifications in GCC clauses for 3 x 500 MW IGSTPP JHAJJAR PROJECT**

❖ Clause no. **2.12 (OVERRUN COMPENSATION)** and **2.13 (INTEREST BEARING RECOVERABLE ADVANCES)** of **GCC – NOT APPLICABLE**

❖ **Modifications in Price variation compensation clause no. 2.17 of GCC is as below:-**

1. Clause no. 2.17.5 of GCC shall be modified as below:
   a. Base date shall be calendar month of the schedule completion date of the contract. (Schedule completion date shall be actual date of start plus delivery period as defined in clause no. 6.0 of TCC.)
2. Clause no. 2.17.9 shall be modified as: PVC shall be applicable only for extended period of contract (if any) after the schedule completion of date. However, total quantum of PV amount payable/recoverable shall be regulated as follows:
   - For the portion of backlog attributable to the contractor, no PV shall be paid.
   - For the period of Force majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.
   - For the portion of backlog attributable to BHEL, PVC will be as per the indices applicable for the respective month.
   - The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional item and extra work.
   - All other terms and conditions of the clause no. 2.17 no GCC shall remain same.

- **Modifications in SCC clauses for 3 x 500 MW IGSTPP JHAJJAR PROJECT**

❖ Clause No. **4.1.1** and **4.1.10** of **SCC – Not Applicable**
❖ Clause No**. 4.2.2 (**Obligations in respect of T&Ps and MMEs provided by BHEL**) – "As per TCC"**

- **Modifications in HSE clauses of SCC-:**

Ref Clause no.	Changes
8.4.5.1 & 8.4.5.2	• Contractor can use existing Medical facilities of APCPL with prior permission. Any applicable charges on this account shall be in contractor`s scope.
13	HSE PERFORMANCE (Serial no. 8 of table): • Non availability of proper first-aid facility, adequate labour welfare initiatives.

ANNEXURE - 4

Certificate by Chartered Accountant on letter head

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

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

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

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

(Strike off which is not applicable)

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

Category under MSMED Act 2006.

Or

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

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

ANNEXURE - 5

GENERAL TERMS AND CONDITIONS OF REVERSE AUCTION (RA)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ANNEXURE – 6

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

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

ANNEXURE – 7

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

1	NEWSPAPER ADVERTISEMENT (NAME OF NEWSPAPER)	
2	BHEL WEBISTE (TENDER NOTIFICATION) (www.bhel.com)	
3	CENTRAL PUBLIC PROCUREMENT PORTAL OF GOVERNMENT OF INDIA (CPP PORTAL) (www.eprocure.gov.in)	
4	EMAIL COMMUNICATION FROM BHEL	
5	ANY OTHER SOURCE (GIVE DETAILS)	

FOR OFFICIAL USE ONLY
NOT FOR PUBLICATION

TENDERER'S COPY
ORIGINAL COPY

TECHINICAL CONDITIONS OF CONTRACT (TCC)

TENDER NO. BHEL/NR/SCT/JHAJJAR/MRS/991

FOR

Erection, Commissioning, Trial Run and Handing Over of "Balance Work of Mill Reject System for Unit#1,2&3 at 3X500 MW IGSTPP Jhajjar Project "

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

INDEX

Chapter - 1: Project Information

Name of the Owner:	ARAVALI POWER COMPANY PVT LIMITED (APCPL)
NAME OF LEAD PARTNER	NTPC LTD. (NTPC)
ADDRESS	INDRA GANDHI STPP VILLAGE- JHARLI, Distt JHAJJAR, HARYANA
INSTALLED CAPACITY	NEW PROJECT
NEW INSTALLATION	3 X 500 MW
Nearest Railway station	JHARLI -3 KM JHAJJAR TOWN – 35 KM BAHADURGARH -70 KM DELHI – 150 KM
NEAREST CITY	JHAJJAR – 35 KM
NEAREST AIRPORT	DELHI – 150 KM
MAXIMUM TEMPERATURE	APPROX. 48 DEG C
MINIMUM TEMPERATURE	APPROX. 2 DEG C

Chapter - 2: SCOPE OF WORKS

INTENT OF SPECIFICATION

1.1 The specification is intended to cover the scope of balance work for Mill Reject Handling System for 3x 500 MW IGSTPP, Jhajjar Project under the specification that covers taking delivery of materials from BHEL stores, fabrication (as per drawing), erection, commissioning, trial run, including painting protection of all items as specified hereinafter but without excluding any other necessary components, which are not mentioned herein but are required for the completeness and; efficient, easy and reliable operation of the system.

1.2 The extent of work under the contract includes erection and commissioning of all items shown in BOQ and as per approved drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules.

1.3 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to enquire for missing information, ensure completeness of specification, to bring out any contradictory requirement in different sections of the specification and within a section itself to the notice of BHEL. In case of any contradictory requirement, the more stringent requirement as per interpretation of Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Customer as and when brought to their notice either by the bidder or by customer themselves. However, such requirements shall be binding on the successful bidder without any commercial implication.

1.4 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.

1.5 In the event of any conflict between the requirements of two clauses of this specification documents or requirements of different codes and standards specified, the more stringent requirement as per the interpretation of the owner shall apply.

SPECIFIC TECHNICAL REQUIREMENTS

This specification is intended to work completion of the Pneumatic type Mill Reject Conveying system supplied by M/s United Conveyor Corporation Ltd at 3 x 500 MW IGSTPP JHAJJAR Project. The work shall include balance work including balance left out job of M/s UCC(I) as mentioned in BOQ, dismantling of defective item in the existing partially erected MRS package & replacing it with new item as per design and BHEL specification. In addition, the bidder's scope shall include erection as per BOQ (except already erected but includes replacement of defective items) and commissioning, unloading, storage and handling of material at site, functional testing, trial run for Mill Reject Handling System for 3 x 500 MW IGSTPP Jhajjar project. Also, bidder to include all necessary items like control cables, power cable, screened control/instrumentation cables, instruments (calibrated) etc. as required for performance test of the complete in totality. Any modification required in the already supplied equipment shall be in bidder scope. Any civil modification required by bidder for installation shall be in the scope of bidder. Safety of nearby and existing equipment shall be ensured by bidder while civil modification.

Bidders to note that originally the plant was supplied by M/s United Conveyer Corporation Ltd. Bidder to note that items which needs to be erected /commissioned, shall be carried out by the bidder. Any additional items required for the completion of the package which comes under Erection and Commissioning shall be in BHEL's scope. To establish the extent of work involved, bidder to mandatorily visit the site prior to quotation for actual assessment of the scope of supply and work. Bidder shall ensure that the additional items, if supplied by the bidder should be interchangeable / compatible (to the extent possible) with the MRS already supplied by M/s UCC and same shall be able to integrate / hook with the existing system. The bidder shall carry out required rectification, erection, commissioning and Trial Run. The plant to be commissioned in totality, including the control system, electrical system & mechanical system for successful run of the plant. The necessary drawings/documents existing plant related to MRS package enclosed in the specification for the bidders reference.

Status of System is as follows:

- ETC work for unit # 1: completed. PG test conducted and report submitted to customer.
- ETC work for unit # 2: Erection is partially completed (Approx. 60%)
- ETC work for unit # 3: Erection work not yet started.

ETC = Erection, Testing and Commissioning

DETAILED TECHNICAL SPECIFICATION OF MILL REJECT SYSTEM PACKAGE IS AS PER ANNEXURE-1 ATTACHED.

(A) SCOPE OF SUPPLY

As per BHEL Site records, almost all of the material as per initial BOQ has been delivered to BHEL Jhajjar site. The material shall be issued/ provided by BHEL. However, following supplies shall be arranged by the contractor within the quoted price as per scope of work defined in the tender document.

1. Applicable quantity of Paint & Primer with all related accessories for its application (as per schedule of BHEL and details as per technical specifications).

Notes:

1. Painting work is applicable for all 3 Units.
2. Some of the equipment/ components may found in rusted conditions. It shall be responsibility of contractor to clean such parts properly prior to applying primer/ paint.

Note: Bidder to make a compulsory visit to site prior to quotation so that extent of work involved may be correctly estimated.

(B) SCOPE OF SERVICE

AS PER DETAILS FROM SITE, THE BALANCE LEFTOVER WORK IS AS PER ANNEXURE-A

The bidder's scope also includes following services for scope under this specification:

1. Site visit for assessment of balance erection and commissioning work.
2. Erection and commissioning of all the items to make system complete, unloading, storage and handling of material at site.
3. If required Structural modification of existing item (to be carried out at site itself).
4. In site transportation of material as per requirement.
5. All necessary T&P's required for erection and commissioning of complete package.
6. All consumables required during erection and commissioning.
7. Repair of discharge pipes and pyrite hoppers of Unit# 2 & 3. Cost of repair shall be inclusive of total price quoted against this tender.
8. Servicing of all items covered in Sl. No: A.00, D.00, E.00 and G.00 of BOQ (attached). Cost of servicing shall be inclusive of total price quoted against this tender.
9. Servicing of air compressors, valves, dryers etc. Cost of servicing shall be inclusive of total price quoted against this tender. The required material (except consumable for servicing purpose) shall be provided by BHEL.
10. Painting of all equipment's and pipelines as per BHEL standards.
11. Arrangement of all calibrated instruments and lab facilities to carry out trial run/commissioning and Demonstration test.
12. The contractor`s scope includes supervisor and providing requisite manpower required for carrying out PG Test and to carry out minor modifications, if any, during PG test.
13. Complete grouting (secondary grouting, including material) for equipment, fixing and any concreting inside the vessels and lining.

14. Hydo-test/ pressure test of associated Water/ Air/ coal lines to MRS, wherever required. Any associated job (temporary platform for inspection etc.), including T & P, to carry out such work.
15. All expertise required during trial run, commissioning and Demonstration Test.

CIVIL SCOPE

Civil work is included in the bidder scope including pit and trench cleaning, steel inserts, plates, bolts, nuts, sleeves and all other embedding components etc. as required to grout their equipment to hold/support shall be in bidder's scope. Supply of material for secondary grouting shall be in contractor`s scope.

Functional test requirements as follows

Continuous effective discharge and conveying at the rated capacity of the mill rejects without spillage or blockage in the system Conveying rate.

Note-: Separate order shall be issued for Supply Scope (A) and Service Scope (B).

DRAWING/DOCUEMNTS REQUIREMENT (FOR MECHANICAL/ELECTRICAL/C&I/ETC)

After award of LOI, all drawing/documents shall be given by BHEL/Customer .List of drawing/ documents given by BHEL:

a) Detailed Equipment & piping layout
b) GA and data sheets of items to be erected.
c) Civil & Mechanical modification drgs.
d) Detailed installation drawings for all instruments and instrumentation schedule.
e) Details Data sheet for instrument etc.

NOTE-1: - Any work of erection which have not been specifically mentioned in but are necessary to complete the woks for trouble free and efficient operation of the plant shall be deemed to be included within the scope of this specification. The bidder without any extra charge shall provide the same.

Chapter - III: Facilities in the scope of Contractor/BHEL

S.No.	Description	Scope /to be taken care by		
		BHEL	CONTRACTOR	LALITPUR
1.1.0	ESTABLISHMENT			
1.1.1	FOR CONSTRUCTION PURPOSE			
A.	Open space for office	YES		Limited space (free of charge) As and where made available by customer M/s APCPL
B.	Open space for storage	YES		Limited space(free of charge) As and where made available by customer M/s APCPL
1.1.2	FOR LABOUR COLONY			
A	Open space		YES	Contractor have to make their own arrangement
1.2.0	ELECTRICITY			
1.2.1.	Electricity for construction purposes (chargeable/free)	YES		FREE SUPPLY- For office and construction workplace.
1.2.1.1	Single point source	YES		
1.2.1.2	Further distribution for the work to be done which include supply of materials & execution		YES	Arrangement shall be made by contractor
1.2.2	Electricity for the office, stores, canteen etc of the bidder which include:			FREE OF COST BASIS
1.2.2.1	Distribution from single point including supply of materials & service		YES	Contractor to made arrangement from single point electricity source provided by BHEL
1.2.2.2	Supply, Installation & connection of material of energy meter including operation & maintenance		YES	Not Required.
1.2.2.3	Duties & deposits including statutory clearances for above		YES	
1.2.2.4	Demobilization of the facilities after completion of works		YES	

1.2.2.5	Electricity for living accommodation of the bidder's Staff, engineers, supervisors etc. on the above lines		**YES**	**Chargeable** **As per prevailing rates** **Contractor shall install calibrated energy meter for metering electricity consumption.**
1.3.0	**WATER SUPPLY**			
1.3.1	**FOR CONSTRUCTION :**			
1.3.1.1	Making the water available at single point	**YES**		**Free supply at single point source**
1.3.1.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
1.3.2	**LABOUR COLONY:**			
1.3.2.1	Making the water available at single point		**YES**	**Contractor have to arrange on his own.**
1.3.2.2	Further distribution as per the requirement of work including supply of materials & execution		**YES**	
1.4.0	**LIGHTING**			
1.4.1	For construction work (supply of all materials) 1. At office storage area 2.At preassembly area 3.At construction site/area		**YES**	
1.4.2	For construction work (execution of lighting work/arrangements) 1. At office storage area 2. At preassembly area 3. At construction site/area		**YES**	
	Providing the necessary consumables like bulbs, Switches, etc during the course of construction		**YES**	
1.5.0	**Communications facilities for site operations of the bidder**			
	Telephone, fax, internet,		**YES**	

	intranet, email etc.			
1.6.0	**COMPRESSED AIR SUPPLY**			
1.6.1	Supply of compressor and all other equipment required for compressor & compressed air system including pipes, Valves, storage system etc.		**YES**	
1.6.2	Installation of the above system and operation & maintenance of the same		**YES**	
1.6.3	Supply of all the consumables for the above system during the contract period.		**YES**	
	ERECTION FACILITIES			
2.1.1	Providing erection drawings for all the Equipments covered under this scope	**YES**		
2.1.2	Drawings for construction method	**YES**	**YES**	**In consultation with BHEL**
2.1.3	As-built-drawings-where ever deviations Observed & executed and also based on Decisions taken at site		**YES**	**Same as above**
2.1.4	Shipping lists etc. for reference & planning the activities	**YES**	**YES**	**Same as above**
2.1.5	Preparation of site erection schedules and other input requirements		**YES**	**Same as above**
2.1.6	Review of performance & revision of site erection schedules in order to achieve the end dates & commitments	**YES**	**YES**	**Same as above**
2.1.7	Weekly erection schedule based on Sl. No.2.1.5		**YES**	**Same as above**
2.1.8	Daily erection/work plan based on Sl. No.2.1.7		**YES**	**Same as above**
2.1.9	Periodic visit of senior official of bidder to site to review the		**YES**	**Same as above**

	progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two month			
2.1.10	Preparation of preassembly bay		**YES**	**Same as above**

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

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

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

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

a) All electrical installations should be as per Indian Electricity rules/ prevailing rules by APCPL in this regards.
b) All distribution Boards installed by the contractor should be constructed with fireproof materials viz. Steel frames, Bakelite sheets etc.
c) Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
d) All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
e) Contractor have to make their own earthing arrangement for their equipment / DB earthing.

f) All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
g) Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.
h) Contractor should ensure that all the CBs / TPNs/ Fuses/ MCCB / ELCB cables etc. should be of adequate rating/ capacity.
i) For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.

3.5 Adequate lighting arrangement such as flood lights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, storage area etc within finally accepted rates.

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

3.7 The contractor should provide sample testing facilities like chemical lab, chemists and required accessories within the firm price of contract.

3.8 On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled, returned to BHEL stores 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 Engineer will get it done and expenses incurred shall be recovered from the contractor along with prevailing overheads. The decision of BHEL Engineer in this regard shall be final.

Chapter - IV: T&Ps and MMEs to be deployed by Contractor

4.0 T&P AND MMD DEPLOYED BY CONTRACTOR

4.1 T&Ps and IMTEs (Inspection, Measuring & Testing Equipment), which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by contractor with in the finally accepted rate. In the event of the failure of contractor to bring necessary and sufficient T&Ps/ and IMTEs, BHEL will be at liberty to arrange the same at the risk and cost of contractor and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.

4.2 All distribution boards, connecting cables/ welding cables, wire ropes, hoses etc. including temporary air/ water/ electrical connections etc, shall have to be arranged by the contractor at his own cost.

4.3 Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection, measuring and Test equipment). The IMTEs shall have test/ calibration certificates from authorised/ Govt. approved/ accredited agencies traceable to National/ International standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for calibration. A list of such instruments deployed by contractor at site with its calibration status is to be submitted to BHEL Engineer for control.

4.4 Re-testing/ re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer with in the contract period. The contractor will also have alternate arrangements for such IMTE so that work does not suffer when the particular instrument is sent for calibration. Also if any IMTEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall i.e. repeat the readings taken by that instrument. Failing which BHEL may deploy IMTEs and re-take the readings at contractor's cost.

4.5 Contractor to use his own T&P for the loading & transportation and unloading of the material. Any T & P required for execution of work as per scope defined in the contract, shall be arranged and provided by contractor with in the finally accepted rate.

4.7 Some of the T&P’s required are Hydra (10/12 MT), Chain Pulley block (2/5 MT), Welding machines. This list is only indicative and bidder shall arrange for all T&P requirements besides these specified T&P’s.

4.8 Any tools, equipment etc. to carry out HYDRO Testing, Pneumatic Testing, if required, shall to be arranged by contractor.

Chapter - V: T&P AND MMD DEPLOYED BY BHEL ON SHARING BASIS

NIL

Chapter - VI: TIME SCHEDULE

6.0 TIME SCHEDULE

6.1 The contractor is required to commence the work within 15 days from the date of issue of LOI unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilisation of manpower and T&Ps by the contractor.

6.2 Entire work as detailed in the tender specifications for all three units shall to be completed within **06 (Six) months** from the date of start of work as per programme/ schedule indicated by BHEL Engineer**.**

NOTE:

A. As the all 3 Units are in running conditions, availability of front shall depends upon the front given by customer/ APCPL.
B. In case, work under specifications not completed within the stipulated time period, necessary time extension will be given as per GCC clause no.2.11.
C. It shall be responsibility of contractor to obtain Permit for Work (wherever applicable), before start of any work at the available front.

6.3 The work under the scope of this contract is deemed to be complete in all respects, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion date shall be final and binding on the contractor.

6.4 Guarantee period for the work executed by supplier shall commence from date of handover of package to the BHELs` customer (APCPL).

Chapter - VII: TERMS OF PAYMENT

7.0 TERMS OF PAYMENT

7.1 The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.

7.2 Contractor shall submit bills for the work completed under the specification detailing work done. The format for billing shall be approved by BHEL before raising invoices.

7.3 Subject to any deduction which BHEL may be authorised to make under the contract, the contractor on the certificate of the Engineer at site is entitled for payment as explained hereunder:

7.3.1 FOR ERECTION AND COMMISSIONING

7.3.1.1 Seventy (70%) percent payment on Pro-rata basis for the work completed (Erection, Alignment, welding with supports etc.) as per approved billing schedule (for balance work of Unit # 1, 2 & 3), shall be released as progressive payment, by the site authorities, and on submission of protocols duly signed by BHEL site official.

7.3.1.2 Twenty Five percent (25%) of the total value shall be released by the site authorities, on successful commissioning of complete system/ package (per Unit basis). (i.e. 12.5% of total contract value for successful commissioning of complete system/ package for Unit # 2 and 12.5% of total contract value for successful commissioning of complete system/ package for Unit # 3).

7.3.1.3 Balance Five percent (05%) of the total value shall be released along with Final Bill on successful completion of complete work as per scope defined in the contract and closing of all pending points between contractor and BHEL.

7.3.2 No separate payment shall be made for any temporary structures, lifting arrangements for testing and other NDT etc., as all these activities shall be performed as integral to erection work as per site requirement and as directed by Engineer.

Chapter - VIII: TAXES, DUTIES, LEVIES

8.0 TAXES, DUTIES, LEVIES

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

8.1 Service Tax & Cess on Service Tax

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

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

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

1. The name, address and registration number of the contractor
2. The name and address of the party receiving taxable service (BHEL)
3. Description, classification and value of taxable service provided and
4. The Service Tax payable thereon.

All the four conditions shall be fulfilled in the invoice for payment of Service Tax by BHEL.

Where more than one nature of Service under Service Tax Rules is involved, the invoice mentioned above shall contain the breakup of all values for each nature of Service.

Purpose of above requirements, inter alia, is to enable for availing CENVAT credit by BHEL. As per recent amendment time restrictions for taking CENVAT credit is within Six months from date of invoice. Wherever CENVAT credit could not be availed by BHEL within statutory time limit of 6 months due to delay in submission of invoice or for any other reason attributable to contractors, liability towards loss of such CENVAT credit shall be passed on to contractors.

8.2 VAT (Sales Tax /WCT)

The rates quoted by the Contractor shall be inclusive of VAT/Sales Tax and BHEL shall not reimburse any amount on this account due to any reason whatsoever.
The Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill.
Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted.

In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

Contractor has to make his own arrangement at his cost for completing the formalities, if required, with Sales Tax/VAT Authorities, for bringing all their material, plant and equipment etc. at site for the execution of the work, including arrangement of Road Permits if and as applicable under the relevant VAT Act.

8.3 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/ Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.

8.4 New Taxes/Levies

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

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

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

8.5 No C-Form/Concessional Form/Road Permit will be provided by BHEL.

Chapter - IX: Others

9.0 OTHERS

9.1 For reverse auction/ for Price Bid opening, only those bidders will be considered who will be qualified for the subject job on the basis of pre-qualification evaluation/ Techno-commercial bids. BHEL reserves the right to reject the bidders with unsatisfactory past performance in the execution of a contract. BHEL's decision in this regard shall be final & binding.

9.2 Clauses as per GCC:

A. Overrun clause no. 2.12 given in GCC shall not applicable for this contract.
B. Interest bearing advance Clause no. 2.13 given in GCC shall not applicable for this contract.
C. Price variation Clauses no. 2.17.5 & 2.17.9 given in GCC are modified as follows:

2.17.5: Base date shall be calendar month of the schedule completion date of the contract. (Schedule completion date shall be actual date of start plus delivery period as defined in clause no. 6.0 of TCC.)

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

- For the portion of backlog attributable to the contractor, no PV shall be paid.
- For the period of Force majeure, the PVC (if applicable) will be limited to the indices applicable at the beginning of the force majeure period.
- For the portion of backlog attributable to BHEL, PVC will be as per the indices applicable for the respective month.
- The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional item and extra work.
- All other terms and conditions of the clause no. 2.17 no GCC shall remain same.

9.3 Clauses as per SCC:

A. Clause no. 4.1.1 given in SCC shall not applicable for this contract.
B. Clause no. 4.1.10 given in SCC shall not applicable for this contract.
C. Clause no. 4.2.2 given in SCC to be read as – "As per TCC".

9.4 Clauses as per HSE (pat of SCC):

A. Clause 8.4.5.1 & 8.4.5.2 to be read as: - "Contractor can use Medical facilities of APCPL with prior permission. Any applicable charges on this account shall be in contractor`s scope."
B. Clause 13 - HSE PERFORMANCE – Serial no. 8 of table- to be read as – "Non availability of proper first-aid facility, adequate labour welfare initiatives."

Chapter - X: ANNEXURES

Status of material supplied and erected at 3 x 500 MW IGSTPP Jhajjar Site

Sr.No.	BBU NO	DESCRIPTION OF ITEMS	UNIT	Designed supplied Quantities Unit #			TOT QTY	QTY balance (To be executed) Unit Wise			Cummulative REMAINING	REMARKS
				1	2	3		1	2	3	QTY	
	A.00	**Mechanical Items**										
1	**A.01**	PIRITE HOPPER WITH GRID	nos.	9	9	9	27	0	0	0	0	
2	**A.02**	AIR RECEIVER	nos.	2	2	2	6	0	1	2	3	
3	**A.03**	VENT FILTER	nos.	1	1	1	3	0	1	1	2	
4	**A.04**	12" Pressure Relief Valve	nos.	1	1	1	3	0	0	1	1	
5	**A.05**	Depac Inlet Valve	nos.	9	9	9	27	0	4	1	5	
6	**A.06**	Depac Pyrites Transmitter	nos.	9	9	9	27	0	4	9	13	
7	**A.07**	Sector Gate at Mill Reject Bin(Manual)	nos.	1	1	1	3	0	1	1	2	
8	**A.08**	Monorail Hoist for Mill Reject bunker(1 ton)	nos.	1	1	1	3	0	0	1	1	
9	**A.09**	Transport Air Compressor without V Belt, Pulleys & Motor	nos.	1	1	1	3	0	0	0	0	
10	**A.10**	Trolley Mounted Sump Pump with Motor	nos.	1	1	1	3	0	0	0	0	
	B.00	**Structural Items**										
11	**B.01**	Reject Bin without Support Structure(As per Dwg.No. "S-70065-002")	unit	1	1	1	3	0	0.4	1	1.4	Alignment to be checked in U#2
12	**B.02**	Liner Plate for Mill Reject Bin-SS-304, 3 mm THK	sets	1	1	1	3	0	0.4	1	1.4	
13	**B.03**	Gratings for Platforms of Mill Reject Bin	sets	1	1	1	3	0	0.4	1	1.4	
14	**B.04**	Support Structure for Mill Reject Bin(As per Dwg.No. "S-70065-002-01")	unit	1	1	1	3	0	0.4	1	1.4	
15	**B.05**	Structural Steel for Pipe Support(As per Dwg.No. "W-70065-001 to 003")	unit	1	1	1	3	0	1	1	2	
	C.00	**PIPING**										
16	**C.01**	125NB MS, Pyrites Reject Conveying Pipe	Mtrs	850	850	850	2550	0	420	850	1270	
17	**C.02**	100NB MS Pipe for Conveying air Line	Mtrs	240	240	240	720	0	130	240	370	
18	**C.03**	80NB MS Pipe for Conveying air Line	Mtrs	110	110	110	330	0	50	110	160	
19	**C.04**	65NB MS Pipe for Conveying air Line	Mtrs	35	35	35	105	0	20	35	55	

20	**C.05**	50NB MS Pipe for Conveying air Line	Mtrs	6	6	6	18	0	3	6	9	
21	**C.06**	40NB MS Pipe for Conveying air Line	Mtrs	70	70	70	210	0	40	70	110	
22	**C.07**	25NB MS Pipe for Service Water Line	Mtrs	90	90	90	270	0	90	90	180	
23	**C.08**	20NB MS Pipe for Service Water Line	Mtrs	150	150	150	450	0	150	150	300	
24	**C.09**	25NB GI Pipe for Instrument Air Line	Mtrs	300	300	300	900	0	0	300	300	
	D.00	**Instruments**										
25	**D.01**	Level Probe (Pyrite hopper)	nos.	18	18	18	54	0	18	18	36	
26	**D.02**	Level Probe (Bunker)	nos.	1	1	1	3	0	1	1	2	
27	**D.03**	Temperature Switch	nos.	9	9	9	27	0	9	9	18	
28	**D.04**	Pressure Gauge	nos.	7	7	7	21	0	7	7	14	
29	**D.05**	Pressure Switch	nos.	6	6	6	18	0	6	6	12	
30	**D.06**	Differential Pressure Switch	nos.	1	1	1	3	0	1	1	2	
31	**D.07**	Pressure Transmitter	nos.	9	9	9	27	0	9	9	18	
	E.00	**Valves**										
	E.01.00	Conveying Air Line										
32	**E.01.01**	100NB Butterfly Valve at Conveying Air Line	nos.	4	4	4	12	0	2	4	6	
33	**E.01.02**	80NB Butterfly Valve, Cylinder Operated at Branch Isolation	nos.	9	9	9	27	0	4	9	13	
34	**E.01.03**	50NB Butterfly Valve at Pressuring Air Line	nos.	9	9	9	27	0	4	9	13	
35	**E.01.04**	40NB Ball Valve at Conveying Air Line to Discharge Elbow	nos.	9	9	9	27	0	9	9	18	
36	**E.01.05**	40NB Ball Valve at Pressuring Line	nos.	9	9	9	27	0	9	9	18	
37	**E.01.06**	40NB Check Valve	nos.	18	18	18	54	0	18	18	36	
38	**E.01.07**	65NB Check Valve	nos.	9	9	9	27	0	9	9	18	
	E.02.00	**Service water line**										
39	**E.02.01**	65NB Ball Valve at Compressor Cooling Water Line	nos.	3	3	3	9	0	0	0	0	
40	**E.02.02**	65NB Globe Valve at Compressor Cooling Water Line	nos.	1	1	1	3	0	0	0	0	
41	**E.02.03**	65NB Check Valve at Compressor Cooling Water Line	nos.	1	1	1	3	0	0	0	0	
	E.03.00	**Instrument Air Line**										
42	**E.03.01**	25NB Ball Valve	nos.	16	16	16	48	0	1	16	17	
43	**E.03.02**	Solenoid Valve	nos.	45	45	45	135	0	20	45	65	
	E.04.00	**Pyrite Hopper Area**										
44	**E.04.01**	200NB Cylinder Operated Knife Gate Valve	nos.	9	9	9	27	0	0	0	0	
45	**E.04.02**	200NB Manually Operated Knife Gate Valve	nos.	27	27	27	81	0	0	1	1	
	F.00	**Misc**										

46	**F.01**	Depac Discharge Elbow	nos.	9	9	9	27	0	4	9	13	
47	**F.02**	Lateral at Pyrites Conveying Line	nos.	9	9	9	27	0	4	9	13	
48	**F.03**	125NB, 45 deg, ACI Elbow for Pyrites Conveying Line	nos.	50	50	50	150	0	22	50	72	
49	**F.04**	Expansion Below	nos.	9	9	9	27	0	0	0	0	
50	**F.05**	Target Box	nos.	2	2	2	6	0	0	2	2	
51	**F.06**	Rupture disc	nos.	9	9	9	27	0	9	9	18	
	G.00	**Electrical**										
52	**G.01**	Control Panel for compressor	sets	1	1	1	3	0	0	0	0	
53	**G.02**	Motors for compressor	nos.	1	1	1	3	0	0	0	0	
54	**G.03**	Local control panel for pyrite hopper	nos.	9	9	9	27	0	4	9	13	
	G.04	Cable Field to JB										
55	**G.04.01**	Control Cable(Assorted Size)	Mtrs	250	250	250	750	0	250	250	500	
56	**G.04.02**	Instrument Cable(Assorted Size)	Mtrs	1500	1500	1500	4500	0	1500	1500	3000	
57	**G.05**	150W Preforated Cable Tray	Mtrs	180	180	180	540	0	85	180	265	
58	**G.06**	Cable Tray Support Steel	Mt.	1	1	1	3	0	1	1	2	
59	**G.07**	Pulse Jet Timer Panel	No.	1	1	1	3	0	1	1	2	
60	**G.08**	Painting	unit	1	1	1	3	1	1	1	3	
61	**G.09**	Pending Points and Material Reconcillation	unit	1	1	1	3	1	1	1	3	

Chapter - XI: UNPRICED RATE SCHEDULE

Sl. No	DESCRIPTION OF WORK	QTY.	Total Amount (In Rs,)
1	Lumpsum price "A" for carrying out balance work of Mill Reject System (MRS) for Unit No. 1, 2 and 3 at 3 x500 MW IGSTPP as per tender specifications.	01 Set	

Break –up of Lumpsum price "A" quoted above:

BOQ OF MILL REJECT SYSTEM (Common for all 3 Units)				
SCOPE OF SERVICE				
Sr.No.	**BBU NO**	**DESCRIPTION OF ITEMS**	**% Break-up**	**Total Price (In INR)**
1	**A.00**	**Mechanical Items**	**10%**	"A" X 10%
2	**B.00**	**Structural Items**	**20%**	"A" X 20%
3	**C.00**	**PIPING**	**10%**	"A" X 10%
4	**D.00**	**Instruments**	**10%**	"A" X 10%
5	**E.00**	**Valves**	**5%**	"A" X 5%
6	**F.00**	**Misc**	**15%**	"A" X 15%
7	**G.00**	**Electrical & others (except G.08)**	**24%**	"A" X 24%
SCOPE OF SUPPLY				
8	**G.08**	**Supply of paint as per Scope of work - Chapter-2**	**6%**	"A" X 6%
		Total amount for all 3 Units	**100%**	

NOTES:

- **The details of items under BBU no. mentioned above shall be as per BOQ (Annexure-10 of TCC).**
- **After placement of LOI, site shall prepare detailed Billing Break-up (BBU) based on BOQ attached within TCC. BBU shall be prepared jointly by BHEL and contractor. However, in case of difference of opinion, BHEL Engineer decision would be final and binding to contractor.**
- **The contractor has to handle / erect / commission all the items indicated by BHEL for successful completion of Mill Reject System (MRS) work.**
- **Evaluation of bids shall be done on total price against this Rate Schedule / BOQ.**
- **In case of any mismatch in Rate and amount on Price discrepancy, the same will be dealt as per clause No. 1.4 of GCC.**
- **Separate order shall be placed for Service scope and supply scope.**

(Signature, date & seal of authorized representative of the bidder)

NATIONAL THERMAL POWER CORPORATION

ANNEXURE-01

2X500 MW SIMADRI, 2X500 MW ENNORE
&
3X500 MW ARAVALI

VOLUME - III

TECHNICAL SPECIFICATION

FOR

MILL REJECT HANDLING SYSTEM

SPECIFICATION NO.- PE-TS-888-160-A002

BHARAT HEAVY ELECTRICALS LIMITED
POWER GROUP
PROJECT ENGINEERING MANAGEMENT
NEW DELHI (INDIA)

1.01.00 **SCOPE OF WORK**

Following systems/equipments are included in bidder's scope of work but scope of work is not limited to the equipment/items indicated. Bidder to include any equipment/item in addition to equipment/items listed here required for satisfactory operation of the Mill Rejects Handling System in their scope of work.

1.01.01 **VENDOR SCOPE OF WORK**

(A) MECHANICAL SYSTEMS

Mill Rejects from the bowl mill reject discharge hoppers for the entire station shall be conveyed to storage silos by providing pressurized pneumatic conveying vessels and conveying pipes. Each silo shall have a storage capacity of 16 hours rejects collection from two bays of mills. From the silos rejects can be disposed off through trucks.

(B) CIVIL AND STRUCTURAL WORKS

Bidder to include all Civil design & Structural works for steel silos/bunkers, pipe racks, pyrite hoppers, supports, galleries/walkways, compressors, Receivers as required. Minor civil works like embedment, insert plates, grouting, foundation bolts, anchor bolts is in bidder's scope.

(C) INSTRUMENTATION AND CONTROL

The complete instrumentation and controls of the mill reject handling system are included in the scope of bidder. The DCS based control has been envisaged for the mill reject handling system.

Mainly the scope of work shall consist of following :-

a) All instruments and controls required for satisfactory operation of mill reject handling system.
b) Local control panel for each mill with accessories.

1.01.02 **ELECTRICAL EQUIPMENT SCOPE**

Refer Electrical scope matrix and electrical specification

1.01.03 **CUSTOMER SCOPE OF WORK**

(A) **Instrument air :** Tapping terminated with an isolation valve for Instrument air shall be provided at first column of each bunker bay and a pressure of 7 Kg/Sq cm tapping shall be provided on each.

(B) **Service water:** Tapping terminated with an isolation valve for service water shall be provided at first column of each bunker bay and a pressure of 2-2.5 Kg/Sq cm tapping shall be provided on each.

(C) **DM/EC Water:** Supply and return water Tapping terminated with an isolation valve for ECW circuit. Equipment water shall be provided near to compressor at a pressure of 6-7 Kg/Sq cm (Approx). Return water line pressure shall be informed later.

(D) **Civil work:** Equipment Foundations for compressors, Mill Reject bunkers, Air receivers shall be provided by customer/civil contractor.

Annexure I

Sno.	Items/Description	Simadri	Ennore	Aravali
1	No of mills	10 (9W+1S)	10 (9W+1S)	9 (8W+1S)
2	Reject generation rate/Design rate	0.65 T/0.8 T	0.65T/0.8 T	0.65 T/0.8T
3	Mill layout	Side mill Arrangement		
4	Project Information & Mill Details	Refer Annexure II	Refer Annexure III	Refer Annexure IV
5	System modification required	Refer section C	Refer section C	Refer section C
6*	Silo Location (Tantative)	Refer Layout	Refer layout	Refer layout
7	Compressor Location	Refer Layout	Refer layout	Refer layout
8	Mandatory Spares	Refer Annexure A	Refer Annexure A	Refer Annexure A

NOTE * Silo location marked in layout is tentative and same shall be finalised durinng detail Engg.

GENERAL

This specification covers the PURCHASER'S general requirement of design, manufacture, fabrication, assembly, inspection, testing and delivery to site or mill reject bunker and accessories specified.

DESIGN AND CONSTRUCTION

1 Mill Discharge Spout and Pyrite Hopper

- Each coal mill has a discharge spout with an Air electric cylinder operated knife gate valve for discharging rejects into a pyrite hopper of adequate capacity. This hopper shall serve to store the mill rejects between each operating cycle of dense phase system. Minimum effective storage capacity shall be 3 times the effective (batch capacity) of the conveying vessel.

- Each pyrite hopper shall be provided with an air electric air cylinder operated plate/ dome type valve of approved design at the bottom, adequately sized manhole/inspection door, impingement deflector plate, sizing gird and emergency chute with manually operated flap gate. Any platform required to maintain the above equipment before pneumatically operated plat / dome valve. Necessary explosion vent of proven design shall be provided in each pyrite hopper.

- Each emergency chute shall be provided with a manually operated gate valve to transfer mill rejects from pyrite hopper to ground or to Owner's trolley. The gates shall be of robust construction and suitable for trouble free operation. The lever/gear wheel arrangement for manual operation shall be designed such that minimum effort is required operate the gate. Necessary access and platform shall be provided. Limit switches shall be provided to indicate the valve position on control panel.

- Each pyrite hopper shall be provided with two level switches – one to start the operating sequence and the other to indicate the hopper above grid chocked condition.

- The sizing grid shall be provided inside the pyrite hopper to prevent oversized mill rejects, tramp iron etc. from entering the conveying vessel. The arrangement for collecting bigger pieces of coal rejects from the grid includes, among others, counter weight operated double flappers, chute work etc. Bigger pieces of coal rejects shall roll down from the grid and through counter weight operated flappers, chute work etc. Bigger pieces of coal rejects shall roll down from the grid and can be removed through the over sized seized reject removal gate (to be provided preferably at the bottom of inspection door) be discharged to Owners trolley. The arrangement shall be finalized during detail engineering. The grid shall be made of minimum mm dia. M.S. bars IS with clear opening of 50 mm x 50 mm.

2 MILL REJECTS VALVES

- Valves isolating pyrite hopper and mill rejects conveying vessel shall be of plate/dome type, pneumatically operated, quick opening and closing remote controlled design. The valve shall be of reliable and proven quality. It shall be possible to operate it cutting through the material

flow. These shall be provided with proper sealing arrangement such that whenever the material is being conveyed from vessel to the bin, there shall not be any leakage of air from vessel to pyrite hopper/atmosphere. Solenoid valves and air piping shall be included in contractor's scope; 'open' and 'close' limit switches shall be provided for panel indication of open/close status of valve. For isolating down stream equipment from pyrite hopper, manually operated knife gate valve shall be provided above pneumatically operated plate/dome valve as explained above.

- The plate/knife edge valve shall be tested hydraulically as per MSS-SP81 with permissible leakage for seat. The dome valve seat shall be tested pneumatically after complete assembly of valve along with operational test.

- **MATERIAL OF CONSTRUCTION**

The valve components shall be suitable for trouble free operation while handling hot mill reject.

Body	C.I IS:210/Grade 260 or BS:1452
Dome/Plate	Alloy C.I (225-250 BHN)
Shaft	Stainless steel (AISI : 316)

- Control valves and pneumatic actuators details shall be as per details indicated below

3. Compressed Air Line Valves

a) Remote actuated main valves on compressed air pipe lines shall be pilot operated solenoid operated 100% leak proof valve.

b) Spring balanced two/three position control valves shall be either solenoid operated or pilot air pressure operated or pilot air pressure operated. In addition, mechanical lever for manual operation of valves shall be provided material of construction is subject to approval during detail engineering stage. Material of construction shall have minimum surface friction and be rust and weatherproof.

c) Pneumatic actuators shall be completely enclosed type, double acting. The pneumatic cylinders for operation of valves shall be selected considering (5) Kg/cm^2 pressure. Material of construction shall be stainless steel. Integral micro limit switches for 'Open' and 'Close' position shall be provided. External pointer for valve shall also be provided.

d) The main valves shall be tested hydraulically to a pressure of minimum 1.5 times (for seat) and 2.0 times (for body) the maximum pressure encountered. Control valves and pneumatic cylinders shall be tested to a pressure of minimum 1.5 times the maximum pressure encountered.

e) Above valves shall meet the requirements of any international / Indian Standard Codes. Bidder shall clearly indicate in his offer the applicable standard/code.

3. **Conveying System and Conveying air compressor**

a) From each surge pyrite hopper Mill Rejects shall be pneumatically conveyed along a pipe line in dense phase using a pressure vessel (conveying vessel) as discharge device. Conveying vessel shall be of bottom discharge type.

b) Supply pressure of compressed air shall be in the range of 3-7 kg/cm2(g). Suitable pressure adjustment device shall be provided by the Bidder before each conveying vessel to obtain the required pressure in the conveying vessel.

c) Mill Rejects shall be conveyed in the pipe line in intermittent mode i.e. conveying vessel is filled up periodically and all the contents of conveying vessel are emptied at a time. Conveying system shall be idle till sufficient mill rejects are accumulated. It shall be optimized for minimum air consumption considering flow of Mill Rejects into surge pyrite hopper and the specified conveying capacity.

d) Bulk mean velocity of material in the conveying pipe line shall be less than 10 meters/sec. Average velocity shall be computed from actual cycle time and length of piping (material travel path) during a number of conveying cycles.

e) Guaranteed Bulk mean solid/ Air weight ratio shall not be less than 20. Average value shall be computed from actual air consumption and actual quantity of solids conveyed during a number of conveying cycles. For this purpose conveying cycle shall start from start of conveying vessel inlet valve open and terminate at the close of air supply line to conveying vessel.

f) All the pneumatic and solenoid valves associated with each surge pyrite hopper conveying system shall be mounted locally in a water and dust tight enclosure. Degree of protected of enclosure shall confirm to IP-55. Manual operation of the system from local panel in case of failure of remote operation system.

g) Pneumatic conveying system shall be designed to empty even the completely filled up pyrite hopper through conveying vessel by operating in a number of automatic conveying cycles.

2.0 CONVEYING AIR COMPRESSOR

2.1 CODES & STANDARDS:

The design, manufacture, inspection & testing of air compressor as specified hereinafter shall comply with the requirements of the latest applicable Indian / British American Standards. The following standards/codes shall be following in particular.

i) IS:5456 - Code of practice for testing pf positive displacement type air compressors and exhauster.

ii) IS:5727 - Glossary of terms relating to compressors and exhauster.

iii) IS:6206 - Guide for selection, installation and maintenance of air compressors.

2.2 The material of various components shall conform as specified in Data Sheet-A and where not specified, the material shall conform to the applicable IS / BS / ASTM / DIN Standards.

2.3 In case of any conflict between the above mentioned standards / codes and specification, the stipulations in the technical specification shall prevail. In case of any further conflict the same shall be referred to purchaser's engineer for clarification whose decision shall be final & binding.

3.0 DESIGN AND CONSTRUCTION

3.1 Air Compressors of reciprocating or rotary (screw) type shall be designed for continuous operation to satisfy the conveying air requirement for fail safe operation.

3.2 The design, manufacture and performance of air compressors shall comply with the requirements of latest applicable Indian / British American / DIN standards.

3.3 The compressors shall be water cooled, non lubricated type along with all accessories as specified in the data sheet - A. Intercoolers/ aftercoolers, if provided, shall also be of water cooled, shell – tube construction. Lubricated compressors of screw type can be accepted if these meet the duty requirement.

3.4 The compressors shall be designed to ensure trouble free operation with min. vibration and noise. Multiple cylinders, if employed, shall be arranged in such a way as to ensure min. unbalance.

3.5 The wall thickness of the compressor cylinder shall be selected to withstand highest internal pressure and at the same time shall allow a number of reborings. The jacket shall be suitable for withstanding a cooling water pressure of 5.5 Kg/cm^2 (g).

3.6 The crank case shall be provided with oil level dip stick, breather and drain plug.

3.7 Any oil adhering to the piston rod shall be wiped-off by suitable wiper ring, suitable collers shall also be fixed on the piston rod between the packing and wiper rings so that any trickling oil flow can be stopped from moving towards the cylinder.

3.8 Suction and discharge valves shall be suitable for quick opening and closing in conformity with the rotating speed of the crank shaft. Valves shall have large effective areas permitting low air velocity along with cushioning arrangement to minimise shock. Valve discs shall be of stainless steel (containing 15% or more chromium) heat treated, tempered and ground. The valve seats, guides & springs shall be of hardened stainless steel.

3.11 Crankshaft, crank pin piston pin bearings shall be of antifriction or journal type depending on manufacturer's standard practice.

3.12 Splash or forced feed type of lubrication shall be provided for all bearings and sliding components.

3.13 The air receiver shall be sized that even in the event of total stoppage of air flow from the compressor, operation of conveying is not stopped for 2 cycle time duration.

3.14 Drive motor shall be connected to the air compressor directly or through V-belt or any other suitable type of power transmission system as specified in the data sheets. Shafts should be coupled through heavy-duty flexible coupling in case of direct drive.

3.15 The power rating of the drive shall be selected such that a min. margin of 15% is available over the total input power required at compressor drive shaft at the rated condition. Total input power shall include air compression power plus any power consumed in auxiliaries etc., (if any), when the driver is not directly coupled to compressor, due account shall be made for losses in power transmission in addition to the above 15% extra margin.

3.16 **MATERIAL OF CONSTRUCTION**

The material of construction for various parts of package air compressors shall be as follows:-

a)	Compressor cylinder	:	CI ,IS- 210, grade FG-260
b)	Piston	:	Aluminum
c)	Piston rod	:	EN-8 as per BS -970
d)	Connectiong rod	:	Forged steel as per IS-1875 Cl IV
e)	Piston ring	:	Teflon with 25-30% carbon.
f)	Crank case	:	CI , IS-210 Grade FG-260
g)	Suction and delivery valves	:	S.S as per EN-56 of BS-970
h)	Air receiver	:	As per class of vessel will be selected during detail engg.
i)	For other parts	:	As per latest IS/BS/ASTM/AIS/ equivalent standards depending upon the parts

3.17.0 **Instrumentation and Accessories**:

The conveying air compressor and drive shall be supplied completed with the following instrumentation and accessories as minimum.

a) Discharge air pressure gauge

b) Pressure switch to control actuation of compressor drive motor.

c) Starter for drive motor.

d) Pressure relief valve

e) Drain valve

f) Delivery valve

4.0 INSPECTION & TESTING

4.1 The manufacturer shall conduct all tests to ensure that the equipment furnished shall conform to the requirements of this specification and in compliance with requirements of applicable codes & standard.

4.2 All materials used for conveying air compressor and drive shall be of tested quality. Materials shalll be tested as per the relevant standards and test certificates shall be made available to the purchaser.

4.3. Test at Shop:

a) All pressure parts shall be subjected to hydraulic testing at a pressure or 150% of design pressure for a period not less than one (1) hour.

b) Assembled receiver shall he hydraulically tested at 150% of the design pressure and the test pressure shall be maintained for at least 30 minutes. All joints shall be gently hammered during the test.

c) Pneumatic test at design pressure shall also be carried out.

5.0 PAINTING

5.1 All parts of air compressors with drive shall be painted as specified in Data Sheet-A or as per the specification furnished elsewhere.

5.2 Before transportation of the equipment necessary cleaning, flushing etc, shall be done. Shop coats of rust inhibiting paints, lacquers etc., shall be applied to various parts as necessary.

4.0 CONVEYING VESSEL

A CODES AND STANDARDS

- The design, material, construction, manufacture, inspection and performance of the Transporter vessel and accessories, shall comply with all statutory regulations and safety codes currently applicable in the locality where the equipment will be installed.The equipment shall also conform to the latest applicable Indian/British/USA/DIN Standards.

- The material of construction and other works of the Transporter vessel and accessories shall in general conform to the following standards/codes but will be subjected to any modification and requirement as specified in Data sheet A of Section D.

-

i)	Transporter Vessel	:	Mild Steel Construction as per IS-2825/BS-5500
ii)	Dome/Metering valve	:	IS-210 FG 260 (body) , Dome- Alloy CI 225-250BHN
iii)	Flange	:	MS as per ANSI-16.11

- Where the above standards are in conflict with the stipulations of this specifications , this specification supersedes them. In case of any further conflict in this matter, the decision of the Engineer will be final and binding.

B DESIGN REQUIREMENTS

- The dense phase pneumatic conveying system shall be designed for low velocity conveying of materials as specified in Data Sheet-A.

- The system shall consist of dome shaped vessels made of Carbon Steel complete with Pneumatically operated dome/metering valves capable of closing through a solid head of material to make a pressure tight seal.

- The bottom of vessel shall have an alloy CI transition bend and a control air supply system to the side of the conveying vessel.

- Airtight seal system shall be provided between the transporter vessel and the feeding point.

- Transporter vessel shall be equipped with air strainer/filter to prevent pipe scale /dirt from causing pressure regulator malfunctioning.

- Automatic drain filter and oil fog lubricator set shall be fitted into the instrument airline to dome/metering valve and other pneumatic actuators for use with pneumatic controls.

- Any air line stop valve fitted in the air supply line of transporter vessel shall be of gate or ball type to avoid any restriction to air flow, when open.

C CONSTRUCTIONAL FEATURES

- The transporter vessel shall be fabricated from mild steel plate to the design of vendor. The vessel shall be of welded structure and shall be provided with necessary supporting structure. The vessel will be airtight / leak proof in fully assembled condition. Conveying vessel shall be class-III vessel, designed and tested as per IS 2825 for pressure vessel. Temperature of the Mill Reject coming into the conveying vessel shall be considered at 100°C. Conveying vessel shall be designed for a pressure 10% above the max. Pressure encountered in vessel. The conveying vessel shall be constructed with tested quality mild steel plates. They shall withstand the abrasive action and hot condition of mill rejects and the operating air pressure. The conveying vessel shall be supported independently on steel columns. The vessel shall have suitable located and adequately numbered air connections for supply of compressed air for conveying mill rejects through pipes to overhead bin.

- Dome/Metering valve shall be of manufacturer's standard construction and will be easily openable and closeable type. Flanges will be of mild steel construction as per relevant standard. All joints will be flanged with asbestos or silicon rubber gaskets suitable for 200°C. Terminal boxes will be of mild steel body with cast deflector plate/liner on impact area.

- The isolating valve at the top of vessel and the outlet bend piece at the bottom of the vessel shall be connected to vessel through air tight flanged joints. The material of construction for the outlet bend shall be alloy C.I. with minimum 400 BHN. All bends will be of long radius cast bends. Conveying pipes will be of mild steel heavy duty type of thickness as specified in Data Sheet-A.

- Conveying vessel shall be tested hydraulically for 1.5 times the design pressure or two times the operating pressure whichever is higher.

D TESTING AND INSPECTION

- The purchaser shall have free access to those parts of manufacturer's works which are concerned with the fabrication of the steel work and shall be afforded with all

reasonable facilities at all stages of preparation, fabrication and trial assemblies for satisfying himself that the fabrication is being undertaken in accordance with the provisions of this specification

- Should any structure or part of a structure be found not to comply with any of the provision of this specification, it shall be liable to rejection. No structure or part of the structure, once rejected shall be resubmitted for inspection/test except in cases where the purchaser or his authorized representative considers the defect as rectifiable defects which may appear during fabrication shall be made with the consent of and according to the procedure laid down by the purchaser, the purchaser may, at his discretion, check the test results obtained at the manufacturer's works by independent tests at the Government test house or elsewhere, and should not be found to be unsatisfactory shall be rejected. The costs of such tests shall be borne by the contractor.

Scope of inspection shall include but not limited to the following:

i) Material used in the fabrication shall be with manufacturer's test certificate with proper correlation for physical properties and chemical analysis. In the absence of correlation actual tests shall be done.

ii) Welder shall be qualified as per ASME standard. Only qualified welder's shall be employed for the fabrication purpose.

iii) Electrodes shall be of makes approved by BHEL.

iv) All fillet welds, root run and trial run of butt welds shall be subjected to visual dye penetrating test with no linear indication. Acceptable norm for dye-penetrating test shall be as per appendix-8 of ASME SEC. VII Div. 1.

v) Special tests like NDT as per relevant code will be carried out for fabrication items.

vi) Chemical analysis and hardness tests of linear plates shall be carried out.

vii) Dimension shall be maintained as per approved drawings.

5. Mill Rejects Conveying Piping, bends Fitting and Accessories

a) Minimum 115.0 mm o.d. x 5.4 mm thick ERW steel pipe as per IS : 1233. Heavy class shall be supplied for mill rejects conveying piping.

b) The routing of the mill rejects conveying pipes is to be submitted by the contractor, which shall be subjected to approval by the employer, during detailed engineering.

c) The pipe work shall be of such design as to enable quick dismantling repairs with flanged type joints. The flanges shall be slip on flat faced flanges as per ANSI B16.5 rating fabricated out

of carbon steel plates to IS:2062/applicable international standard. Gaskets shall be of compressed rubberized asbestos fiber with minimum 3 mm thickness.

d) All fittings (i.e. bends, specials etc) used in the lines shall be as per good engineering practice, commensurate with the service conditions. The material of construction of fittings shall be alloy C.I with minimum hardness of 400 BHN.

e) The specification includes supply of all steel hangers supports and steel pipe bridge for routing of mill rejects piping. However mill rejects piping in the coal mill area shall be supported on purchasers columns/floor.

7. MILL REJECTS STORAGE BIN

A CODES AND STANDARDS

- The design, materials of construction, manufactures, inspection, testing and performance of the mill reject bunker shall comply with all statutory regulations and all safety codes currently applicable in the locality where the equipment will be installed.

- The material of construction and other works of the mill reject bunker shall in general conform to the following standards /codes but will be subject to any modification and requirements as specified in data sheet A of Section-D.

1)	Structural steel	:	IS-2062,Gr 'A'
2)	Rolled Steel Beams, Channels and Angle Sections	:	IS-808
3)	Scheme of Symbols for Welding	:	IS-813
4)	Covered Electrodes for Metal Arc Welding of Structural Steel	:	IS-814
5)	Code of practise for use of Metal Arc Welding for general Construction in Mild Steel	:	IS:816
6)	Code of practise for inspection of Welds	:	IS-822
7)	Code of practise for use of structural steel in general building construction	:	IS-800
8)	Dimension for steel plate, sheet and Strip for structural and general Engineering purposes.	:	IS-1730
9)	Recommendation for metal arc welding	:	IS-9575

Where the above standards are in conflict with the stipulations of this specification, the specification supercedes them. In case of any further conflict in this matter, the decision of the ENGINEER shall be final binding.

B DESIGN REQUIREMENT

- The coal mill reject bunker shall have a capacity as specified in data sheet-A and shall be fabricated of mild steel plate with adequate stiffeners welded on. The bunker shall be supported on the concrete foundation provided by the purchaser. Foundation bolts, grating etc shall be provided by the bidder.

- The reject bunker shall be complete with manually operated twin sector discharge gate as per data sheet A, steel liners, flanged connections, platforms, arches staircase, hand railings etc. The equipment shall be designed and equipped for outdoor operation, complete with all accessories and ready for erection and placed in serving for desired duty.

- Vendor shall furnish all steel work required for support and access for operation and maintenance. This shall include platforms, grating/ chequered plates, stairways, railings, baseplates, foundation bolts etc. Purchaser will provide only the foundation with pockets. These shall have shed over it and shall be proviede with monorail & hoist for equipment handling.

C CONSTRUCTIONAL FEATURES

- The bunker shall be fabricated to the design of vendor, but not less than 12 mm steel plate with adequate stiffeners. The bunker shall be of welded structure and shall be provided with necessary supporting structure Flanged opening shall be provided at the bottom of the bunker for attaching the twin sector gate. The inclined part of the bunker shall be designed with a valley angle of not less than 60 deg. to the horizontal. The design of the bunker shall be such that the problem of formation of arch is eliminated. The inside surfaces shall be provided with renewable 3 mm thick SS liner covering the complete bunker. Explosion diaphragm shall be provided to release the air from the Bin. In case the pressure exceeds 1.0 kg/cm^2 (g).

- The reject bin shall be sized at least to above mentioned capacities and shall be designed and located such that they can emptied from bottom into Owner's trucks (10T capacity) at regular intervals. The bunker supporting column shall be so spaced to have a clear road access of 5 m width & clear headroom of 5.5 m.

- Access and platform shall provided with 32 mm thick MS grating 32 MS GI pipe hand railing shall be provided wherever required.

- Manually operated/Air cylinder operated (as indicated in data sheet) undercut gate shall be provided at the mouth of each reject bin. Gate shall be double pivoted sector type. Suitable levers, pulleys/sheaves, ropes, air cylinder etc. shall be provided for operating the gate from the operating platform or from panel. The gate shall be designed for heavy duty application.

- Suitable vent with filters shall be provided at the top of the silo. Vent filters shall have adequate number of bags made from synthetic fabric suitable for coal dust. Maximum air to cloth ratio (NM3/min/M2) shall be considered as 1.5 with isolation of 10% bags. The material of filter bags shall be suitable for prolonged operation up to a temp of 140°C without losing its collection efficiency and durability. Filter bags shall be suitably treated to minimize the chances of filter bags catching fire. It shall be possible to plug opening for the damaged bag filters, if any, to facilitate uninterrupted operation of the unit. The guaranteed particulate emission rate from the filter shall not be moe than 50mg/Nm^3 of air. Suitable explosion vents shall be provided for the bag filter unit. Sequential cleaning cycle shall be initiated with pressure drop signal across the bag filter once sufficient cleaning air pressure is available. Solenoid/pneumatic valves shall be provided for this purpose. Bag cleaning mechanism shall be automatic, and shall comprise of solenoid valves, air nozzles shall be placed just above the filter bags to facilitate individual cleaning of each bag.

- The reject conveying pipes shall be terminated at the top of bins in individual terminal boxes. The terminal boxes shall be of steel construction with necessary deflector or impingement plate to take care of impact and wear due to high velocity reject particles discharging into the bin.

- One (1) no. level switch shall be provided in the bin to indicate 'Bin Full' condition.

D INSPECTION AND TESTING

- The purchaser shall have a free access at all reasonable times to these parts of manufacturer's works which are concerned with the fabrication of the steel work and shall be afforded all reasonable facilities at all stages of preparation, fabrication and trial assemblies for satisfying himself that the fabrication is being undertaken in accordance with the provisions of this specification.

- Should any structure or part of a structure be found not to comply with any of the provisions of this specification, it shall be liable to rejection. No structure or part of structure, once rejected shall be resubmitted for inspection/ test except in cases where the purchaser or his authorised representative considers the defect as rectifiable. Defects which may appear during fabrication shall be made good with the consent of and according to the procedure laid down by the purchaser. The purchaser may, at his discretion, check the test results obtained at the manufacture's works by independent tests at the government test house or elsewhere and should the material so tested be found to be unsatisfactory shall be rejected. The cost of such tests shall be borne by the contractor.

- Examination of material of construction, verification, correlation and identification with material test certificate.

- Ensuring that the relevant weld procedure and welder qualifications tests are in accordance with fabrication code.

- Inspection during fabrication at appropriate stage including fit up. Witness of dye penetration testing at root and final run for all groove welds and final run for fillet welds as per ASTM E 165. All surfaces examined shall be free of:

  a) Relevant linear indications (Linear indications are those indications in which length is more than three times the width and only indication with major dimension greater than 1.6 mm shall be considered relevant).

  b) Four or more rounded defects in a line separated by 1.6 mm or less (edge to edge). Rounded indications are those where length less than three times the width.

- Any other tests as specified in the fabrication code.

- Dimensional check match marking as per approved drawings.

E SCOPE OF INSPECTION FOR RACK AND PINION SECTOR GATE

- Examination of materials of construction, verification, correlation/testing and identification of material with test certificate for important items like body, drives, worm shaft, rack & pinion, wheel etc.

- D.P. check on drive shaft & worm shaft as per IS-3658 and there shall be no surface defects.

- Dimensional check

- For chain, proof load shall be carried out.

- Shore Hardness of rubber component

- Check for overall dimension, completeness, no load working after assembly.

- Clearing, marking and painting.

8 AIR LINE, COOLING WATER AND DRAIN PIPING, VALVES, FITTINGS AND ACCESSORIES PIPING

The scheme and scope of supply of the air piping, water piping and drain piping is to be submitted by the Bidder, which shall work out the sizes of air piping for the various services

based on the system requirements (Design) and submit the final layout and pipe sizing data to the 'Engineer' for approval.

All pipes shall be tested hydraulically after installation to minimum 1.5 times the maximum pressure encountered.

The air piping shall be galvanized and shall be as per IS: 1239 Heavy Grade.

The water piping shall be as per IS:1239 Heavy grade galvanized.

For compressed air piping for instrument and control following standard shall be adopted

a) upto 6mm and 6mm — Copper tubing
b) above 6mm upto 15 NB — Polyurethane flexible hose
c) above 15 NB — As per IS 1239 heavy grade, galvanized.

Following line velocities shall be assumed for estimating pipes sizes of compressed air lines.

	Velocity m/sec		
Pipe Size	**Below 50mm**	**50-150mm**	**200mm and up**
Pressure below $2kg/cm^2(g)$	15-20	20-30	25-35
Pressure above $2kg/cm^2(g)$	20-30	25-40	35-45

Screwed couplings shall be used.

Valves:

a) Code and Standards

IS: 778 - Gunmetal gate, globe and check valves for general purpose.
IS: 780 - Sluice valve for water works purposes (50 to 300 mm)
Any other BS or equivalent international standard are acceptable.

b) For valves of 50 mm size and above and up to a working pressure of 10 kg/cm2(g):

Type - Bolted bonnet, outside screw and yoke, rising stem, flat faced flanged end.

Material of construction - Body –Cast iron (IS: 210 Gr. 260) with0.30% max (P) and 0.12 max. (S) Trim & Stem – Gun metal.

c) For valves below 50 mm size and upto a working pressure of $10kg/cm^2$ (g):

Type - Union bonnet, rising stem, screwed end.
Material of construction - Body –Gun metal, Trim & Stem – Gun metal.

All valves will be tested to minimum 1.5 times (for body) and 1.0 times (for seat) the maximum pressure encountered Air tests shall be conducted to detect seat leakage.

9. AIR RECEIVERS

- As far as possible, the design, manufacture and performance of air receivers shall be in accordance with the latest applicable Indian / British / American / DIN standards. The latest editions of the following shall be followed in particular :
    - IS : 2825 – Code for unfired pressure vessels.
    - ASME – Section – VIII, Division – 1.
    - BS – 487 – Fusion welded steel air receivers.
    - IS : 7938 – Air receivers for compressed air installation.
- The materials of the various components shall conform to applicable IS/BS/ASTM/DIN standards.
- The air receivers shall be vertical self-supporting cylindrical vessels with supporting stands for resting on the civil foundation.
- Other design parameters and design internal pressure of the receiver shall be as per the data specification sheet enclosed. The receiver shall be designed as per IS:7938.
- Receivers shall be of welded construction with a minimum number of joints. Longitudinal seams in adjacent section of shell shall not be in the same line.
- Receivers shall be provided with gasket inspection openings. Receivers below 500 mm diameter shall have at least two inspection holes. For receivers of larger diameter, manhole of minimum 450 mm diameter shall be provided. These openings shall be placed as far as possible from any welded seam and in no instance shall pierce any seam.
- All welding shall be performed in accordance with relevant codes. Filler material that will deposit weld metal with a composition and structure as near as that of the material being welded shall be used. All welding electrodes shall be got approved by the Owner. The electrodes shall be dried in ovens immediately before use to ensure freedom from porosity. All the circumferential and longitudinal butt welds of the air receiver shall be subjected to spot radiography. Tee joints and dished welding shall be subjected to 100% radiography.
- All other welding on the air receiver, including filet weld and nozzle connection shall be DP tested as per IS: 2825 (Para 8.7.11).
- Each finished receiver complete with all welded attachments shall be hydraulically tested at 150% of the design pressure. The test pressure shall be maintained for at least 30 minutes. All joints shall be gentle hammered during the test.

- Receivers shall be provided with relief valve of the capacity and set pressure as specified in the data specification sheet. The spring in the relief valve in service for pressure up to and including 250 psi shall not be reset for any pressure more than 10% above or below the design set pressure. For higher pressures, the spring shall not be reset for any pressure more or below 5% design set pressure.

- Each air receiver shall be complete with drain connection of 25 mm NB with a trap station consisting of a trap, strainer, isolation and bypass valves.

- The receiver shall be provided with necessary number of nozzles. The orientation of the nozzles
shall be subjected to the approval of the Owner.

- Local instruments like pressure gauge, switch and temp. gauge of suitable range if asked for in the data specification sheet shall be supplied.

10. SUMP PUMPS

Casing & suction Bell	:	2.5% Ni-CI to IS 210 Gr, FG-260
Impeller	:	2.5% Ni-CI to IS 210 Gr, FG-260
Shaft/Sleeves	:	EN-8

The make of pump shall be subjected to approval of BHEL.

TRANSPORTER VESSEL AND ACCESSORIES

S.NO	DESCRIPTION		DATA/PARTICULARS
1	No. of transporter vessel envisaged	:	As per Annexure I
2	Material of construction a) Transporter vessel b) Dome Valve/ Inlet Valve	: :	Mild Steel IS – 2062, Gr B As per Manufacturer's Standard
3	Quantity of material to be conveyed per hour by each transporter vessel	:	As per Annexure I
4	Capacity of transporter vessel envisaged	:	To suit the conveying rate.
5	Material to be conveyed	:	Coal Mill reject (Temp upto 200 degree C)
6	Maximum size of material to be handled	:	Upto 40mm (max 10%), Normal 20-25mm
7	Density of material	:	2.4 T/m^3 for weigh purpose 1.6 T/m^3 for volumetric calculation
8	Air supply pressure available	:	Bidder to decide
9	Any Cooling envisaged for dome valve	:	Bidder to decide
10	Pipe Size	:	Bidder to decide
11	Material of pipe line and its thichkness	:	MS as per IS 1239 Heavy Grade
12	Type of joint in pipe line	:	Flanged
13	Distance over which material is to be conveyed and the lift	:	Refer Layout Drg.
14	Inlet Valve of the vessel	:	Plate valve/ Dome Valve/ Butterfly valve / cone valve as per manufacturing proven design.

	TITLE	SPECIFICATION NO. PE-TS-888-160-A001
BHEL	**MILL REJECT SYSTEM**	VOLUME-II-B
	PYRITE HOPPER	SECTION D
	DATA SHEET -A	**REV** 0 DATE 09 Jan 07
		SHEET 1 OF 1

S.NO.	DESCRIPTION	UNIT	DATA/PARTICULARS
1.0	Number required	-------	One (1) for each mill
2.0	Material Handled	--------	Coal Mill rejects
3.0	Number of outlet	--------	Three (3)
4.0	**MATERIAL OF CONSTRUCTION AND THICKNESS HAVE: -**		
5.1	Bunker Plates	mm	10mm thick. MS as per IS: 2062 Gr. A (Min) with sizing grid
5.2	Discharge Valve	----	Manual operated plate valve
5.3	Density of rejects	Metric Tonnes/m^3	1.6 for Volume Calculation 2.4 for Structural Load calculation
5.4	Inlet valve to pyrite hopper	----	Pneumatically operated KGV with expansion joint
5.5	Valves at discharge chute, by-pass chute and emergency chute	----	Manual operated KGV
5.6	Min. instruments required	---- ----	Two nos. of level switches (High/High-High) One (1) no of temperature switch
5.7	Explosion vent	----	Rupture Disc type
5.8	Water Spraying arrangement with Solenoid Valve	----	Yes (Manual isolation & bypass valve also to be provided)

DATA SHEET --- A

S.NO.	DESCRIPTION	
1)	Capacity (In Kg)	To suit the heaviest equipment lifting on silo top
2)	Service condition	Class II outdoor
3)	No. of CPB	
4)	Lift (m)	16 m (min.)
5)	Type of suspension	Traveling Trolley
6)	Head Room	As per Vendor data
7)	Type of gear in CPB	Spur Gear
8)	Type of bearing	Ball/Roller
9)	Grade of Load Chain	Alloy Steel /Gr 80.
10)	Grade of Hand Chain	Steel / Gr. 30
11)	Factor of Safety	As per Relevant IS

	TITLE	SPECIFICATION NO. PE-TS-888-160-A001
	MILL REJECT BUNKER AND ACCESSORIES	VOLUME-II-B
	DATA SHEET -A	SECTION D
		REV 0 DATE 09 Jan 07
		SHEET 1 OF 1

S.NO.	DESCRIPTION	UNIT	DATA/PARTICULARS
1.0	Number required for unit	-------	As per Flow Diagram
2.0	Material Handled	--------	Coal Mill rejects
3.0	Effective Capacity	Tonnes	To store mill rejects for 16 hours with all mills operating at worst coal firing at 100% BMCR.
4.0	Number of outlet	--------	One
5.0	Minimum free board	mm	500
6.0	**MATERIAL OF CONSTRUCTION AND THICKNESS OF: -**		
6.1	Bunker Plates	mm	10mm thk. MS plates (min) as per IS:2062 Gr A
6.2	Liners	mm	3 mm thk SS on complete bunker
6.3	Discharge gate	----	Twin Sector gates Cast Iron IS210/ MS to IS 2062 with Liner, Min 400BHN
6.4	Size of Bunker Discharge	mm	Minimum 400 mm
6.5	Method of Discharge gate operation	-----	Manually.
6.6	Minimum Valley Angle	-----	60 Degrees
6.7	Density of rejects	Tonnes/m^3	1.6 for Volume Calculation 2.4 for Structural Load calculation

Notes

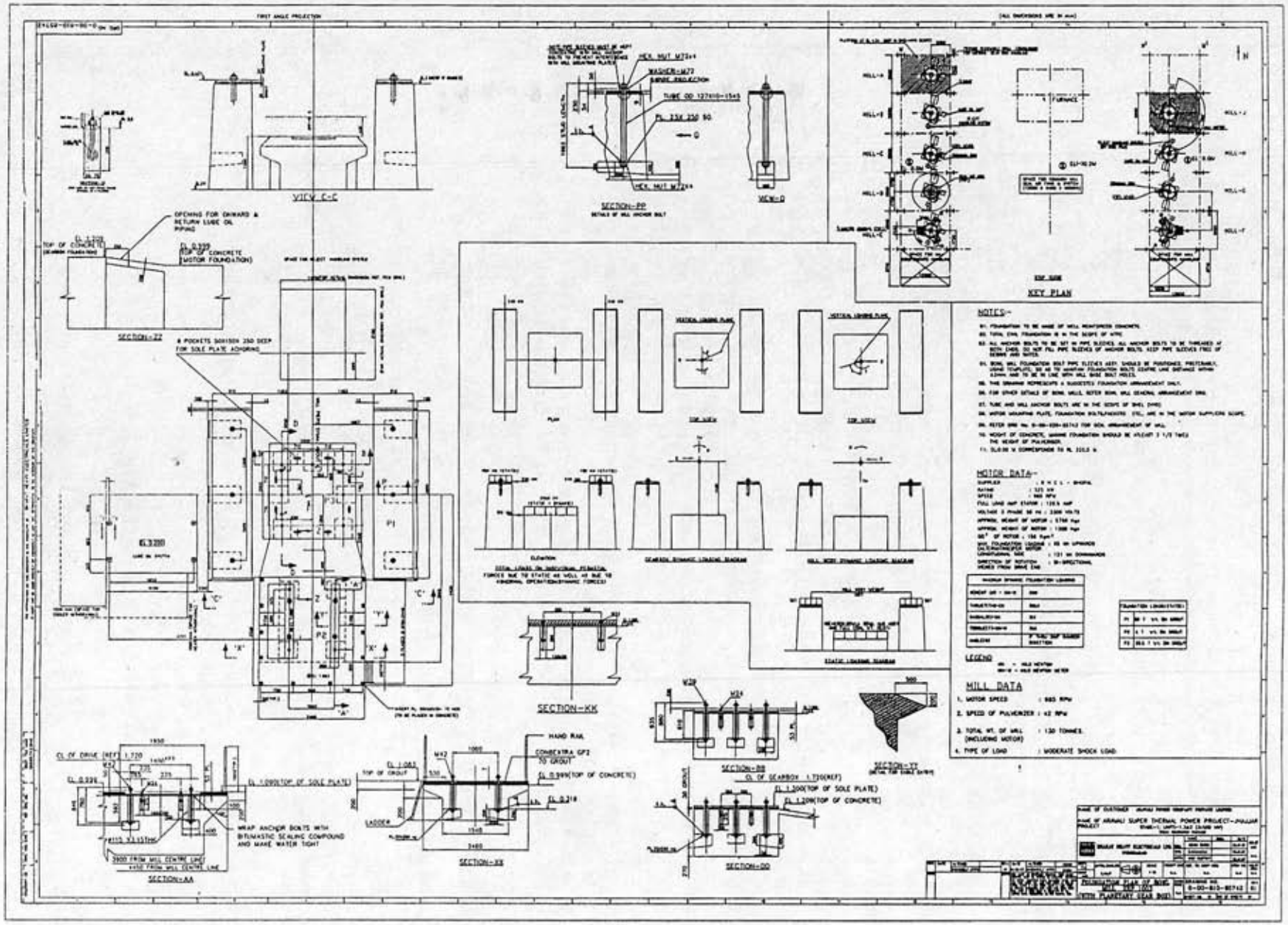
Following Accessories shall be provided

1 Level probe (high) shall be as per C&I specification requirement.
2 Counter weight type Pressure relief valve designed for max. pressure subjected.
3 Reverse pulse jet Bag filter with emission level of 50 mg/m^3 with air to cloth ratio 1.5m/min

	TITLE	SPECIFICATION NO. PE-TS-888-160-A001
BHEL	**MILL REJECT HANDLING SYSTEM**	VOLUME-II-B
	DATA SHEET -A	SECTION D
		REV 0 DATE 09 Jan 07
		SHEET 1 OF 1

SYSTEM TECHNICAL DATA SHEET

1.	Type of mill reject system	:	Pneumatic Pressure Conveying
2.	Capacity of pneumatic system	:	As per Annexure I
3.	Nos. of Transport air compressors	:	2 x 100% compressors
4.	Capacity of mill reject silo	:	16 Hours storage capacity with all mills with worst coal at 100% BMCR
5.	Dust loading condition of outlet air:		50 mg/NM^3
6.	Max. size of rejects to be handled	:	upto 40 mm (10% of total reject) rest 25 mm & below
7.	No. of denseveyor envisaged	:	As per Annexure I
8.	Material of construction	:	
	a) Denseveyor	:	Mild steel IS-2062 Gr B
	b) Dome valve/Inlet valve	:	As per Specification.
9.	Quantity of material to be conveyed per hour by each densenveyor	:	As per spec.
10.	Capacity of denseveyor envisaged	:	To suit the conveying rate with 85% filling
11.	Material to be conveyed	:	Coal mill reject(Temp. upto 200 degree C)
12.	Density of material	:	1600 kg/M^3 for volumetric calculation 2400 Kg/M^3 for civil/structural design
13.	Any cooling envisaged for dome valve	:	Bidder to decide.
14.	Pipe size	:	To suit the conveying rate.
15.	Air supply pressure available	:	Bidder to decide.
16	Inlet/ Outlet Valves of the mill reject discharge hopper (pyrite hopper	:	Pneumatically operated knife edge gate valve/ Manual optd KGV
17.	Material of pipeline and its thickness	:	MS as per IS: 1239 heavy grade
18.	Sizing Grids for hopper	:	Yes
19	Emergency Discharge Chute & oversize reject removal chute	:	Yes (manual optd KGV with limit switch)
20	Bends/ Fittings/ Laterals	:	Alloy CI to 400 BHN
21	Type of joint in pipeline	:	Flanged.
22	Explosion vent for pyrite hopper	:	Yes
23	Pneumatic/ Local control panel	:	Yes with DOP of IP 55


VIEW C-C
SECTION-PP
VIEW-D
KEY PLAN
SECTION-ZZ
SECTION-KK
SECTION-AA
SECTION-XX
SECTION-BB
SECTION-YY
SECTION-DD
NOTES:-
MOTOR DATA:-
MILL DATA
1. MOTOR SPEED : 885 RPM
2. SPEED OF PULVERIZER : 42 RPM
3. TOTAL WT. OF MILL (INCLUDING MOTOR) : 130 TONNES.
4. TYPE OF LOAD : MODERATE SHOCK LOAD
LEGEND

DIMENSIONAL PLAN VIEW
MILL MOTOR
DETAIL E
KEY PLAN
N

NTPC	Client : Bharat Heavy Electricals Limited Project : NTPC 1 x 500 MW, Unit #7, Stage-III, Korba STPP Package : Mill Rejects Handling System LOI No. PW/NGP/KRB/0910/BOP/MRS/1003	**PAINTING SCHEDULE**	NTPC Doc. No. 2140-108-14PE-PVM-W-001 BHEL Doc. No..... UCCI Doc. No. 70063-01-PS-001 Rev - 02 Dated : 26/03/2010

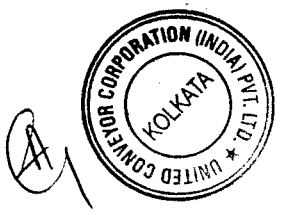
Sl. No.	Equipments	Surface Preparation	Primer Coat			Intermediate coat			Finish Coat			Total DFT (Micron)	Colour Shade	Remarks
			Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFTper coat (Micron)			
I	**Self Manufactured (Fabricated Items)**													
A)	,Pyrite Hopper , Depac Pyrite Transmitter	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Heat resistant aluminium paint	2	20	~	~	~	Heat resistant aluminium paint	2	20	~ 80		
B)	Air Receiver, Bunker Discharge Gate , Pressure Relief Valve, Terminal Box.	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-140	Ref. Annexure-I enclosed	
C)	Pneumatic Panel for , Depac Pyrite Transmitter	Seven Tank Process	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-145	Ref. Annexure-I enclosed	
II	**Bought Out Items**													
1	Compressor Panel, Misc. Panel	Seven Tank Process	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-145	Ref. Annexure-I enclosed	
2	Conveying air compressor, Motors	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	HB Zinc Phosphate (Alkyd medium)	2	35-45	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	2	20-25	~ 110-140	Ref. Annexure-I enclosed	

CONVEYOR CORPORATION (INDIA) PVT. LTD. KOLKATA

Sl. No.	Equipments	Surface Preparation	Primer Coat			Intermediate coat			Finish Coat			Total DFT (Micron)	Colour Shade	Remarks
			Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFT per coat (Micron)	Type	No of coats	DFTper coat (Micron)			
3	Plate Valves (Cylinder Optd. & Hand Wheel Optd.) , Metallic Expansion Bellow .	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Heat resistant aluminium paint	2	20	~	~	~	Heat resistant aluminium paint	2	20	~ 80		
4	C.I valves , Rupture Disc , Chain Pulley Block & Bag Filter Casing	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Red Oxide Zinc Chromate as per IS:2074 (Alkyd medium)	2	25-35	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	3	20-25	~ 110-145	Ref. Annexure-I enclosed	
a	for temp. <=90 deg c													
b	Depac Inlet Valve for temp. >90 deg c		Heat Resistant Aluminium	2	20	~	~	~	Heat Resistant Aluminium Paint	2	20	80	Aluminium	
5	Structural Steel works including mill rejects storage bunker	SA 2 1/2	Inorganic Ethyl Zinc Silicate Primer	1	75	Epoxy based Titaniu m di-	1	75	Epoxy based two pack finish paint	2	35	~ 250	Ref. Annexure-I enclosed	Site Painting Work
									Final coat of acrylic PU paint	1	30			
6	Compressed air piping, Mill Rejects conveying piping, cooling water piping, service water piping. pipe fittings and ACI Bends.	Deagreasing & Mechanical cleaning with wire brushing/Hand tool (Sa1/St2/St3 as applicable)	Red Oxide Zinc Chromate as per IS:2074 (Alkyd medium)	2	25-35	~	~	~	Synthetic enamel (Alkyd medium) as per IS:2392	3	20-25	~ 110-145	Ref. Annexure-I enclosed	Site Painting Work

Notes:

1 Surface preparation shown is as per Swedish standard SIS 05-5900.Degreasing will be as per Standard SSPC-SP1
2 GM / SS Valves and Galvanised Instrument Air Pipes will not be painted.Further, SS/GI piping shall be given necessary colour banding for identification as per colour coding scheme.
3 All instruments shall be painted as per manufacturer standard practice.
4 Method of painting application shall be as per paint manufacturer's recommendation.
5 Item/Material as per s.no 5 & 6 shall be painted at site.



NTPC	Client : Bharat Heavy Electricals Ltd. Project : NTPC 1 x 500 MW, Unit #7, Korba STPP Package : Mill Rejects Handling System LOI No. PW/NGP/KRB/0910/BOP/MRS/1003	**PAINTING SCHEDULE**	NTPC Doc. No.. 2140-108-14PE-PVM-W-001 BHEL Doc. No.. UCCI Doc. No. 70063]-01-PS-001 Rev 02 Dated : 26/03/2010

Sl. No.	Equipment Description	Ground Colour		Identification Tag/Band			Legend	Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.		
1	Air Receiver	Blue	5012	White		9010		
2	Motor	Blue	5012					Enamel Paint to be used
3	Pneumatic panel for , Depac Pyrite Transmitter	Blue & Grey	5012 9002					Front & Rear panels in Grey.End Panels sides in Blue
4	Conveying Air Compressor/After Cooler	Blue	5012	White		9010		Identifying legends to be used
5	Compressor panel, Misc. panel	Grey	9002					
6	Rupture Disc,Bag filter casing ,Bunker Discharge gate, Pressure Relief Valve, Terminal box	Grey	9002					
7	Structural steel works including mill rejects storage bunker	Blue & Grey	5012 9002					Primary strl menbers(columns & beams) in Blue Secondary members in Grey
8	Compressed air piping, Valves & Fittings.	Grey	9002	Sky Blue	101		PA	
9	Mill rejects convey piping valves & fittings, ACI Bends	Grey	9002	White		9010		
10	Service water lines, valves & fittings	Grey	9002	Sea Green	217		RW/ SW	
11	DMCW water lines, valves & fittings	Grey	9002	Sea Green	217		DMW	
12	Chain Pulley Block with Monorail	Golden Yellow	1004					
13	Hook	Signal Red	3001					

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