Rev 01
1st Jun
2012

NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

TENDER NO.: BHEL/NR/SCT/PANKI/NDCT/1167

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

Bharat Heavy Electricals Limited

Ref: **BHEL/NR/SCT/PANKI/NDCT/1167** Date: 26/07/2019

==========

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

==========

To

Dear Sir/Madam

Sub : NOTICE INVITING E-TENDER

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

1. **Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION	
i	**TENDER NUMBER**	**BHEL/NR/SCT/PANKI/NDCT/1167**	
ii	**Broad Scope of job**	**CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.**	
iii	**DETAILS OF TENDER DOCUMENT**		
a	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc*	*Applicable*
b	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
c	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
d	Volume-ID	*Forms and Procedures*	*Applicable*
e	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	**Issue of Tender Documents**	**From BHEL website (www.bhel.com) and https://bhel.abcprocure.com** Tender documents will be available at website till due date of submission	*Applicable*
v	**DUE DATE & TIME OF OFFER SUBMISSION**	***Date : 06/08/2019 , Time : 15:00 HRS*** ***Place : on https://bhel.abcprocure.com***	*Applicable*
vi	**OPENING OF TENDER**	***At due date / time*** ***Date : 06/08/2019 , Time : 15:30 HRS*** *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender.* ***However it being an e-tender it shall be opened online***	*Applicable*

vii	**EMD AMOUNT**	*Rs. 90,74,000/-.*	*Applicable (for all bidders including MSEs)*
viii	**COST OF TENDER**	*Rs 2000/-.*	*Applicable (for all bidders including MSEs)*
ix	**LAST DATE FOR SEEKING CLARIFICATION**	***Five days before bid submission due date.*** *Along with soft version also, addressing to contact address given below* ***1)*** *Name: **G.V. RAJA SEKHAR*** *Designation: Sr. Manager* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline) 0120-2416232* *Email : gvr@bhel.in* ***2)*** *Name: **DESHRAJ YADAV*** *Designation: Sr. Engineer* *Deptt: SCT* *Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301* *Phone: (Landline) 0120 - 2416261* *Email : deshraj@bhel.in*	*Applicable*
x	**SCHEDULE OF Pre Bid Discussion (PBD)**		*Not applicable.*
xi	**INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)**	*Please refer clause no.15a.*	*Applicable*
xii	**Latest updates**	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums) & portal https://bhel.abcprocure.com **and not in the newspapers**. Bidders to keep themselves updated with all such information	
xiii	**Tender submission**	on portal https://bhel.abcprocure.com	

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

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

As this tender is an E-Tender and no paper bids will be accepted therefore the scanned copy of the Demand Draft or the Cash Receipt issued by BHEL PSNR should be uploaded in the E procurement portal. Hard Copy of the demand draft should reach BHEL PSNR HQ Noida before the due date and time of bid submission. BHEL shall not be responsible for postal or any other delays in this regard.

4. Unless specifically stated otherwise, tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described in Clause no. 1.9 of General Conditions of Contract.

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

However, the One Time EMD can be adjusted against the EMD applicable against this tender on specific request of bidder.

For Electronic Fund Transfer the details are as below-:

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

b) Bank Particulars

i).	Bank Name -:	STATE BANK OF INDIA
ii).	Bank Telephone No.(with STD code)-:	011-23475566
iii).	Branch Address-:	CAG II BRANCH, NEW DELHI 4th & 5th FLOOR, REDFORT CAPITAL, PARASNATH TOWERS, BHAI VEER SINGH MARG, GOLE MARKET, NEW DELHI-110001
iv).	Bank Fax No. (with STD code) -:	011-23475566
v).	Branch Code -:	17313
vi).	9 Digit MICR Code of the Bank Branch -:	110002562
vii).	Bank Account Number -:	10813608647
viii).	Bank Account Type -:	CASH CREDIT
ix).	11 Digit IFSC Code of Beneficiary Branch-:	SBIN0017313

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

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

Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

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

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.
iii. Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
iv. A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
v. A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.
vi. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, same shall not be considered.

DO NOT"S

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

Digital Signing of e-Tender

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

.

The Requirement:

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

BHEL has finalized the e-procurement service Provider-:

M/s AbcProcure, Ahmedabad

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

Ellis Bridge, Ahmedabad-380006

The contact details of the service provider are given below:

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

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

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

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

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

6. **Not Used**

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

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

9. **Assessment of Capacity of Bidders:**

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

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

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

Total number of Packages in hand = Load (P)

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

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

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

i). Calculation of Overall 'Performance Rating' for 'Similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

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

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

c) Sum 'S_1 'of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$…. $S_{1\text{-}T1}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}$). Similarly, S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '$\mathbf{P_T}$' for all Regions (i.e. 'S_T '$= S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

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

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

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

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

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

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No. of similar packages for all Regions = $\mathbf{P_T}$ i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = $\mathbf{T_T}$

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

ii). Calculation of Overall 'Performance Rating' ($\mathbf{R_{BHEL}}$) in case at least 6 evaluation scores for 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

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

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

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

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

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

III. 'Assessment of Capacity of Bidder':

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

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

Note:

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

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

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

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

IV. **Explanatory note**:

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

ii). Identified Packages (Unit wise)

Table-1

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

iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

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

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

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

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

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

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

a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

c) If even after using option "a" and "b", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

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

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

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

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

c. Up to Synchronization in all Balance Packages

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

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

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

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

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

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

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

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

11. For any clarification on the tender document, the bidder may seek the same over e-procurement portal as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any

other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

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

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

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

15. Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at Clause No. 1, Salient Features of NIT, Sl. No. (xi) above.**

15a **Integrity Pact (IP)**

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

Sl	IEM	Address	Phone & Email
1.	Mrs. Pravin Tripathi, IA & AS (Retd.)	D-243, Anupam Gardens, Lane IB, Neb Sarai, Sainik Farms, New Delhi – 110 068	pravin.tripathi@gmail.com

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

iii) Please refer Section-8 of the IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the above IEM. All correspondence with the IEM shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are as per **Clause No. 1, Salient Features of NIT, Sl. No. (ix) above.**

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

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

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

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

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

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

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

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

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

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

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

23. **NOT APPLICABLE.**

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

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

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

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

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

27.1.1 **Commitment by BHEL:**

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

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

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

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

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

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

28.0 **NOT APPLICABLE.**

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

30.0 **PREFERENCE TO MAKE IN INDIA:**

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

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

31.0 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 (Consisting of TCC, TECHNICAL SPECIFICATION FOR NATURAL DRAFT COOLING TOWER Book,1 & 2)
e. Special Conditions of Contract (SCC) —Volume-1B
f. General Conditions of Contract (GCC) —Volume-1C
g. Forms and Procedures —Volume-1D

for BHARAT HEAVY ELECTRICALS LTD

(SCT)

Enclosure:-

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

ANNEXURE - 1

PRE QUALIFYING REQUIREMENTS

JOB	**CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.**
TENDER NO.	**BHEL/NR/SCT/PANKI/NDCT/1167**

SL. NO.	NAME AND DESCRIPTION OF PRE QUALIFICATION CRITERIA	
A	Submission of Integrity Pact duly signed	**Applicable**
B	Assessment of Capacity of bidder to execute the work as per clause 9.0 pf NIT	**Applicable – by BHEL**
C	**TECHNICAL** Bidder who wish to participate should have experience as follows:	**Applicable**
C-1	Bidder should have executed similar work for any one of the following in the last seven years from latest date of bid submission: One (1) work of value not less than **Rs. 6459 Lakhs**. **OR** Two (2) works each of value not less than **Rs. 4037 Lakhs.** **OR** Three (3) works each of value not less than **Rs. 3230 Lakhs.**	
C-2	The Bidder should have designed, constructed and commissioned at least one (1) number of Natural Draught Cooling tower in RCC construction with splash / film type fill, of capacity not less than 70,000 cum/hr., which should have been in successful operation for at least one (1) year prior to **02nd November 2015.** The reference cooling towers should be of the same type, as is being offered by the Bidder. In case the reference cooling tower was designed by a party other than the Bidder himself, the Bidder shall employ a cooling tower designer/ supplier who has independently designed an Natural Draught Cooling Tower of same type as being offered of capacity not less than 70,000 cum/hr. in RCC construction with splash type fill which should have been in successful operation for at least one (1) year prior to **02nd November 2015.**	
D	**FINANCIAL**	**Applicable**
D-1	**TURNOVER**: Bidders must have achieved an average annual financial turnover (Audited) of **Rs. 2422 Lakhs** or more over last three Financial Years (FY) i.e. (2015-2016, 2016- 2017, 2017-2018). Bidder shall submit audited accounts (balance sheets and profit & loss account) in support of this. In case audited financial statements have not been submitted for all the three years as indicated above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three	

	If Financial Statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Charted Accountant.	
D-2	**NET WORTH**: Net worth of the Bidder based on the latest Audited Accounts as furnished for 'D-1' above should be positive. Net Worth = Paid up share capital* + Reserves. (*: Share Capital OR Partnership Capital OR Proprietor Capital as the case may be).	
D-3	**PROFIT:** Bidder should have earned profit in any one of the three financial years as applicable in the last three financial years defined in 'D-1' above. PROFIT shall be PBT earned during any one year of last three financial years as in 'D-1' above.	
D-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	
E	**Approval of Customer**	**Applicable**
F	**Consortium Criteria**	**Not Applicable**

Explanatory Notes for QR 'C'

1. For Sl. No. 'C-1', 'Executed' means the bidder should have achieved this criteria, even if the total contract has not been completed or closed. Actual executed value shall be considered, irrespective of completion status of contract (s) under consideration.

2. For Sl. No 'C-1' above the word 'Similar Works' means "Piling AND/OR Civil AND/OR Structural Works AND/OR Chimney AND/OR NDCT".

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

4. In support of PQR criteria at Sl. No. 'C-2', Bidder should furnish the following;
   a. Copy of PO/WO of minimum one executed contract along with experience list.
   b. Satisfactory performance feedback certificate from the end customer (owner) (in English) for at least one successfully executed contract which has been in use for at least one year prior to **02nd November 2015**, indicating salient features viz. year of commissioning of NDCT, rating of project, flow of NDCT, project name etc., date of issue of certificate and name / designation of certificate issuer.
   c. In case documents submitted for meeting PQR are in language other than English, notarized English translation shall also be submitted.

5. For sl.no. 'C-1' above Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula

   $$P = \{R + 0.425 \times R \times (XN - X0)/ X0 + 0.425 \times R \times (YN - Y0)/ Y0\}$$

Where

P = Updated value of work

R = Value of executed work

XN = All India Avg. Consumer Price index for industrial workers for the month, three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 03-Apr-17, then bid submission month shall be reckoned as April'17 and index for Jan'17 shall be considered).

X0 = All India Avg. Consumer Price index for industrial workers for last month of work execution

YN = Monthly Whole Sale Price Index for All Commodities for the month, three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 03-Apr-17, then bid submission month shall be reckoned as April'17 and index for Jan'17 shall be considered).

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

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

ANNEXURE - 2

CHECK LIST

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

1	**Name of the Tenderer**	
2	**Address of the Tenderer**	
3	**Type of the Firm/ Company**	
(i)	In case of Individual Tenderer	His / her full name, address and place & nature of business shall be furnished along with the offer.
(ii)	In case of Partnership Firm	The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership dully certified by the Notary Public shall be furnished along with the offer..
(iii)	In case of Companies	a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.
4.a	**Details of Contact person for this Tender**	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID: Fax No:
4.b	**Details of alternate Contact person for this Tender**	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID: Fax No:
5	**EMD DETAILS**	Mode of payment: Demand Draft/ NEFT/ RTGS/ OTHER Details of Transaction:
6	**Validity of Offer**	TO BE VALID FOR **SIX MONTHS** FROM DUE DATE

	DESCRIPTION	**APPLICABILITY (BY BHEL)**	**ENCLOSED BY BIDDER**
7	Whether all pages of the Tender documents including annexures, appendices etc are read and understood	Applicable	YES / NO
8	Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE – 1) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
9	Audited Balance Sheet and profit & Loss Account for the last three years	Applicable	YES / NO
10	Copy of PAN Card	Applicable	YES / NO
11	Copy of GST registration	Applicable	YES / NO

SL. NO.	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
12	Organization Chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.	Applicable	YES / NO
13	Integrity Pact	Applicable	YES / NO
14	Offer forwarding letter / tender submission letter ***[Form No. F-01 (Rev 00)]***	Applicable	YES / NO
15	Declaration by Authorised Signatory ***[Form No: F-02 (Rev 00)]***	Applicable	YES / NO
16	Declaration by Authorised Signatory regarding Authenticity of submitted documents ***[Form No: F-02A (Rev 00)]***	Applicable	YES / NO
17	No Deviation Certificate ***[Form No: F-03 (Rev 00)]***	Applicable	YES / NO
18	Declaration confirming knowledge about Site Conditions ***[Form No: F-04 (Rev 00)]***	Applicable	YES / NO
19	Declaration for relation in BHEL ***[Form No: F-05 (Rev 00)]***	Applicable	YES / NO
20	Non-Disclosure Certificate ***[Form No: F-06 (Rev 00)]***	Applicable	YES / NO
21	Bank Account Details for E-Payment ***[Form No: F-07 (Rev 00)]***	Applicable	YES / NO
22	Format for seeking clarification ***[Form No: F-08 (Rev 00)]***	Applicable	YES / NO
23	Capacity Evaluation of Bidder for current Tender ***[Form No: F-09 (Rev 00)]***	Applicable	YES / NO
24	Power of Attorney for Submission of Tender/Signing Contract Agreement ***[Form No: F-25 (Rev 00)]***	Applicable	YES / NO
25	Analysis of Unit rates ***[Form No: F-26 (Rev 00)]***	Applicable	YES / NO
26	Tie Ups/Consortium Agreement are submitted as per format ***[Form No: F-22 (Rev 00)]***	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

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

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

ANNEXURE – 4

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

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

BHEL-IP

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____

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

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

Section 1- Commitments of the Principal

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

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

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

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

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

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

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

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

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

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

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

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

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

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

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

Section 4 - Compensation for Damages

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

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

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

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

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

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

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

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

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

Section 8 - Independent External Monitor(s)

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

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

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

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

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

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

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

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

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

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

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

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

Section 9 - Pact Duration

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

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

Section 10 - Other Provisions

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

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

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

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

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

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/

Contractor

(Office Seal)

Place----------

Date----------

Witness:_____

(Name & Address) _____

_____

Witness:_____

(Name & Address) _____

_____

वी. के. गुप्ता/V. K. GUPTA
अपर महाप्रबंधक (उप संविदा एवं क्रय)
Addl.General Manager (SCP)
भारत हेवी इलेक्ट्रिकल्स लिमिटेड, पावर सेक्टर-उत्तरी क्षेत्र
Bharat Heavy Electricals Ltd., Power Sector-Northern Region
प्लॉट सं.25, सेक्टर-16ए, नोएडा/Plot No.25, Sec.16A, Noida

TECHNICAL CONDITIONS OF CONTRACT (TCC)

NAME OF WORK:

CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENTS

PANKI THERMAL POWER STATION (1x660 MW)

INTRODUCTION

Panki (1X660 MW) is being set up by UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LIMITED (UPRVUNL) at Panki. The site is located within the premises of existing Panki Thermal Power Station, Kanpur. One (01) 660 MW supercritical unit will be installed.

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

APPROACH TO SITE

Project Site Location:	Panki, Kanpur
Latitude & Longitude of project site:	North N 26028'20" East E 80014'32"
Nearest Railway Station:	Panki 5 km
Nearest Town:	Kanpur 16km
Nearest Highway:	National Highway – N.H.25
Nearest Airport:	Kanpur (25 km) & Lucknow (80 Km)
Nearest Commercial Airport:	Delhi 140 km

Sl. No.	Title	Description
1	Owner	UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LIMITED (UPRVUNL), LUCKNOW
2	Project Title	Panki Thermal Power Station 1X660 MW TPS Extension
3	Project Site Location	Place - Panki District - Kanpur State - Uttar Pradesh Country - India
4	Land	Land is in possession of UPRVUNL
5	Location Co ordinate	26.28 N, 80.14 E
6	Site Ambient Condition	
I	Monthly mean (DBT) :	Maximum 44.4 °C : Minimum 3.8 °C
II	Extreme Recorded (DBT) :	Maximum 47.3 °C Minimum -0.9 °C

III	Monthly mean (WBT) :	Maximum – 27.3 °C, Minimum 9.2 °C
IV	Relative Humidity :	Maximum 84 % Minimum 28 %
V	Average relative humidity Annual	Average 65 %
VI	Seismic Data Rainfall:	Annual average 832.6 mm
VII	Heaviest rainfall recorded in 24 hrs	- 247.4 mm
VIII	Wind Data	Basic wind speed at 10m height 47.00 m/s As per IS: 875 part – III - 1984 For wind resistance design of structure & equipment refer relevant civil section
IX	Seismic Zone	Zone – III As per IS: 1893, For earthquake resistance design of structure & equipment refer relevant civil section

The Nearest Town Kanpur is about 16 Km from site and is easily accessible by Road/ Railway.

INSTRUCTIONS TO TENDERERS

The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the Contract. All costs for and associated with site visits shall be borne by the bidder.

The bidder shall physically visit the site and fully acquaint themselves with site conditions, transportation routes, various distances and the fact that other contractors would be working in this area and their structures are to be protected. The material brought and stacked for construction should not make hindrance to other contractors. **Necessary precaution and arrangements including sprinkling of water during work as acceptable to BHEL for safety & security for the above have to be made by the contractor. No claim will be entertained by BHEL on ground of lack of knowledge and the contractor's rates shall be deemed to have taken this into account.**

The contractor, in the event of this work awarded to him, shall establish an office at site and keep posted an authorized, responsible officer with valid Power of Attorney for the purpose of the contract. Any order or instructions of the `Engineer' or his duly authorized representative, communicated to the contractor's representative at site office will be deemed to have been communicated to the contractor at his legal address.

2.0	**GENERAL SCOPE OF WORK**
2.1	Scope of this tender covers "All Civil, Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower (NDCT) including supply of materials for civil, mechanical, electrical and C&I works, labour, tools and plants etc., for 1X660 MW PANKI TPS, PANKI, U.P." **(BHEL shall provide cement & reinforcement steel for civil work and structure steel for structural works only for incorporation in the permanent works as free supply as per BOQ cum Rate schedule).**
2.1.1	**VETTING OF THERMAL DESIGN, MODE OF EXECUTION AND PERFORMANCE GUARANTEE:** BHEL has done the thermal sizing of the NDCTs through its design Consultant and the same is approved by the owner. The owner approved thermal design is enclosed at Section IA of technical specifications along with the General Arrangement Drawing. The NDCT contractor is required to own the owner approved thermal design and GA drawing such that the responsibility of cooling tower performance shall remain with the bidder in all manners. Any questions or clarifications regarding thermal design may be sought by the NDCT contractor to satisfy himself of its veracity. The tentative quantities of thermos-hydraulic components (Fills and Distribution System) listed at Sl. No. 24 and 25 of BOQ cum Rate Schedule as per BHEL's design are indicated in Annexure-II "Approximate quantities of Thermo-hydraulic components based on BHEL design" of TCC and the same is calculated based on the area inside the NDCT at respective levels shown in the GA Drawings. If found necessary, the NDCT contractor may suggest modifications to the thermo-hydraulic components (listed at Sl. Nos. 24.1 to 24.6 and 25.1 to 25.5 in the Annexure-II of TCC) with technical reasoning/analysis/calculations to justify the measures to improve the thermal performance of the NDCT which will be guaranteed by the bidder. And as such the responsibility of cooling tower performance shall remain with the bidder in all manners. While suggesting justifiable reasons for changes as above the NDCT contractor shall abide by the following constraints. Also, the NDCT contractor shall guarantee the NDCT performance considering these constraints that are inviolable. 1) Civil Design of NDCT Shell, Shell Profile and Shell dimensions at various heights 2) Foundation of NDCT 3) Air Inlet Height

	4) Basin & Internal Structure Column-Beam Grid Dimensions and Elevations 5) Water Distribution Ducts 6) Layout of CW Hot water inlet header to Cooling Tower 7) Height and Diameter of NDCT. Once the changes with justifiable reasons/analysis/calculations provided by the NDCT Contractor are accepted by BHEL/Consultant and duly incorporated, the NDCT contractor will vet the final thermal design & GA of NDCT and furnish the Performance guarantee. The thermal design and GA vetted by the NDCT contractor shall be furnished to Customer for approval. The NDCT contractor shall vet the thermal design as above within two weeks of award of contract, for further approval by BHEL/customer. The GA drawing already approved by owner may be required to be approved again depending on changes to the thermo-hydraulic components, if any and therefore the NDCT contractor shall furnish the relevant modifications agreed to by BHEL/Consultant to these items (only) keeping the other dimensions frozen for further approval from BHEL/Customer. The complete design and engineering of NDCT shall remain in the scope of BHEL's Consultant. All Mechanical/Electrical/C&I drawings prepared by BHEL Consultant will be reviewed by the NDCT contractor before submission to customer for approval. The NDCT contractor is required to quote the lump sum cost of the thermo-hydraulic components based on his modified arrangement (if any) or as per Annexure-II. Lump sum cost quoted against the thermo-hydraulic components shall remain firm (Except PVC as applicable) irrespective of any variation in the items and quantities of the detailed components as suggested by BHEL in Annexure-II or in the modified arrangements proposed by the vendor.
2.2	**BRIEF SCOPE:** The scope of work includes supply, construction, erection and commissioning excluding engineering, including supply of complete bought out materials, hot water distribution system up to battery limit, cold water basin and outlet channels up to battery limit, sludge pit, stair case from ground level to water distribution level & top of CT and all other equipment and accessories as mentioned herein after. It is not the intent to list all details herein, scope of supply listed in brief as follows:

2.2.1	**MECHANICAL:** a. Incoming hot water piping, including vertical run, Motorized Butterfly valves on hot water risers. Terminal point for hot water pipe shall be as per enclosed NDCT GA Drawing. Welding at terminal point shall be in bidder's scope. Bidder shall also supply a Pressure Gauge & Temperature Gauge at the terminal point. Any reducer/ expander required at the terminal point shall also be in the bidder's scope. b. Tower fills & fill supports, drifts eliminators, including all supporting structures, fastening arrangements & accessories. c. Screens, along with handling arrangement and guides embedded in concrete shall be provided at the outlet of cold water channel. d. Sluice/ stop log gate with handling arrangement and guides in each of the cold water outlet channel connection from the cold water basin. e. Manually operated chain pulley blocks, together with the monorails and supporting frames for the handling of screen and gates. f. Knife-edge gate valve/sluice valve in each de-sludge connection and also De-sludge piping up to the disposal point at local storm water drain channels. g. Pipe spools to be embedded in sludge pit walls and terminated with flanged end at suitable distance from outer face of respective wall. h. Water Distribution system consisting of Pipes, Hangers & pipe supports & anchoring arrangement for all piping coming under the scope of supply. i. Two (2) Nos. (1+1) sludge pumps (submersible type) complete with electric motors, non-return valve, isolation valve, piping supports, hangers etc. for cold-water basin drainage. The bidder shall terminate pump discharge pipe work at a distance of 100 M from sludge pit. j. Counter flanges, bolts, nuts & gaskets for all piping connections in the scope of bidders and also at terminals.
2.2.2	**ELECTRICALS:** a. Complete electrical equipment s per specification/ details indicated in technical specification (Section – II B) shall be in bidder's scope.

	b. The scope of power & control cables & special cables shall be as per section II B (electrical). c. Base plate, foundation plate, anchor bolts, sleeves, inserts in concrete work for electrical and mechanical equipment & accessories.
2.2.3	**C & I:** a. Removable type Pitot tube at each hot water inlet- piping header to measure the flow (during performance guarantee test only). The Pitot tube shall be left with customer after the completion of the test. b. One number pressure gauge and one number temperature gauge at hot water pipe header at T.P. c. One no. of Anemometer for measurement of wind velocity. d. One number Psychrometer. e. Local control panel for sump/ sludge pumps (submersible type). f. Level switches for sump/ tank level high/normal/low/very low interlocks. g. Actuator for motorized BFV at inlet of hot water pipes/
2.2.4	**CIVIL:** a. Complete civil works includes excavation, shoring, dewatering, backfilling, concrete work including shuttering, sand filling, disposal of surplus soil outside plant boundary, formwork including automatic climb form / jump form, laser beam survey instruments, fabrication, galvanizing and erection of steel structures and inserts, finishing anchor bolts, RCC sump/ duct, laying and testing hot water pipe line, water proofing, providing PVC water stops and joint fillers, drainage and other ancillary items connected with cooling towers. All faces of concrete structures and steel structures coming directly in contact with water shall be coated with corrosion resistant coating system as approved. The surfaces that would include are inner face of the hyperbolic shell, raker column faces, inner faces of cold water basin, fill support structures, hot water distribution ducts & channels, cold water channels, etc. The scope of this work shall consist of, but not limited to, the construction of reinforced concrete double curvature hyperbolic shell, ring beams, foundations

	(excluding piling), cold water basins with partition walls, hot water ducts, drain sumps, external drain chamber with associated piping work, cold water channel with sluice gate up to the terminal point as specified elsewhere, hoists and monorails, primary and secondary hot water distribution troughs, fill support system including columns and beams, drift eliminators, testing of cold water basin for water tightness, external stairs. Sludge pit for each basin section, all other staircases/ ladders as required, doors and their frames, walkways, platforms, steel fitting, fixture, inserts including fabrication, hand railing, providing protective measures in concrete and steel materials against effect of water and other chemicals on the completed structure. b. Supply & application of painting at site including lettering on the outer wall of the cooling tower asper customer requirement. c. The civil construction of the cooling tower shall be in accordance with following technical specifications and the data specification sheets enclosed with this specification – i. Earthwork in excavation and backfilling ii. Cement concrete (plain & reinforced) iii. Masonry and allied work iv. Finish to masonry and concrete v. Metal doors, windows, ventilators, louvers, etc. vi. Roof water proofing, insulation and allied work (as applicable) vii. Painting, white washing, polishing, etc. (as applicable) viii. Sheet work in roof and siding (as applicable) d. The technical specifications are of general nature. Only those portions of the specifications which relate to the various works required to be done as per technical requirements as specified in the tender document need to be considered. e. The cooling tower shell, ring beams, diagonal columns at base supporting ring beams below shell, cold water basin, fill support frame work, hot water distribution duct, cold water channel, louver, etc. shall be cast in-situ RCC construction.
2.2.5	The following are also included in bidder's scope:

	a. One set of special tools & tackles required for maintenance of equipment & accessories in the cooling towers. b. Various drawings, datasheets, calculations, test reports/ certificates, operation & maintenance manuals including as built drawing etc. as specified & as necessary. c. Supply of first fill of lubricants for all equipment under this package including second fill/ replenishments as necessary during & after commissioning till handing over of the plant. d. Supply of commissioning spares as on when required basis. e. Scope of services shall include but not limited to erection/ testing/ commissioning/ trial run/ performance testing & handing over of cooling towers. Transportation of equipment, material to site, local clearance, storage at site etc. & supply of all labour including supervision personnel, materials, erection tools & tackles etc. as necessary for expeditious execution of works etc. are also included in bidder's scope. It shall be the responsibility of the bidder to arrange all T&Ps required for execution of complete job including erection & civil works.
2.2.6	**Equipment & services to be provided by the BHEL:** a. Supply & erection of incoming hot water piping up to bidder's terminal point. b. Supply & erection of sludge discharge piping beyond the bidder's terminal point, as applicable. c. Cold water outlet channels for cooling tower beyond the bidder's terminal point.
2.2.7	**PERFORMANCE TESTING AT SITE:** To ascertain the fulfillment of guarantees after completion of erection and commissioning of the cooling tower, contractor shall carry out performance test at site of CT in presence of employer / purchaser at site.
2.2.7.1	**Codes:** The following codes and standards shall be applicable for conducting test unless otherwise modified or supplemented by the enclosed procedure and mutually agreed to between Owner, BHEL and contractor. a) Code ATC-105: Acceptance test code for water cooling towers. (Latest Version). b) BS-4485: Specification for Water Cooling Tower. c) BS-1042: Methods for the measurement of fluid flow in pipes. d) BS-3435: Measurement of electrical power and energy in acceptance testing. e) ASME 19.5: Supplements on instruments and apparatus.
2.2.7.2	**Conductance of tests:**

	Performance testing of cooling tower shall be done to demonstrate the guaranteed cooling water temperature at rated duty point. The cold-water temperature as specified in the specification shall be guaranteed by the bidder for the design conditions of CW flow, range, ambient WBT as specified. The contractor shall submit cooling tower performance test procedure as per ATC 105 for approval & conduct the test as per the approved procedure, in the event of order. The contractor shall be given permission to inspect the Cooling Tower in advance and ready it for the test.
2.2.7.3	**Cooling Tower performance shall be tested jointly by Contractor in presence of BHEL and Owner. All the representatives shall jointly record data of test**. a) The responsibility for conducting the test will be with the bidder. b) All test instruments required for the PG test will be provided by contractor and meets the stipulations of the CTI ATC 105. c) Calibration of instruments to be used in the test shall be carried out by an approved independent agency. Calibration of instruments should be carried out previous to, but not more than six months before the test. The calibration certificate of the instruments should be valid for the period of test. d) List of instruments to be arranged by the bidder along with the calibration certificates of the instruments to be used and psychometric charts and tables should be submitted to owner for approval. e) Other provisions regarding performance testing of cooling tower shall be applicable as specified in technical specifications and approved procedures.
2.2.7.4	**Penalty for performance:** Bidder is responsible for quality of material supplied, workmanship & performance for the cooling tower. a) Performance testing of cooling tower shall be done to demonstrate the guaranteed cooling water temperature at rated duty point. The cold-water temperature as specified in the specification shall be guaranteed by bidder for the design conditions of CW flow, range, ambient WBT as specified. b) In case the test cold-water temperature as determined from the PG test is higher than the specified value. BHEL reserves the right to reject the fills and any other material associated with the performance of the tower and contractor shall have to replace / rectify the same within the specified time at their own cost, failing to do so BHEL shall have the right to carry out the replacement / rectification works at

<table>
<tr><td></td><td>the risk and cost of the contractor. Performance testing shall be carried out again by the contractor to demonstrate the guaranteed parameters.

c) In the event of acceptance of cooling tower with sub-optimal results by owner, penalty of 5% of contract value as retained from the bills of contractor in line with clause no. 7.4 of payment terms shall be recovered.</td></tr>
<tr><td>2.2.8</td><td>Successful bidder in the event of award of contract shall furnish the drawings/ documents for all temporary structures, all erection methodologies, bought items or self-manufactured and/or fabricated items.</td></tr>
<tr><td>2.2.9</td><td>Note: The above provided brief scope of work is indicative for the contractor's guidance only. For detailed scope and technical specification, following specifications enclosed with the tender shall be followed:

TECHNICAL SPECIFICATION NATURAL DRAFT COOLING TOWERS:

<table>
<tr><td colspan="2">Specification No.: PE-TS-426-165-N002</td></tr>
<tr><td>Section</td><td>Title</td></tr>
<tr><td>I</td><td>Specific Technical Requirement</td></tr>
<tr><td>IA</td><td>Specific Technical Requirements (Mechanical)</td></tr>
<tr><td>IB</td><td>Specific Technical Requirements (Electrical)</td></tr>
<tr><td>IC</td><td>Specific Technical Requirements (C&I)</td></tr>
<tr><td>ID</td><td>Data Sheet- A</td></tr>
<tr><td>II</td><td>Standard Technical Specifications</td></tr>
<tr><td>IIA</td><td>Standard Technical Specifications (Mechanical)</td></tr>
<tr><td>IIB</td><td>Standard Technical Specifications (Elec.)</td></tr>
<tr><td>IIC</td><td>Standard Technical Specifications (C&I.)</td></tr>
<tr><td>III</td><td>Documents to be submitted by Bidder</td></tr>
<tr><td>IIIA</td><td>Guarantee Schedule (To be submitted along with the Bid by all Bidders)</td></tr>
<tr><td>IIIB</td><td>Compliance Certificate (To be submitted along with the Bid by all Bidders)</td></tr>
<tr><td>IIIC</td><td>Data Sheet – B (To be submitted by successful Bidder after award of Contract)</td></tr>
<tr><td colspan="2">Specification No. PE-TS-426-165-N011: Civil Specification</td></tr>
</table>
</td></tr>
<tr><td>2.2.10</td><td>a) The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials including dismantling, removing and disposing off the</td></tr>
</table>

	existing underground structures / facilities etc. (if found), shall be burnt or otherwise disposed of as directed by the Engineer-in-Charge. No separate payment for these operations shall be made. The cost of all these operations shall be deemed to have been included in the unit rates rendered for the different items under bill of quantities. b) All the works areas shall be adequately flood lighted to the satisfaction of the Engineer-in-Charge when the work is in progress during the night shifts. c) The unit rates shall include all material equipment, fixtures, labor construction plant, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects. d) The unit rates quoted for various items of B.O.Q shall include all the stipulations mentioned in technical specifications for the particular BOQ Item and nothing extra over B.O.Q rates shall be payable. e) Drawings showing enough details for the construction as per the specification shall be furnished to the contractor in a phased manner as far as possible. f) The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications
2.2.11	**Cement and Steel Supply:** Cement, Reinforcement Steel and Structural Steel (as per BOQ cum Rates Schedule) required for permanent works under this tender's scope shall be procured by BHEL and issued to contractor as Free of Cost (FOC) Item.
2.2.12	The working area shall be separated from the existing plant area (if required) by cordoning off the area by providing MS / GI sheets of suitable heights with appropriate frame work as approved by BHEL/ Customer. No extra payment shall be paid to contractor for this work.
2.2.13	The Customer Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd. (UPRVUNL) may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works at no extra cost to BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
2.2.14	The work under this contract shall be carried out as per BOQ Cum Rate Schedule. In case the description / specifications as per BOQ are found to be incomplete, Indian standard specifications shall be followed. Quantities mentioned in the BOQ cum Rate schedules are

	approximate only and liable for variation due to change in scope of work / variation in schedule of quantities, changes in design etc. The tenderers shall undertake to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same. The quantities indicated against each item may vary to any extent and no compensation will be payable due to any variation of Individual quantity.
2.2.15	The complete works shall be carried out as per BOQ cum Rate schedule. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per GCC clause 2.15. However, contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer which will be binding on the contractor.
2.2.16	Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
2.3	**Contractor's scope also includes following:**
2.3.1	Furnishing all labor, materials (except those specified in BHEL scope), supervision, construction plans, equipment, supplies, transport to and from the site, materials handling, fuel, electricity, compressed air, water, transit and storage insurance and all other incidental items and temporary works not shown or specified but reasonably implied or necessary for the proper completion, maintenance and handing over the works, in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by BHEL Engineer during the course of works.
2.3.2	Furnishing samples of all materials required by the engineers for testing / inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works. Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.
2.3.3	Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that are required for all works including temporary works.
2.3.4	Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.
2.3.5	The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably implied and necessary for completion of the job as a whole all as desired and as directed by the engineer.

Sl. No.	Description	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.0	**ESTABLISHMENT**			
3.1	**FOR CONSTRUCTION PURPOSE:**			
3.1.1	Open space for office	Yes		BHEL may provide free of charge limited open space for office and store as and where made available by its customer. Also refer clause no. 3.9.1
3.1.2	Open space for storage	Yes		
3.1.3	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
3.1.4	Bidder's all office equipment, office / store / canteen consumables		Yes	
3.1.5	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
3.1.6	Firefighting equipment like buckets, extinguishers etc.		Yes	
3.1.7	Fencing of storage area, office, canteen etc. of the bidder		Yes	
3.2	**FOR LIVING PURPOSES OF THE BIDDER**			
3.2.1	Open space		Yes	

Sl. No.	Description	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.2.2	Living accommodation		Yes	
3.3	**ELECTRICITY**			
3.3.1	**Electricity For construction purposes (To be specified whether chargeable or free)**		**Yes**	Construction Power can be provided at single point source at 415V (3-phase) on **chargeable basis** as and where made available by Owner. However contractor has to deploy DG Sets at no extra cost to BHEL.
3.3.1.1	Single Point source	**Yes**		
3.3.1.2	Further distribution for the work to be done which include supply of materials and execution		Yes	
3.3.2	**Electricity for the office, stores, canteen etc. of the bidder, which include:**		Yes	
3.3.2.1	Distribution from single point including supply of materials and service		Yes	
3.3.2.2	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	
3.3.2.3	Duties and deposits including statutory clearances for the above		Yes	
3.3.2.4	Living facilities for office use including charges		Yes	
3.3.2.5	Demobilization of the facilities after completion of works		Yes	
3.3.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc. on the above lines.**		Yes	
3.4.0	**WATER SUPPLY**			
3.4.1	**For construction purposes:**			

Sl. No.	Description	Scope / to be taken care by		Remarks
		BHEL	**Bidder**	
3.4.1.1	Making the water available at single point	**Yes**		Construction Water may be made available at single point source, as per availability. However Bidder has to ensure an alternate arrangement for construction water at his own cost by resorting to the methods like bore well, water tankers etc.
3.4.1.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4.2	**Water supply for bidder's office, stores, canteen etc.**		Yes	
3.4.2.1	Making the water available at single point		Yes	
3.4.2.2	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.5.0	**LIGHTING**			
3.5.1	For construction work (supply of all the necessary materials) 1. At office storage area 2. At the preassembly area 3. At the construction site /area		Yes	
3.5.2	For construction work (execution of the lighting work/ arrangements) 1. At office storage area 2. At the preassembly area 3. At the construction site /area		Yes	

Sl. No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.5.3	Providing the necessary consumables like bulbs, switches, etc. during the course of construction		Yes	
3.5.4	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.6.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
3.6.1	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.7.0	**COMPRESSED AIR SUPPLY**			
3.7.1	Supply of Compressor and all other equipment required for compressor and compressed air system including pipes, valves, storage systems etc.		Yes	
3.7.2	Installation of the above system and operation and maintenance of the same.		Yes	
3.7.3	Supply of the all the consumables for the above system during the contract period		Yes	
3.8	**CONSTRUCTION FACILITIES**			
3.8.0	Engineering works for construction:			
3.8.1	Providing the construction drawings for all the works covered under this scope	Yes		
3.8.2	Drawings for construction methods and detailed shop drawings	Yes	Yes	In consultation with BHEL. Drawings for construction methods and detailed shop drawings shall be prepared by the Contractor as specified in the BOQ.

Sl. No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.8.3	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site– routing of small bore pipes		Yes	In consultation with BHEL
3.8.4	Shipping lists etc. for reference and planning the activities	Yes		”
3.8.5	Preparation of site construction schedules and other input requirements		Yes	”
3.8.6	Review of performance (Form-14) and revision of site construction schedules in order to achieve the end dates and other commitments	Yes	Yes	”
3.8.7	Weekly construction schedules based on Sl. No 3.8.6		Yes	”
3.8.8	Daily construction / work plan based on Sl. No 3.8.7		Yes	”
3.8.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
3.8.10	Preparation of preassembly bay / Fabrication Yard		Yes	
3.9	Other important Conditions regarding facilities to be provided by BHEL / Contractor i.e. Space, Construction Power and Construction Water etc.:			
3.9.1	BHEL may provide free of charge limited open space, for office & storage shed, as and where made available by Customer (UPRVUNL). It is the responsibility of the contractor to construct sheds, fabrication yard, establish batching pant, provide all utilities and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.			
3.9.2	Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. as required under			

	various labor laws and statutory rules and regulations framed there under to the personnel employed by him.
3.9.3	**Construction power, for construction purposes will be provided on chargeable basis** at one point near erection site, from supply point **AS AND WHEN IT IS MADE AVAILABLE BY THE CUSTOMER** . In the initial stages, the Contractor may have to deploy the DG sets for carrying out the tender works. Further distribution of power (when received) shall be done by contractor at his cost. All wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply.
3.9.4	Provision of distribution lines of power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the 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, fittings 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 shift / hours accordingly and deploy additional manpower if necessary so as to achieve the targets.
3.9.5	In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor. As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction sites, contractor should make his own arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown / failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency.
3.9.6	BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage / frequency or interruptions in power supply.
3.9.7	Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. within finally accepted rates.
3.9.8	No claim for damages will be entertained by the Company on account of interruptions of water supply or limitation of quantity of water as aforesaid or on account of the water so taken being not fit for construction purposes or on any other account in connection with such water supply.
3.9.9	**Contractor has to make alternate arrangement for construction water by providing suitable bore well / water tankers within the quoted rates.** Contractor to satisfy himself that the water drawn by him is fit for construction / consumption and adequately treat such water at his cost when it is not found fit for the said purposes.

3.9.10	The Contractor should make arrangements for storage of sufficient quantity of water required for work.
3.9.11	The Contractor shall during the progress of the work, provide, erect and maintain at his own expenses all necessary temporary workshops, stores, consumables, offices, etc. required for the proper and efficient execution of the work. The planning, setting and erection of these buildings shall have the approval of the Engineer and the Contractor shall at all times keep them tidy and in a clean and sanitary condition to the entire satisfaction of the Engineer.
3.9.12	On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the Engineer and expenses incurred shall be recovered from the contractor along with prevailing overhead. The decision of BHEL Engineer in this regard shall be final.

(A) INDICATIVE LIST OF T & Ps TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST:

Sl. No.	EQUIPMENT	INDICATIVE QUANTITY
1.	Poclain CK90 Excavators	2 Nos.
2.	JCB Excavators	2 Nos.
3.	Dumper (Min 15 cum each)	3 Nos.
4.	Transit mixer with matching dumpers (Min. 5/6 M3 capacity)	3 Nos.
5.	Concrete pumps (static, 60 cum/ hr. min capacity & lift 90M)	2 Nos.
6.	Boom placer with required boom length	2 Nos.
7.	Submersible pump (diesel / electric)	2 Nos.
8.	PLC operated automatic batching plant (min 30 cum per hour) with minimum 2 Nos. of silo (100mt each) per batching plant.	2 Nos.
9.	Mini batching plant CP-15	1 Nos.
10.	Tower crane of suitable capacity for height of approx. 200m and bottom radius 75m along with operator and necessary spares	1 Nos.
11.	Jump form for shell concreting along with all accessories e.g. required no. Of jacks (including spare jacks), power packs, ropes, safety accessories, etc. All complete required for smooth operation of jump form	1 Set
12.	Suitable passenger lift cabin for carrying (min 8 passengers) along with all accessories	1 Nos.
13.	Light crane 18/20 MT	1 Nos.
14.	Hydra 12/14 MT capacity	2 Nos.
15.	15/20 MT trailors with pulling unit / tractor – trailors	3 Nos.
16.	Self-priming De watering pump – 5/10/25 hp	1 Nos. EACH
17.	Sludge / slurry pump (diesel / elec)	1 Nos.

18.	Power driven earth rammer	1 Nos.
19.	Reinforcemet cutting / bending machine	3 Nos.
20.	Portable lighting mast / lighting system	2 Nos.
21.	Cement storage shed of min 800 MT capacity	1 Nos.
22.	DG SET 125 KVA	1 Nos.
23.	Concrete mixture machine	APR*
24.	Concrete vibrators	APR*
25.	Power / hand winches	APR*
26.	Welding machines	APR*
27.	Heating oven	APR*
28.	Portable ovens	APR*
29.	Portable grinding machine of various sizes	APR*
30.	Spray painting equipment	APR*
31.	Paint thickness measuring equipment	APR*
32.	Earth compactor	APR*
33.	Plate compactor	APR*
34.	Pneumatic jack hammer	APR*
35.	Sludge / slurry pump (diesel / elect)	APR*
36.	Plate bending machine	APR*
37.	Vibromax	APR*
38.	Road roller	APR*
39.	All scaffolding materials	APR*
40.	Ply shuttering board with adequate supporting structure	APR*
41.	Raker column steel shuttering	APR*

42.	Optical/laser plumb – 3 Nos. for each NDCT	APR*
43.	Pipe cutting machine	APR*
44.	VIBRO - HAMMER / DROP HAMMER ARRANGEMENT	APR*
45.	HYD EXCAVATORS / POCLAINS / JCB	APR*
46.	DOZERS	APR*
47.	AIR COMPRESSOR	APR*
48.	WINCH WITH BUILDING HOIST	APR*
49.	WATER TANKER WITH SPRINKLER	APR*

APR*: As per Requirement

NOTEs:

1. The above list – (A) is only indicative and these T&Ps may not be required for entire contract period but contractor will ensure that these T & Ps are provided as per the work requirement. **T&P Deployment schedule will be finalized at site based on the work fronts and in consultation with BHEL Engineer. Contractor have to mobilize / maintain the T& P as per the schedule notified time to time by BHEL Engineer.**

2. If any one of T&P mentioned above is not needed for proper execution of scope of work, provided contractor has not utilized BHEL free issued T&P for completing such work, no recovery from contractor shall be applicable.

3. Any additional item required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.
4. In case deployment of T&P w.r.t requirement, is delayed or deployed for a shorter period or abnormal down time of T&P or in case T&P w.r.t requirement was not deployed by the contractor as per instruction of BHEL and BHEL had to deploy either its own T&P or from outside, the recovery shall be done from the contractor as under:

    a. In case BHEL had to deploy its own T&P, hire charges of T&P applicable for outside agencies as per extant guidelines for "Hire Charges on issue of Capital Tools & Plants" shall be recovered.

    b. In case BHEL had to deploy the T&P from outside, actual hiring cost plus applicable overheads shall be recovered.

5. All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to BHEL site in-charge before the start of work.

6. Other terms and conditions regarding above items please also refer clause for T&P/IMTEs in SCC.
7. All the tools and plants required for this scope of work, except the Tools & Plants provided by BHEL are to be arranged by the contractor within the quoted rates. The list is suggestive in nature. **Any additional T & P required to meet BHEL commitments/schedule shall be arranged without any extra cost by the contractor.**
8. **If the work related to T & Ps mentioned above list - (A) is completed then, Engineer I / C can release the T & P during contract period / extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager before releasing T&P.**

B- INDICATIVE LIST OF IMTEs/MMEs REQUIRED:

SL. NO.	EQUIPMENT
1.	Total station
2.	Auto level and staff
3.	Compression strength testing equipment
4.	Concrete cube moulds (150 X 150 X 150) mm
5.	Physical balance for lab work
6.	Rapid moisture meter
7.	Dumpy level up to 350 mm
8.	Core cutter test apparatus
9.	Cube moulds (70mm size)
PROCESS CONTROL ACCESSORIES	
1.	Hot Air Oven (temperature range 50^0 c to 300^0c)
2.	Electronic Balance of required capacity & size
3.	Physical Balance of required capacity & size
4.	Thermometer (range 0^0c to 150^0c)
5.	Poker thermometer (concrete road) of required range
6.	Measuring jars (100ml, 200ml, 500ml & 1000ml)
7.	Digital Ph Meter
8.	Digital Micrometre
9.	Digital paint thickness meter for steel
10.	Screw gauge (0.1mm – 10mm, Least Count .05)
11.	Digital paint thickness meter for masonry / concrete painting

Construction Materials Testing Laboratory:

The Bidder shall establish laboratory arrangements or get the materials tested through approved national accredited laboratory and submit the reports for approval of BHEL/ Customer.

The laboratory must have qualified technicians to carry out all tests and must be adequately equipped to ensure that all necessary testing work can carriedout in compliance with the standards.

Field and laboratory testing procedures for materials follow Indian standard specifications with necessary equipment's like as given in table below:

Sl. No.	Name of Test	Name of Equipment	IS Reference
1.	Initial & final setting time, Consistency of cement	Vicat Apparatus with desk pot	IS 5513
2.	Shrinkage of cement, Auto Clave Test	Le Chatelier's apparatus Auto Clave Equipment	IS 5514
3.	Abrasion value test	Los Angles Abrasion testing machine	IS 2386
4.	Aggregate Impact value Test	Aggregate Impact value testing machine with blow counter	IS 9377
5.	Aggregate crushing value Test	Crushing value apparatus	IS 2386
6.	Flakiness index	Thickness gauge for measuring flakiness index	IS 2386
7.	Elongation Index	Elongation gauge	IS 2386
8.	Bulk density, voids and Bulking apparatus	Measuring cylinders (3, 5,10 & 15 liters cylinders)	
9.	Workability of concrete	Slump cone	IS 456
10.	Specific gravity of Aggregates	Pycnometer	IS 383
11.	Cement mortar cube Vibrating	Motorised vibration machine for cement testing	IS 4031
12.	Course aggregate Sieve analysis (Concrete & Road Works)	Sieve set 450mm dia GI Frames Size: 125 mm, 90 mm, 75 mm, 63 mm, 53 mm, 40 mm, 20 mm, 16 mm, 12.5 mm, 10 mm, 4.75 mm, Pan and cover	IS 383
13.	Fine aggregate sieve analysis	Sieve set: 200 mm dia Brass sieves;	IS 383

		Size 4.75 mm, 2.36 mm, 1.18 mm 600 micron, 300 micron, 150 micron, 75 micron, 75 micron, Pan and cover	
14.	Sieve Shaker	Motorized Sieve shaker	
15.	Silt content check	Sand silt content beaker	

NOTES:

1. The above list is only indicative and these IMTEs/MMEs may not be required for entire contract period and will be provided as per need. Contractor will assess actual quantity and period of requirement based on his experience.

2. Other terms and conditions regarding above items please also refer clause for T&P/MMEs.

3. The contractor has to establish / arrange at site the field-testing facilities for testing of civil construction materials and concrete cubes for ensuring the proper quality, grade and strength of the materials used in the construction in line with approved field quality checklist of BHEL/ its client. Contractor has to submit detailed report for testing of all material used etc. All testing shall be done as per IS code specifications/ BHEL's quality plan. If further test is required by the engineer to be carried from outside laboratory, the cost of the same shall be borne by the contractor.

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

5. All the IMTEs /MMEs required for this scope of work, except the IMTEs / MMEs provided by BHEL, are to be arranged by the contractor within the quoted rates. **The list is suggestive in nature. Any additional IMTEs / MMEs required to be arranged by the contractor.**

NOT APPLICABLE

6.0	**TIME SCHEDULE (MOBILIZATION, TIME SCHEDULE, CONTRACT PERIOD)**
6.1	**INITIAL MOBILIZATION** After receipt of Letter of Award (LOA), Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources within 4 weeks of issue of letter of intent or as per the directive of Project Manager / Construction Manager. Such resources shall be progressively augmented to match the schedule of milestones as directed by BHEL Engineer.
6.2	**START DATE / ZERO DATE** The schedule date of start of work shall be the date after 4 weeks of issue of LOA; The Actual Date of Start of Contract Period (Zero Date) shall be date of handing over of site to contractor for work and shall be certified by the BHEL Engineer**.**
6.3	**COMPLETION PERIOD:** Entire work as detailed in tender specification **shall be completed within 20 (Twenty) months from the actual date of start of work** as per the programs / milestones indicated by BHEL**.** Contractor has to mobilize adequate resources to meet BHEL's commitments to their customer as indicated from time to time. **In the event the contractor fails to respond to these requirements, BHEL shall take appropriate actions to meet customer's commitments in line with the provisions of General Conditions of Contract.**
6.3	In case due to reasons not attributable to the contractor, the work gets delayed and scheduled completion gets extended, time extension will be granted by BHEL as per clause no. 2.11 of GCC.
6.4	The work under the scope of this contract is deemed to be completed in all respects, only when all the works are carried out as per satisfaction of BHEL. The decision of BHEL on completion date shall be final and binding on the contractor.
6.5	In order to meet above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL without any extra cost to BHEL.
6.6	**CONTRACT PERIOD:** The contract period for completion of entire work under scope of this contract shall be **20 (Twenty) Months** from the actual / zero date of start of work.
6.7	The above time allowed for completion of work including Sundays and Holidays is from the date of commencement of work. Detailed program to be prepared by the tenderer taking in to consideration of the COMPLETION SCHEDULES /site decision on drawings flow (latest) and submitted for BHEL's approval.
6.8	**The Milestones to be achieved are as under:** The tentative milestone plan for NDCT of PANKI is as follows:

	Mile Stone	**Schedule from Zero date**	**Intermediate Milestone (M1 & M2)**
	RCC for ring raft	Progressively by 03rd month	
	Tower crane erection	Progressively by 03rd month	
	Basin wall & pedestals	Progressively by 05th month	
	Basin floor	Progressively by 06th month	
	Raker column	Progressively by 07th month	M1
	RCC shell	Progressively by 13th month	M2
	Grillage structure	Progressively by 14th month	
	RCC for Cold water channel	Progressively by 15th month	
	RCC hot water duct	Progressively by 15th month	
	Completion of precast beams	Progressively by 16th month	
	Completion of fills	Progressively by 17th month	
	Completion of hot water inlet pipes	Progressively by 17th month	
	All electrical works, staircase, internal painting, cage ladder erection	Progressively by 18th month	
	Readiness for unit sync	Progressively by 19th month	
	Inspection, testing, entire finishing and handing over	Progressively by 20th month	
6.9	**Provision of Penalty in case of slippage of Intermediate Milestones:** A. Two Major Intermediate Milestones are identified as M1 and M2 above. B. In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones. C. In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.		

	D. In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 3% of executable contract value , will be withheld. E. Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone. F. Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills. G. Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be. H. In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery. ** Executable Contract Value - Value of work for which inputs/ fronts were* made *available t contractor and were scheduled for execution till the date of achievement of that milestone.*
6.10	**Detailed Construction Schedule (L3):** The contractor shall submit and a detailed area/structure wise L3 schedule within 7 days in consultation with BHEL based on the tentative schedule provided as per the clause 6.8. The detailed L3 schedule shall be approved by BHEL and same shall be implemented. Bidder shall submit L3 schedule in MS Projects to meet the agreed project schedule covering various mile stone activities and their split up details such as construction, procurement of materials, fabrication & erection activities. This schedule shall also clearly indicate the interface facilities/inputs required.
6.10	**CONSEQUENCE OF DELAY** It may be noted that in the event, delay in completion is attributable to the contractor; BHEL will impose LD on the contractor as per clause no. 2.7.9 of GCC.

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	**The Contractor shall be paid monthly running bill as per chapter – X of SCC and Clause Nos. 2.22 & 2.23 of GCC.** The format for billing shall be approved by BHEL before raising invoices.
7.3	The contractor on certification of the engineer at site is entitled for payments of his running bills which shall be subject to any deduction/retention specifically under clauses 2.22 of GCC and chapter- X of SCC.
7.4	In addition to the standard deductions as mentioned in GCC and SCC, **5% amount** shall be retained from each running bill towards successful completion of guarantee test and the same shall be payable to contractor after successful completion and acceptance of **performance guarantee test and achievement of the guaranteed parameters** in accordance with technical specifications and approved procedures.
7.5	For facilitation of payment against the lump sum cost of the Item No. 24 & 25 (Thermo-Hydraulic Items) indicated in BOQ cum Rate Schedule (Annexure-I), further breakup shall be done at site by BHEL Engineer.

8.0	**TAXES & DUTIES**
8.1.1	Price quoted should be inclusive of all applicable Taxes/charges but **Excluding GST.** The Contractor shall pay all other taxes, fees, royalty, commission etc. which may be levied on the contractor in executing the contract. In case BHEL is forced to pay any of such taxes, it shall be recovered from Contactor's bills or otherwise as deemed fit. **GST Shall be payable extra as per following:**
8.1.2.	Contractor/Vendor has to issue invoice indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder. With the implementation of e way bill provisions, contractor shall comply with same as applicable.
8.1.3	Vendor has to submit GST compliant invoice within seven days from the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts. Special care should be taken in case of month end transactions.
8.1.4.	GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor : - a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor.
8.1.5	TDS under GST law as applicable shall be deducted.
8.1.6	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder
8.1.7	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altered/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.

8.1.8	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.1.9	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract is limited to direct transactions between BHEL & its Contractor. BHEL is not responsible for any liability that may arise due to any transaction beyond the direct transaction between BHEL & its Contractor.
8.1.10	**Variation in Taxes & Duties**: Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
8.1.11	**Modalities of Tax Incidence on BHEL:** Where GST law permits more than one option or methodology for discharging liability of tax/ levy/ duty; the contractor shall approach BHEL before choosing any option to discharge his tax liability. BHEL shall have the right to direct the contractor to adopt the appropriate option considering the amount of tax liability on BHEL as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the contractor for discharging the obligation of BHEL in respect of the tax liability to the contractor.
8.2	**BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**
	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor

	shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-
8.2.1	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.
8.2.2	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
8.2.3	It shall be the responsibility of the sub-contractor to furnish the receipts /challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.
8.2.4	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
8.2.5	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
8.2.6	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
8.2.7	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/Rules shall be deducted from the contractor.

9.0	**MATERIALS**
9.1	The contractor shall at his own expenses provide all materials including paints, welding electrodes etc. required for the work. However for permanent works **cement, reinforcement steel and structure steel will be issued free of cost** as per BOQ cum Rate Schedule, terms & conditions specified in clause No. 9.14 from BHEL / Customer stores or at a point instructed by BHEL.
9.2	All materials to be provided by the Contractor shall be of the best kind in conformity with the specifications laid down in the contract or as per relevant Indian standard and the Contractor shall, if requested by the BHEL Engineer, furnish proof to the satisfaction of BHEL Engineer that the materials so comply.
9.3	The Contractor shall, at his own expense and without delay, supply to the BHEL Engineer, samples of materials proposed to be used in the works. The BHEL Engineer shall within seven days of supply of samples or within such further period as he may require will intimate to the Contractor in writing, whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the BHEL Engineer for his approval fresh samples complying with the specifications laid down in the Contract. Any delay in approval of samples (original or fresh ones) shall not make the contractor eligible for any compensation.
9.4	The BHEL Engineer shall have full powers for removal of any or all of the materials brought to site by the Contractor which are not in accordance with the Contract specifications or do not conform in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials, the BHEL Engineer shall be at liberty to have them removed by other means. The BHEL Engineer shall have full powers to procure other proper material to be substituted for rejected materials and in the event of the Contractor refusing to comply; he may cause the same to be supplied by other means. All costs, which may attend upon such removal and / or substitution, shall be borne by the Contractor.
9.5	The Contractor shall indemnify BHEL, its representatives or employees against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any article or material or part thereof included in the Contract. In the event of any claim being made or action being brought against BHEL or any agent, servant or employee of BHEL in respect of any such matters as aforesaid, the Contractor shall immediately be notified thereof, provided that such indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by BHEL but the Contractor shall pay any royalties or other charges payable in respect of any such use, the amount so paid being reimbursed to the Contractor only if the use was the result of any drawings / specifications issued after submission of the tender.

9.6	The BHEL Engineer shall be entitled to have tests carried out as specified in the Contract for any materials supplied by the Contractor other than those for which, as stated above, satisfactory proof has already been furnished, at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the Engineer may require for the purpose. If no tests are specified in the Contract, and such tests are required by BHEL Engineer, the Contractor shall provide all facilities required for the purpose and the charges for these tests shall be borne by the Contractor only. The cost of materials consumed in tests shall be borne by the Contractor in all cases except when otherwise provided.
9.7	In addition, the Contractor shall perform / submit at his own cost such tests / samples as may be required by the BHEL Engineer out of the materials used by the company except for the costs of materials used in such tests/ samples.
9.8	After acceptance of the Contract, if Contractor desires BHEL to supply any other materials, such material may be supplied by BHEL, if available, at rates to be fixed by the BHEL Engineer along with prevailing departmental charges. BHEL reserve the right not to issue any material. The non-issue of such material will not entitle the Contractor for any compensation whatsoever either in time or in cost.
9.9	Material required for the works, whether brought by the Contractor or supplied by BHEL, shall be stored by the Contractor only at places approved by BHEL Engineer. Storage and safe custody of material shall be the responsibility of the contractor.
9.10	BHEL's officials concerned with the Contract shall be entitled at any time to inspect and examine any materials intended to be used in or on the works, either on the Site or at factory or workshop or other place(s) where such materials are assembled, fabricated, manufactured or at any place (s) where these are lying or from which these are being obtained and the Contractor shall give such facilities as may be required for such inspection and examination.
9.11	All materials brought to the Site shall become and remain the property of BHEL and shall not be removed off the Site without the prior written approval of the BHEL Engineer. But whenever the Works are finally completed and advance, if any, in respect of any such material is fully recovered, the Contractor shall at his own expense forthwith remove from the Site all surplus material originally supplied by him and upon such removal, the same shall re-vest in and become the property of the Contractor.
9.12	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc. before procurement of welding electrodes / TIG wires. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch No. date of expiry etc. and produce test certificate for each lot / batch with correlation of batch / lot no. with respective test certificate. No electrode will be allowed to be used without valid test certificate.

9.13	All charges on account of Octroi, terminal or sales tax and other duties on material obtained for the works from any source shall be borne by the contractor.
9.14	**ISSUE AND ACCOUNTING OF CEMENT, REINFORCEMENT AND STRUCTURAL STEEL.**
9.14.1	**Cement, steel (reinforcement & structure) will be issued as free issue materials from BHEL / UPRVUNL site stores or other issuing points as specified by the Engineer.** Such issues would be only for permanent works. Necessary indents shall be raised by the contractor as per procedure laid down by the Engineer-in-Charge about 7 days in advance of the actual requirement for incorporation in the works.
9.14.2	Materials will be issued only for permanent works and not for making templates, other temporary works, enabling works etc. and the same shall not be taken into account for purpose of material reconciliation.
9.14.3	The contractor shall bear all other costs including the lifting, carting from issue points to works site / contractor's stores, custody and handling etc. and return of surplus / serviceable materials to Owner's stores to be designated by the Engineer-in- charge and all expenditure will be made by the contractor.
9.14.4	All steel shall be issued in available lengths / shapes and no claims for extra payment on account of issue of non-standard lengths / shapes will be entertained. For the purpose of billing and accounting only linear measurement will be taken and weight will be calculated as per the IS Co-efficient. The different in unit weight as per IS and actual as issued, if any shall be to the contractor's account and contractor shall quote the rates for corresponding item to take care of such difference.
9.14.5	Cement, as received from the Manufacturer / Stockiest will be issued to the contractor. The theoretical weight of each bag of cement for issue purpose will be considered as 50Kgs. Per Bag. Any type of cement and in any container as received from Manufacturer / Stockiest shall be issued to the contractor No claim whatsoever shall be entertained on this. Cement bags weighing up to 4% less will be accepted by the contractor and accounted for as 50Kg per bag.
9.14.6	The Contractor shall maintain good stores for storing the cement issued to him. The flooring of the storage house, the clearance of cement bags from the sidewalls etc., shall be as per the instructions of the Engineer-in-charge.
9.14.7	The cement stores shall be open for supervision and verification by the Engineer-in-charge or his authorized representative by any time when the Engineer-in-charge feels the need to do so.
9.14.8	In the case of steel materials, the same shall be issued generally on the basis of linear measurement and the corresponding weight will be calculated as per Indian Standard. For the purpose of billing & accounting, only linear measurement will be taken and any difference in weight based on linear measurement & actual weight shall be to contractor's account. Quoted price shall be deemed to include the above & the permissible wastage mentioned. No claim

<table>
<tr><td></td><td>whatsoever shall be entertained on account of wastage & difference in weight as referred to above.</td></tr>
<tr><td>9.14.9</td><td>Issue of stores material is subject to availability and the contractor shall not be entitled to any claim or compensation for non-supply or delay in the supply under any circumstances. The material will be issued generally during the working hours.</td></tr>
<tr><td>9.14.10</td><td>The Contractor will have to submit their design mix for different grades of Concrete keeping in view the requirements stipulated in IS:456, specifically regarding slump and Water Cement ratio and Specific Gravity of Materials brought to site as analyzed in the laboratories. The design shall be used upon absolute volume method and theoretical consumption of Cement shall be worked out on this basis. For other than above designated mix Concrete items, the coefficients for consumption of cement shall be adopted as per CPWD practice. The theoretical consumption of cement thus worked out shall be binding upon the Contractor for reconciliation of Cement issued by the Owner. For any excess /under consumption based on these coefficients, the Contractor shall be penalized as per contract provisions. Though, permissible wastage specified shall be considered, while effecting penal recovery, no other allowance whatsoever shall be taken for reconciliation purposes.</td></tr>
<tr><td>9.14.11</td><td>The theoretical consumption of cement, reinforcement steel and structural steel required for the work will be calculated on the basis of approved drawings / joint measurements. In the case of cement, the theoretical consumption shall be decided by the Engineer as mentioned above and his decision in this regard shall be final and binding on the Contractor. Reinforcement and structural steel shall be measured by weight in tones. The weight will be arrived at by multiplying the used length by the sectional weight. The sectional weight will be same as were applied at the time of issue. Standard hooks, cranks, bends and authorized laps, chairs, separator pieces etc. specified in drawing or instructed by engineer as required shall be measured and paid for. No payment shall be made for binding wires, spacer block etc. required for keeping the steel in position unless otherwise specified in the contract. No extra payment will be made for modification of already embedded reinforcement, if required due to faulty fabrication or placement.</td></tr>
<tr><td>9.14.12</td><td>The contractor shall submit proper account of material / material reconciliation statement for the material drawn by him from stores once in every three months. Failing compliance of this requirement further issue of steel to the contractor may be suspended and no claim of compensation for delay in execution on this account shall be entertained.</td></tr>
<tr><td>9.14.13</td><td>All the cement & reinforcement steel thus issued shall be properly accounted for as per the following permissible wastage over the theoretical quantity / consumption incorporated in the works.
<table>
<tr><td>Item</td><td>Area</td><td>Permissible Variation / Wastage</td></tr>
<tr><td>Cement</td><td>For All works</td><td>1.5%</td></tr>
</table>
</td></tr>
</table>

	Reinforcement Bars & MS Earthing Rods	For All works	3%
	Structural Steel	For All Works	4%
9.14.14	Any unused / serviceable quantity of cement, reinforcement steel & structural steel not returned in good condition & wastages / loss / consumption beyond specified / agreed limits shall be charged at penal rate of **Rs 7000 per MT for cement, Rs 60,000 per MT for reinforcement steel & Rs 70,000 per MT for structural steel** at the time of preparing final bill, during finalization of the contract. The decision of Engineer-in-charge with regard to applicability of penal rates shall be final & binding upon the contractor.		
9.14.15	For the materials i.e. Reinforcement (TMT), Structure Steel being issued free of cost, the scrap generated shall belong to BHEL.		
9.14.16	Empty cement bags shall be the property of contractor and recovery @ 01/- (Rs. One only) per empty cement bag shall be made from their RA bills.		
9.14.17	**SCRAP & SERVICEABLE MATERIALS:** All reinforcement steel / Structural steel (rolled sections) of length above 2 M shall be considered as serviceable materials provided the materials be in good and acceptable condition. Structural Steel / Reinforcement steel in length less than 2 M shall be treated as scrap. All plates/ sheets of size above 2 SQM shall be considered as serviceable materials provided the materials be in good and acceptable condition. All plates and sheets below the size of 2 SQM shall be treated as scrap.		

10.1	**EXECUTION OF WORK**
10.1.1	The work shall be executed in a workman like manner and to the entire satisfaction of the Engineer and as per technical specification issued with tender, IS codes, technical specifications as applicable. In case of conflict, the decision of the Engineer I/c shall be final & binding.
10.1.2	The Engineer I/c will communicate or confirm his instructions to the Contractor in respect of the execution of the work in a "Work Site Order Book" maintained at his office and the Contractor shall visit this office daily and shall confirm receipt of such instructions by signing the relevant entries in this book or through e-mail. Such entries / e-mails will rank as order or notices in writing within the intent and meaning of these conditions.
10.1.3	Only BHEL approved make of electrodes will be used. All electrodes shall be heated and dried in the electric electrode drying oven to the required temperature for the period specified by the Engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to site will have valid manufacturing test certificate. The test certificate will have co-relation with the lot no. / batch no. given on electrode packets. No electrodes will be allowed to be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved / accredited test house traceable to National / International standards) will be submitted to BHEL before putting the oven in use. Periodical calibration for the same shall also be arranged by the contractor within the finally accepted rates.
10.2	**SETTING OUT**
10.2.1	All the works shall be set out to the true lines, grades and elevation indicated on the drawing. The contractor shall be responsible to locate and set out the works. Only one grid reference line and bench mark all be made available for setting out the works under the contract. This reference lines shall be used as datum for the works under the contract and the contractor has to establish for his work area at available points horizontal and vertical control points. The contractor shall inform BHEL well in advance of the times & places at which he wishes to do work in the area allotted to him so that suitable datum points established by him are checked by BHEL / Customer to enable the contractor to proceed with the works. Any work done without being properly located may be removed and / or dismantled by BHEL / Customer at contractor's expense.
10.2.2	The contractor shall at his own expense take all proper and responsible precautions to preserve and maintain these datum marks to its true position. In the event of these marks being disturbed or obliterated by accident or due to any other cause whatsoever, the same may be deemed necessary placed by BHEL / Customer at contractor's expenses.
10.3	**SITE DRAINAGE**

10.3.1	All water including sub-soil water which may accumulate on the Site during the progress of the works or in trenches and excavations, including monsoon period shall be removed by the contractor from the Site to the satisfaction of the Engineer. It will also be responsibility of the contractor to de-water all the foundation pits, trenches with suitable de-watering methods like, pumping out, well point system etc. considering the depth of water table at plant site. All such expenditure on de-watering shall be deemed to be included in quoted rates.
10.4	**INSPECTION AND STAGE APPROVAL OF THE WORK**
10.4.1	The owner or his duly authorized representative shall have at all reasonable times access to the contractor's premises or works and shall have the power to inspect drawings or any portion of the work, examine the materials and workmanship and shall have the authority to reject any work. This would be implemented through joint inspection by the representative of the owner and BHEL and in the form of joint protocols without any extra claims and loss of time and amount.
10.4.2	All work embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice in writing to the Engineer when each stage is ready. In default of such notice being received, the Engineer shall be entitled to approve the quality and extent thereof at any time he may choose and in the event of any dispute, the decision of the Engineer thereon shall be final and conclusive.
10.5	**UNCOVERING AND MAKING GOOD**
10.5.1	The Contractor shall uncover any part of the Works and/or make openings in or through the same as the Engineer may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the Engineer. If any such part has been covered up or put out of view after being approved by the Engineer and is subsequently found on uncovering to be executed in accordance with the Contract, the expenses of uncovering and / or making opening in or through, reinstating and making good the same shall be borne by BHEL. In any other case all such expenses shall be borne by the Contractor.
10.6	**DISCREPANCIES AND ADJUSTMENT OF ERRORS**
10.6.1	The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small-scale drawings and figures dimensions in preference to scale and special conditions in preference to general conditions.
10.6.2	In case of discrepancies between schedules of quantities, the specification and / or the drawings, the following order of preference shall be observed. (a) Description in schedule of quantities.

	(b) Technical Conditions of Contract. (c) Drawings. (d) Technical Specifications (e) Special Conditions of Contract (f) General conditions of contract
10.6.3	If there are varying or conflicting provisions made in any one document forming part of the contract, the Engineer shall be the deciding authority with regard to the document.
10.6.4	Any error in description, quantity in schedule of quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to the drawings and specifications or from any of his obligations under the contract.
10.7	**MATERIAL OBTAINED FROM EXCAVATION**
10.7.1	Valuable Materials / Archeologically important materials of any kind obtained from excavation on the Site shall remain the property of BHEL / its client and shall be disposed of as the Engineer may direct, at no extra cost.
10.8	**SAFETY CODE**
10.8.0	**The contractor shall comply with following towards Safety and Social Accountability.**
10.8.1	Besides provision with regard to SAFETY under Clause 9.0 of SCC, the contractor will be responsible for Health, Safety & Environment management at site for the construction activities to be carried out by them. The contractor shall continuously take special care to ensure the safety and prevention of human and equipment accidents and maintain good sanitary conditions in and around the site. All the construction work and plant operation must be carried out in the safest possible manner. The Engineer reserves the right to stop any process which, in the Engineer's opinion, is being performed dangerously. In this case the contractor must immediately adhere the requisite safety precautions and any delays attributed to the work stoppage on this account shall not affect the agreed contractual finishing dates.
10.8.2	HSE plan for site operation by Sub Contractor (Doc No. HSEP 13 Rev 00 attached) shall be followed.
10.9	**NUISANCE**
10.9.1	The Contractor shall not at any time do, cause or permit any NUISANCE on Site or do anything which shall cause unnecessary disturbance or inconvenience to owners, tenants or occupiers of other properties near the Site and to the public generally.

10.10	**TREASURE , TROVE , FOSSILS etc.**
10.10.1	All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site shall be the absolute property of BHEL / BHEL's client and the Contractor shall take reasonable precautions to prevent his workmen or any other person from removing or damaging any such article or thing, shall immediately upon discovery thereof and before removal acquaint the Engineer with such discovery and carryout the Engineer's directions as to the disposal of the same.
10.11	**PROTECTION OF WORKS**
10.11.1	Trees designated by the Engineer shall be protected from damage during the course of the Works and earth level within 1 meter of each such tree shall not be charged. Where necessary, such trees shall be protected by providing temporary fencing.
10.11.2	The contractor shall provide and maintain at his own expense all lights, guards, fencing and watching when and where necessary or required by the Engineer for the protection of the Works or for the safety and convenience of those employed on the Works or the public.
10.11.3	The contractor shall have total responsibility for protecting his works till it is finally taken over by the Engineer. No claim will be entertained by the Engineer for any damage or loss to the contractor's works and the contractor shall be responsible for the complete restoration of the damaged works to its original condition to comply with the specifications and drawings. Should any such damage to the contractor's works occur because of other party not under his supervision or control, the contractor shall make his claim directly with the party concerned. The contractor shall not cause any delay in the repair of such damaged works because of any delay in the resolution of such disputes. The contractor shall proceed to repair the work immediately and no cause thereof will be assigned pending resolution of such disputes.
10.12	**RECORD FOR MATERIALS CONSUMED**
10.12.1	The contractor shall maintain and furnish to the Engineer the RECORD OF MATERIALS consumed in the works for each activity. The statement showing the theoretical vis-à-vis actual consumption of specified materials, such as structural /reinforcement steel, cement, bitumen, lead, paint etc., shall be enclosed along with the running bills submitted by the contractor. Contractor has to also furnish the test results of the materials used in the work as per IS specifications.
10.13	**PROTECTION OF EMBEDMENTS, BOLTS ETC.**
10.13.1	The contractor shall ensure proper protection to the satisfaction of the Engineer, of all bolts, inserts, embedment etc. from weather etc./ by greasing, rapping them with

	gunny bags or canvas or by any other means as directed by Engineer. Cost of such protections shall be deemed to be included in the rates quoted for the item.
10.14	**COMPLETION OF WORK AND COMMENCEMENT OF GURANNTEE PERIOD**
10.14.1	The works shall be completed to the entire satisfaction of the Engineer and in accordance with the completion schedule as specified in the Contract, and all unused stores and materials, tools, plant, equipment, temporary buildings, site office, labor hutments and other things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of the Engineer at the Contractor's expenses.
10.14.2	BHEL shall have power to take over from the Contractor from time to time such sections of the work as have been completed to the satisfaction of the Engineer. Such work however shall not be treated as have been completed until the extra / pending works are executed to the satisfaction of Engineer.
10.14.3	The Engineer shall certify to the contractor the date on which the work is completed and the date thereof for commencement of Guarantee Period. Guarantee Period shall be as given in GCC.
10.15	**CLEARANCE OF SITE AND REPAIRS.**
10.15.1	Contractor has to clear the site / area where mechanical and electrical erection work is to be commenced / or in progress. The contractor shall remove construction materials and equipment lying in the vicinity and causing obstruction in the erection work within 24 hrs. notice. In case, he fails to clear the site, this will be done at his risk & cost by BHEL.
10.16	**QUALITY ASSURANCE**
10.16.1	Contractor shall prepare a Field Quality Plan (FQP) for this tender's scope, in consultation with BHEL and submit to BHEL / Customer (NTPC) for approval. All works shall be carried out in accordance of the approved Field Quality Plan for this work. The contractor has to establish / arrange at site the field-testing facilities for testing of civil construction materials and concrete cubes for ensuring the proper quality, grade and strength of the materials used in the construction in line with approved field quality checklist of BHEL/ its client. Contractor has to submit detailed report for testing of all material used etc. All testing shall be done as per IS code specifications/ BHEL's quality plan. If further test is required by the engineer to be carried from outside laboratory, the cost of the same shall be borne by the contractor.
10.17	**NA**
10.18	**METHOD OF MEASUREMENT**
10.18.1	Method of measurements shall be as per standard specifications included in the tender. For other items measurements shall be as per relevant IS Codes.

10.19	**DEVIATION**
10.19.1	The Contractor shall not make any alteration in, addition to or omission from the work as described in the tender documents except in pursuance of the written instructions of the Engineer. No such deviation from the work described in the tender documents shall be valid unless the same has been specifically confirmed and accepted by the Engineer in writing and incorporated in the Contract.
10.19.2	The Engineer may deviate, either by way of addition or deduction, from the work so described, provided that the Contract sum be not thereby varied on the whole by more than the percentage set out in the tender documents. The value of all additions and deductions shall be added to or deducted from the Contract sum. (Whenever the Engineer intends to exercise such a right his intentions shall specify the deviations which are to be made, the lump-sum assessment or the proposed basis of payment, the extra time allowed, if any, and the date for completion of the entire contract). Any objection by the contractor to any matter concerning the order shall be notified by him in writing to the Engineer within seven days from the date of such order, but under no circumstances shall the work be stopped (unless so ordered by the Engineer) owing to differences or controversy that may arise from such an objection. In the absence of such a notification of objection by the Contractor, he will be deemed to have accepted the order and the conditions stated therein.
10.19.3	Valuation of Deviations shall be as per Clause 2.15 & 2.16 of GCC.
10.20	**COMPLIANCE TO REGULATIONS AND BYELAWS**
10.20.1	The Contractor shall conform to the provisions of any statute relating to the work and regulations and bylaws of any local authority and of any water and lighting Companies or Undertaking with whose system the work is proposed to be connected. He shall, before making any variation from the drawings or the specifications that may be necessitated for such connections give the Engineer, notice specifying the variation proposed to be made and the reasons therefore and shall not carry out any such variation until he has received instructions from the Engineer in respect thereof. The Contractor shall be bound to give all notices required by statute, regulations or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.
10.20.2	**In order to give phillip to Pradhan Mantri Kaushal Vlkas Yojna:** "The contractor shall, at all stages of work deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/ Industrial Training Institute/ National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/ semi-skilled workers required in each trade at any stage of work. The contractor shall submit

	number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.
10.21	**PROGRESS REPORTING :**
10.21.1	Contractor is required to draw mutually agreed monthly program in consultation with BHEL well in advance as per the Form F-14 given in the tender. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
10.21.2	Weekly progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled programme shall be discussed for actions to be taken for achieving targets. The programme for subsequent week shall also be presented by contractor for discussions. The contractor shall constantly update / revise his work programme to meet the overall requirement. All quality problems shall be discussed during above review meetings. Necessary preventive and corrective action, shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.
10.21.3	The contractor shall submit weekly and monthly progress reports, materials reports, consumables (gases / electrodes) report and other reports as per proforma considered necessary by the Engineer.
10.21.4	The progress report shall indicate the progress achieved against planned , with reasons indicating delays , if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time , so that further works again proceed as per the original programme and the slippages do not accumulate and effect the overall programme.
10.21.5	The daily manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.
10.22	**DRAWING AND DOCUMENTS**
10.22.1	The detailed drawings, specifications available with BHEL engineers will form part of this tender specification. These documents will be made available to the contractor

	during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
10.22.2	Necessary drawings / documents by BHEL to carry out the construction work will be furnished to the contractor by BHEL (except those proposed to be prepared by contractor, as mentioned in this contract) on loan which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
10.22.3	The contractor shall maintain a record of all drawings and documents available with him in a register as per format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete ones from work place and return to BHEL.
10.22.4	The data furnished in various annexures enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work.
10.22.5	Should any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
10.22.6	Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details, without specific approval of BHEL**.**
10.23	**MODIFICATION/ DELETION OF GCC & SCC CLAUSES:** **A. GCC Clauses:** i. Clause No. 2.12 of GCC (ORC) shall not be applicable. **B. SCC Clauses:** i. Clause No. 4.1.4 of SCC (TIG Filler wire for Boiler and Filler wires for Electrodes of P91/T91 piping) shall not be applicable. ii. Clause No. 8.3.3 and 8.3.4 of SCC (Statutory Inspection of Work) shall not be applicable.

Annexure-A

UNPRICED RATE SCHEDULE

ITEM NO.	DESCRIPTION OF WORK	TOTAL VALUE "A" IN INR (IN FIGURES AND WORDS)
1.0	**TOTAL PRICE FOR THE TOTAL WORK OF "CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P." as per tender specifications.**	

Notes:

1 Bidder's quoted price above shall be complete in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.

2 Contractor shall fully understand description and Specifications of items mentioned in BOQ cum Rate Schedule.

3 Conditional price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.

4 Quantities mentioned in BOQ cum Rate Schedule are approximate only and liable for variation on either side depending upon site / design requirement. The tentative contract value (CV) of entire scope of work shall be calculated as per finally quoted / accepted rates & the Quantities indicated in BOQ cum Rate Schedule.

5 Contractor's total quoted price as per BOQ cum Rate Schedule will be taken as tentative only. The contractor undertakes to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same.

6 In case of any mis-match in rate and amount on price discrepancy, the same will be dealt as per clause no. 1.4 of GCC.

7 Taxes (GST) shall be payable extra as per relevant clauses in Technical Conditions of Contract.

Annexure-I: BOQ cum Rate Schedule for the Work of **"ALL CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS, LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.**"

Annexure-II: Approximate quantities of Thermo-hydraulic components based on BHEL design
(Also provided at Annexure-1 of Section- IA of Technical Specification No. **PE-TS-426-165-N002)**

ANNEXURE-I

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
I	**CIVIL WORKS:**					
100	**EARTH WORK: Earth work In excavation, backfilling and disposal including all labour, equipments (unless otherwise specified in BOQ/contract specification) etc complete as per specification, drawing and as directed by engineer- in-charge for the following.**					
101	Earth work in excavation in all types of soil including ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1Km, spreading/levelling of disposed materials etc all complete for following depths below ground level.					
a	Depth from ground level but not exceeding 2 m	Cu.M	500	0.0106119	-	-
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	500	0.0132649	-	-
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	100	0.0165495	-	-
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	100	0.0207185	-	-
102	Extra over ST No. 101 for dewatering of ground water by well point method as per IS 9759.	Cu.M	1200	0.0059035	-	-
107	Earthwork in Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250mm thickness using/with selected materials from compulsorily excavated earth (includes soil, soft rock boulder excluding hard rock and mixture of both) available within a lead upto 1 Km and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.				-	-
a	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	Cu.M	8650	0.0078326	-	-
b	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	Cu.M	50	0.0087169	-	-
109	Extra over ST No. 101 and 103 to 107 for carriage of material/earth for every 500m or part there of beyond an initial lead of 1km.			-	-	-
a	Carriage for stacking/ backfilling of serviceable material/ earth	Cu.M	2400	0.0008843	-	-
b	Carriage for disposal of serviceable/unserviceable material/ earth	Cu.M	2400	0.0008843	-	-
A110	Earth work in backfilling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness so as to achieve required compaction with approved borrowed earth (includes soil, rock boulder of specified size and mixture of both) (borrowed earth to be arranged by the bidder) and compacted as specified including supplying borrowed earth, royalty/ seignorage fee (if any), sorting, spreading, breaking clods, watering, ramming/compaction by manual/mechanical means, dressing, finishing to required lines, grades and slopes, testing, all lead and lifts etc all complete as per specification, drawing and as directed by the engineer for the following:				-	-
a	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	Cu.M	10000	0.0391630	-	-
b	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	Cu.M	50	0.0391630	-	-
A111	Supplying and filling sand upto any depth under floors, around foundations, plinths,surrounding pipe and in pipe beds etc. in layers not exceeding 300 mm thickness and compacted so as to achieve at least 75% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete.	Cu.M	50	0.2649191	-	-
200	**CONCRETE WORK: Providing and placing concrete work including cost of labour, materials (unless otherwise specified in BOQ/contract specification) and equipment for handling, transportation, batching, mixing, placing, vibrating and curing (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, transit mixer, concrete pump, tower cranes of suitable capacity and all accessories, including demobilisation of the same after completion of works etc and passenger lift to be installed at outer shell with all accessories & safety arrangement required for safe movement of labourers. the scope inclusive of transportation of the equipments, mobilization, demobilization, maintenance, operator charges, and necessary foundations etc. all complete as per drawing, specifications and as per direction of engineer in charge. Note: Cement will be supplied by BHEL and issued as FOC (free of Cost) item**				-	-
201	Concrete of grade M7.5 (1 part cement, 4 part sand, 8 parts of 40 mm graded aggregate by volume) as mass filling course, lean concrete, levelling course, mud mat under and around foundations/ floors, at any depth below finished floor level etc.	Cu.M	50	0.4177813	-	-
A202	Concrete of grade M10 (1 part cement, 3 part sand, 6 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	50	0.4177813	-	-
A203	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	2310	0.4177813	-	-

ANNEXURE-I

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
A205	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in foundations/substructure, grade slab, paving, drains, under floors etc at all level below basin wall top level, any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.				-	-
a	M 25 Grade	CUM	50	0.4649033	-	-
b	M 30 Grade	CUM	6370	0.4679353	-	-
c	M 35 Grade	CUM	50	0.4709672	-	-
A206	Providing and laying Design Mix cement concrete of grade conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in superstructure at all level above finished floor level (all structures above top of basin wall), any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.				-	-
b	M 30 Grade	CUM	50	0.4727359	-	-
c	M 35 Grade	CUM	4635	0.4757679	-	-
Ad	M 40 Grade (except shell,ring beam, corbel, platform,walkway , raker column)	CUM	50	0.9266483	-	-
Ae	M 40 Grade (For shell, ring beam, corbel, platform, walkway etc.)	CUM	20120	0.8983498	-	-
Af	M 45 Grade	CUM	50	0.9433241	-	-
Ag	M 50 Grade (For Raker column)	CUM	1520	0.9433241	-	-
A212	Screed concrete conforming to IS 456 with coarse sand and graded hard stone aggregate 12.5mm/6 mm nominal size of any thickness over basin floor,drains etc. complete as per following.				-	-
a	1:2:4 (1 part cement, 2 part sand, 4 parts of aggregate by volume)	Cu.M	50	0.4177813	-	-
A214	Providing and laying Design Mix cement concrete as per IS:456, IS 3370 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in water retaining/conveying structures (such as basin floor slab, basin wall, partition wall, CW outlet, sumps, hot water ducts etc.) including addition of suitable plastisizer cum waterproofing cement additives confirming to IS 9103 latest to achieve a slump more than 125 mm in concrete as per manufacturers recommendation and conforming to limits of permeability as per IS 2545 and specification with 20 mm nominal size graded aggregate for following grades. Watertightness is to be ensured including structural grouting if required.				-	-
b	M 30	CUM	8260	0.6159968	-	-
Cc	M 35	CUM	50	0.6159968	-	-
A213	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in precast works like roof slabs/trench covers, fins, lintels, chajjas, beams, columns, bracings, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds, curing, rendering the top exposed surface with cement sand mortar (1:3), handling, storing, transporting, all leads, erection without damage, setting in position with cement sand mortar (1:3), filling the gaps between adjacent pre-cast units with M30 grade concrete or cement sand mortar (1:3) and including making of holes for bolts for fixing, welding etc.complete with graded aggregate (20/12.5/10 mm) and as per specification and drawing for following grades.				-	-
b	M 30	CUM	50	0.6279984	-	-
c	M 35	CUM	570	0.6279984	-	-
215	Dismantling concrete work for all types of structures at all levels including stacking of serviceable material to a lead of 500 m and disposal of unserviceable material upto a lead of 2 km, cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge.				-	-
a	Plain cement concrete of all grades	CUM	20	0.0843901	-	-
b	Reinforced cement concrete of all grades	CUM	20	0.1134465	-	-
216	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	100	0.0039163	-	-
217	Extra over and above ST No 216 for cutting of reinforcement, all sizes and types including labour, equipment, return of cut reinforcement to store etc all complete as per specification, drawings and instructions of engineer in charge. Measurement shall be on the cross sectional area of reinforcement cut.	SQCM	100	0.0003790	-	-
218	Cutting Reinforced concrete with mechanised tools like Core drilling machine etc. for cutting pockets, holes, cores in slab, beam, column or foundation as per direction of engineer in charge.	CUDM	50	0.0200869	-	-
300	**FORMWORK: Providing, fixing and removing formwork at all elevations for all structures, as per specifications and including all labour, material, scaffoldings and centering etc. complete as per drawing, specifications and as per direction of engineer in charge for the following:**				-	-
301	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface below basin wall top level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc.including chamfering of edges as per drawing, specification and instruction of engineer in charge..	SQM	5630	0.0418160	-	-

ANNEXURE-I

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
302	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface above top of basin wall for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, etc. including chamfering of edges as per drawing for all heights as per specification, drawing and instruction of engineer in charge.	SQM	41890	0.0501540	-	-
A302	Fairface Formwork for smooth surface for Raker columns including preparation of scheme, designing, submission and approval of staging drawing with sufficient props, braces and ties for all heights complete including chamfering of edges, deshuttering as per drawing,specification, and instruction of engineer in charge.	SQM	4330	0.1675168	-	-
B302	Fairface formwork for smooth surface of shell by providing and using jump form shuttering of approved quality with plastic coated plywood shuttering and minimum three working platforms internally and minimum two working platforms externally, with continuous spray curing arrangement with automatic system including lifting arrangement, adjustment as per shell profile , access system, hoisting, strutting, propping, adequate illumination and safety arrangements etc. and other temporary supports/structures as required including dismantling and removal of formwork for tower shell, peripheral top platform, peripheral inner walkway etc. as per specifications and as directed by engineer-in-charge including all plant and machinery, accessories etc. Tie rod holes & holes due to jumpform arrangement are to be plugged/filled up with mortar and shuttering impression are to be made good.	SQM	102780	0.0915910	-	-
304	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm plan area) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.				-	-
a	Upto 150 mm depth	EACH	100	0.0218555	-	-
b	Pockets of depths more than 150mm and upto 300 mm depth	EACH	100	0.0395420	-	-
c	Pockets of depths more than 300mm and upto 600 mm depth	EACH	100	0.0744098	-	-
d	Pockets of depths more than 600mm and upto 1000 mm depth	EACH	10	0.1200158	-	-
e	Pockets of depths more than 1000mm and upto 1500 mm depth	EACH	10	0.1764864	-	-
400	**REINFORCEMENT WORK: Reinforcement work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling including cleaning, derusting, straightening, cutting, bending, binding in position with soft drawn annealed binding wire or tack welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement etc. at all level as per specification, drawings and as directed by engineer - in - charge including all plant and machinery, accessories etc.**				-	-
403	Transportation from BHEL stores, straightening, cutting, bending, placing in position at all level, binding in position of CRS/HCRM reinforcements of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer. **Note: CRS/HCRM Reinforcement Steel shall be supplied by BHEL and issued to contract as FOC (Free of Cost) Item.**				-	-
a)	For all works except shell and Piles	MT	2636	1.3784130	-	-
b)	For all works in shell	MT	3085	1.1625109	-	-
c)	Mild steel reinforcement bars **Note: supply of mild steel bars is in contractor's scope**	MT	50	7.8543388	-	-
500	**Roof Treatment works: Roof treatment works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, curing, sampling, testing etc at all level as per specification, drawings and as directed by engineer - in - charge.**				-	-
511	Providing and applying two coats of bitumen grade 85/25 as per IS 702 (@ 1.7kg/sqm) with 1% antistripping compound conforming to IS 6241 in foundation, wall, column etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	SQM	5680	0.0131386	-	-
600	**JOINTS AND FILLERS: Joints & fillers including all labour, material, equipment, transportation, handling etc at all level as per specification, drawings and as directed by engineer - in - charge.**				-	-
601	Supplying & installation of bitumen impregnated fibre board confirming to IS 1838 as joint filler at joints in concrete including nailing, coating of both faces with coal tar pitch/bitumen etc. all complete.				-	-
c	25 mm wide joints	SQM	220	0.0981603	-	-
603	Providing and applying polysulphide based sealant conforming to IS:12118 in joints in concrete including cleaning of joints, raking out groove, application of primer, scaffolding etc. all complete for following size grooves:				-	-
a	25mmX25mm	RM	3200	0.0669562	-	-
b	50mmX25mm	RM	50	0.1302487	-	-
A610	Providing and fixing PVC water stops in joints conforming to IS 12200 & IS 15058 all complete for the following: (Bulb type)				-	-
Ab	230 mm wide and 6 mm thick	RM	50	0.0409317	-	-
Ac	230 mm wide and 8 mm thick	RM	50	0.0541966	-	-
Ad	230 mm wide and 10 mm thick	RM	3200	0.0673352	-	-
700	**MS EMBEDMENTS: Embedments including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.**				-	-
701	Supply, fabricating and fixing of steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc. including welding, bolting, cutting, drilling, scaffolding, setting etc. all complete.	MT	3	9.0873431	-	-

ANNEXURE-I

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
702	Supply, Fabrication, transportation, delivery at site and erection, installation and alignment of steel foundation bolt assembly conforming to IS:2062 and grade 1 of IS:432 in concrete along with nuts, lock nuts (as per IS:1363, 1364 and IS:3138), washers, anchor plates, stiffener plates, protective tape, pipe sleeves, templates etc. including welding, cutting, grinding, threading, drilling etc. all complete.	MT	1	10.8683775	-	-
704	Supplying, fabricating, erecting and installing following items in concrete/brickwall for all kind of works, including setting material in concrete, layout, scaffolding, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete.				-	-
a	Steel pipes of all diameters	Kg	100	0.0073273	-	-
b	PVC pipes / conduits of all diameters	Kg	25	0.0392894	-	-
c	UPVC and/or GRP pipes / conduits of all diameters	Kg	25	0.0410580	-	-
Ae	Mechanical expansion fasteners, cold formed stud type having 3 way expansion sleeve of SS 316 grade approved for use in cracked concrete and seismic design with ETA C1/C2 approval or equivalent of safe tensile capacity as specified below for concrete work.				-	-
i	(SS.316) Candorr M6*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	0.0092854	-	-
ii	(SS.316) Candorr M8*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	0.0123806	-	-
iii	(SS.316) Candorr M10*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	0.0175602	-	-
iv	(SS.316) Candorr M12*125 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	100	0.0258981	-	-
800	**GROUTING: Grouting including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, roughening surface, cleaning, ramming, curing etc. at all level , drawings and as directed by engineer - in - charge.**				-	-
804	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with Conbextra GP-1 or equivalent as per specification, drawing and direction of engineer-in-charge. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	7	4.9514726	-	-
1300	**FINISHES TO CONCRETE / PLASTERED SURFACES: Finishes, painting to concrete, plastered surfaces including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, surface preparation, scaffolding etc. at all level as per specification, drawings and as directed by engineer - in - charge.**				-	-
A1310	Providing and applying **three coats of bituminous paint per IS:3384&IS:9862** on all surfaces in contact with water/moisture/soil/earth, including required scaffolding, cleaning and preparing the surface, etc complete as per specifications and as directed by the engineer				-	-
a)	For all internal and external surfaces of internal structure (except shell) and raker columns	Sq.M	70670	0.0288038	-	-
b)	For all internal suraces of shell	Sq.M	51160	0.0380261	-	-
A1312	Providing and applying waterproof cement paint of approved make and color on complete exterior surface of shell at all heights including cleaning and preparing the surface, material, labour, scaffolding, curing etc including primer coat complete as per specification and as directed by engineer-in-charge to give an even shade.	Sq.M	51620	0.0226135	-	-
A1313	Providing and applying to all underground water retaining/conveying system structures with plasticiser cum waterproofing cement additives conforming to IS: 9103 of 'SIKA', 'FOSROC' make and In addition, limits on permeability as given in contact with soil shall be provided with minimum two coats of bituminous painting of grade 85/25 conforming to IS:702 @ 1.7 kg/sqm (minimum) for water/damp proofing. including cleaning and preparing the surface, material, labour, scaffolding, curing etc including primer coat complete as per specification and as directed by engineer-in-charge to give an even shade.	Sq.M	50	0.0391630	-	-
1800	**MISCELLANEOUS: Miscellaneous works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. at all level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge.**				-	-
A1850	Providing and installing **FRP access door**, in shell with clear opening size of 1.2m x 2.1m, complete with all fittings and fixtures, locking arrangements, frames, fasteners, auto door closure, including the cost all labour, material and equipment, setting in place, grouting etc. complete as per drawing and specifications.	Each	2	9.6745362	-	-
A1872	Lettering with approved colour synthetic enamel paint including preparation of surface and painting work of base area for lettering on external face of NDCT at any height. Item includes for all tools & plants, staging, supporting, hanging platforms, safety arrangements, labours, materials etc. to complete the work in all respect.				-	-
a	Lettering "UPRVUNL" or similar (Letter size: height approx. 2M and distance between two letter shall be approx. 13M. lettering width, location and pattern (i.e horizontal or vertical) shall be as decided at site by Engineer in charge.	L.S.	2	40.0766841	-	-
2300	**STRUCTURAL WORKS: Structural steel works including all labour, material (unless otherwise specified in BOQ/contract specification), equipments unless otherwise specified, transportation, handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.**				-	-

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
A2301	Fabrication,erection and alignment of structural steel with mild steel rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, hangers, struts, monorails, stiffeners, brackets, stub columns, bracings, cleats, base plates, splice plates, chequered plate flooring, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc, connection design & preparation of fabrication drgs, collection of steel from stores, fabrication, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts, nuts and welds not payable), assembly, edge preparation, preheating (min preheat and interpass temperature of 20^{o} C for welding over 20 mm and upto 40 mm & 66^{o} C for welding over 40 mm and upto 63 mm & 110^{o} C for thickness over 63 mm & use of low hydrogen/ radiogenic electrodes), post heating, testing of welders, inspection of welds, visual inspection, non destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a separate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL. **Note: Structural steel for the above will be supplied by BHEL and issued as FOC (Free of Cost) item**	MT	2	2.9106988	-	-
A2302	Extra over ST No. A2301 for surface preparation by blast cleaning of steel structures as per IS:1477 (Part 1 and 2) and applying epoxy resin based zinc rich primer as per **IS:14589** in 2 coats, one at shop and second coat after erection, including touch-up painting etc all complete.	MT	2	0.4742519	-	-
A2305	Providing and applying two coats of epoxy paint with minimum 25 micron total dry film thickness (DFT) per coat of approved make and shade to achieve an even shade over steel sections already having primer coats and keeping overall DFT with primer not less than 115 microns including protection and cleaning, scaffolding etc. all complete.	MT	2	0.3625740	-	-
2307	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.				-	-
a	Minimum galvanisation of 900 g/sqm	MT	0.25	13.8711726	-	-
A2309	Extra over above ST NO. A2301 for finishing the structural steels, chequered plate, bolts, inserts etc. with hot double dipped galvanisation @ 9000 gm/sqm all complete.	MT	1	3.9861666	-	-
A2322	Supply, fabrication and fixing of MSHDG pipe hand railing (1300 mm high with two intermediate horizontal rails at 450 mm and 900 mm heights) of 32 mm dia (Medium/Heavy Grade) including transportation, loading/unloading, application of etching primer, epoxy painting etc. all complete..	MT	33	14.0548600	-	-
A2323	Supply, fabrication and fixing of MSHDG Cage Ladders conforming to IS: 3696 with Width - 600mm, ladder side flats - 60mm x 10 thk., Rungs - 20mm dia @ 300mm c/c., ladder stays @ 2.25m c/c, Circumferential cage rings @ 800c/c - 50mm x 6thk, Cage vertical flat - 50mm x 6 thk x 5 nos. The cage ladders shall be complete with all the necessary accessories, embedded parts, hardware, etc. as directed engineer and as per drawings including transportation, loading/unloading, painting etc. all complete..	MT	25	14.0548600	-	-
2600	**Site clearing and stripping works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. as per specification, drawings and as directed by engineer - in - charge.**				-	-
A2602	Earth work in stripping of top soil upto a maximum depth of 0.15m below ground level so as to exclude all debris, grass, vegetation, bushes, trees having girth upto 300 mm including roots and organic materials etc for leveling and grading including dressing to specified levels & grades and compacting the graded/stripped surface by manual/mechanical means, disposal of stripped materials within a lead upto 1km etc all complete as per specification, drawing and as directed by the engineer-in-charge.	Sq.M	25450	0.0011370	-	-
II	**MECHANICAL WORKS:**				-	-
A2329	Design, supply, fabrication, erection of stoplog gates, Sluice gates etc. with embedments required, lifting beams, special tools & plants, spare parts for three years, machining, casting, all materials such as structural steel, cast steel, stainless steel, brass used for seals, rubber seals, gears, ball and roller bearing, branch bushings, greasing, bolts, nuts, lugs, threaded fastners etc., cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc 750 gms/sqm., following by an application of etching primer and dipping in black bitumen as per B.S. 3416, erection along with a second stage concreting to true plumb and levels, submission of drawings / fabrication drawings for engineers approval etc all complete. The leakage through rubber seal shall not be more than 5 lit/min/metre length of seal under maximum head. **(Stoplog gate shall be designed as per IS:5620 and shall be of clear size 4m wide x 4m deep approx., minimum 8 thk skin plate in HDGS, SS316L seal plate, SS316L guide frame, EPDM side seal and SS 316 hardware)** **Note: Supply of structural steel is in the scope of contractor only.**	Sets	2	83.4203244	-	-

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
A2332	Design, Supplying, fabricating, erecting in position and testing / examining bolted and / or welded structural steel work for stationary screens made out of rolled sections and / or plates including cutting, straightening if required, edge preparation, bolting / welding of joints, cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc as 900 gms./sqm. followed by application of an etching primer and dipping in black bitumen as per BS 3416, etc all complete. **(SS304L Coarse screen of 4m x 4m approximate clear opening size fabricated out of minimum 6mm thick wire mesh of 16mm x 16mm apertures including SS316L guide frame and SS 316 hardware)** **Note: Supply of structural steel is in the scope of contractor only.**	Sets	3	50.4692938	-	-
A2333	Design, Supplying, fabricating, erecting in position and testing / examining bolted and / or welded structural steel work for stationary screens made out of rolled sections and / or plates including cutting, straightening if required, edge preparation, bolting / welding of joints, cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc as 900 gms./sqm. followed by application of an etching primer and dipping in black bitumen as per BS 3416, etc all complete. **(SS304L Fine screen of 4m x 4m approximate clear opening size fabricated out of minimum 6mm thick wire mesh of 12mm x 12mm apertures including SS316L guide frame and SS 304 hardware)** **Note: Supply of structural steel is in the scope of contractor only.**	Sets	3	71.1615324	-	-
21.6	Chain pulley block with trolley conforming to IS:3832 with load chain conforming to IS: 3109 complete with necessary accessories such as hooks, slings etc. with corrosion resistant hardware as per specifications and as directed or as per drawings				-	-
i)	3 Ton capacity with 15 m chain for Stop Log Gates as per specifications, drawings and as directed by engineer	Sets	1	2.6646033	-	-
ii)	2 Ton capacity with 15 m chain for Coarse Screens as per specifications, drawings and as directed by engineer	Sets	1	2.1783498	-	-
iii)	2 Ton capacity with 15 m chain for Fine Screens as per specifications, drawings and as directed by engineer	Sets	1	2.1783498	-	-
21.7	Providing & fixing handling Facilities on top of cooling tower including fabrication, erection complete with all the necessary accessories, hardware, etc. as per specifications, as directed by engineer and as per drawings				-	-
a	Swivelling type lifting arm complete with swivelling brackets, pins, etc. along with 250 mm diameter CS pulleys, and all the necessary hardware, etc. as per specifications, drawings and as directed by engineer	Sets	1	5.1731860	-	-
b	75 NB pipe inserts for top platform slab as per specifications, drawings and as directed by engineer	Sets	10	0.7923569	-	-
22	**PIPING AND VALVES**				-	-
22.1	Providing & fixing 300 NB flanged CI/MS pipe in Sludge Pit as per specifications, drawings and as directed by engineer	RM	20	0.8269720	-	-
22.2	Providing & fixing 300 NB double flanged Knife Edged Gate Valve in CI construction in Sludge Pit as per specifications, drawings and as directed by engineer	Sets	2	8.3983262	-	-
22.3	Providing & fixing Fabricated MS piping (20 thk of dia 3.8 m header and 2.8 m riser for hot water supply) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro-testing, etc. as per specifications, drawings and as directed by engineer	MT	250	18.4253298	-	-
22.4	Providing & fixing 2800 NB Double Flanged Moto Actuated Butterfly valves of approved make conforming to AWWA C-504 / BS: 5155 in CI construction with Rubber/Ebonite lining (for corrosion protection against Sea Water) with mating flanges, and complete accessories and Duplex SS Shaft and Duplex SS hardware as per specifications and data sheets including aligning, erecting, testing etc complete as per specifications, drawings and as directed by engineer	Sets	2	718.0072386	-	-
22.5	Providing & fixing Fabricated MS piping (12 thk of dia 1.2 m for by-pass line during commissioning) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro-testing, etc. as per specifications, drawings and as directed by engineer	MT	11	27.6004740	-	-
22.6	Providing & fixing 150 NB SS 304 drain nipple with suitable drain plug for flushing of HW ducts and complete with accessories and hardware as per specifications and data sheets including aligning, erecting, testing etc.	Sets	4	0.7923569	-	-
22.7	**FIXTURES ON PIPING**				-	-
a)	Providing & fixing 100 NB x 200 long MS heavy duty Stub connections as per IS: 1289 with isolating CI Ball Valves as per IS:9890 of flanged type for flow measurement in HW pipe and complete with accessories & HDGS hardware as per specifications and data sheets including aligning, erecting etc.	Sets	3	0.7963995	-	-
b)	Providing & fixing Dial type pressure guage of 150 mm dial size in GI material as per IS:3624 including stub connection with isolation CI Ball Valve as per IS:9890 and complete accessories, HDGS hardware as per specifications and data sheets including erecting, testing etc necessary for installing & operating the system	Sets	2	1.5264745	-	-
23	**PAINTING / PROTECTIVE COATING ON PIPING**				-	-

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
b	Surface preparation, providing & applying painting on outside surface of above-ground HW pipe as per specifications (2 coats of 35 micron DFT each Epoxy Primer followed by 2 finish coats of 35 micron DFT each High Build Epoxy Paint to achive a total DFT of 150 microns) and as directed with approved make and type of paints	Sq.M	1200	0.1647375	-	-
c	Surface preparation, providing & applying painting on inside surface of above-ground HW pipe as per specifications (2 coats of 35 micron DFT each Epoxy Primer followed by 2 finish coats of 35 micron DFT each High Build Epoxy Paint to achive a total DFT of 150 microns) and as directed with approved make and type of paints	Sq.M	1200	0.1647375	-	-
d	Surface preparation, providing & applying painting of steel surfaces as per specification with approved make and type of paints	Sq.M	800	0.1647375	-	-
26	**PUMP**				-	-
26.1	Providing & fixing Submersible Sludge Pumps of minimum 200 Cu.M/hr capacity @30MWC head, complete with associated 100m long discharge piping, valves and accessories up to nearest plant drain, including control panel as per specification & as directed	Sets	2	19.6860010	-	-
26.2	Providing and fixing tripod for handling sludge pump including 2T capacity chain pulley block with minimum 8m chain length along with pipe inserts as per sludge pit drawing for mounting the system	Sets	1	3.7830241	-	-
27	**Tests**				-	-
27.1	Thermal Performance Guarantee Test as per ATC-105 by Contractor (Class B Test with data collection system and logger)	LS	1	137.3474627	-	-
III	**ELECTRICAL & INSTRUMENTATION WORKS:**				-	-
1.0	**AVIATION WARNING LIGHT SYSTEM**				-	-
a	Providing & fixing Hi Intensity LED twin-type (double fixtures) white flashing Aviation Obstruction Lights as per ICAO, FAA and DGCA, India specifications. The fixtures shall be in corrosion resistant aluminum casting finished in stove enameled control gear suitable for 200/240V, 50Hz supply, complete as per specifications with all the necessary fixing accessories. Expected life is required to be more than 10 years.	Sets	8	87.0340631	-	-
b	Providing & fixing 1.5 m long SS 316 ISMC 100 with brackets/clamps, nuts and bolts for mounting the light fixtures as per drawings and/or manufacturer recommendations and as directed by engineer	Sets	8	0.7341177	-	-
c	Providing & fixing JBs with necessary brackets, bolts & nuts for cabling to the fixtures	Sets	12	0.7745440	-	-
d	Providing & fixing Aviation Lighting Panel cum Controller with Photoelectric light detectors to monitor north sky to control the aviation warning lights. The lights should be switched on when the ambient light goes below 35 candelas and should be swithced off when the intensity is more than 58 candelas. The AOLs should not swith off due to short time increase in sky light due to lightning flashes or any other short bursts of light. The detectors should be complete with all the accessories, hardware, etc. necessary for installation. The provision for Auto manual operation shall also be provided	Sets	1	27.2530598	-	-
e	Providing & fixing 250W HPSV well glass fixture with built in capacitor/ballast and controller with IP:55 protection along with 3 m pole for staircase lighting as per specification and/or as directed by engineer	Sets	110	10.6738256	-	-
f	**Cables:**				-	-
	All cables shall be 1.1 KV grade, PVC inner heathed, FRLS-HRPVC insulated, armoured PVC outer sheathed copper cable conforming to IS:1554 part-I and including lugs etc. and subject to BHEL approval. The cables shall be clamped to Cage Ladders at every 750 c/c along its run and will include all the hard ware requied for its fixing and terminations, etc. The Junction/Terminal boxes should be provided as and where required during erection and/or as directed by engineer				-	-
i	Providing & fixing power Cable for Receptacless: 4Cx10sq.mm AL	RMT	445	0.1176155	-	-
ii	Providing & fixing 4C x 6 sq.mm Copper cable for power supply from AOLP to AOL JBs & Staircase Lighting	RMT	834	0.1806554	-	-
iii	Providing & fixing 3C x 2.5 Sq.mm copper cable for local connection from local Junction box to aviation warning lights	RMT	40	0.0927280	-	-
iv.	40 dia PVC Conduits for cables	RMT	700	0.0117489	-	-
g	Providing & fixing 240V x 15 & 63A single phase 3-pin outdoor, weather proof, industrial type switch- -socket outlets with inter-lock switches and fitted with metal cap as per specifications, drawings and as directed by engineer	Sets	5	1.0440111	-	-
h	Providing & fixing weather & dust proof (IP-55) 200 mm x 150mm x 100mm deep junction box (2/3/4 way) made out of 2mm thk G.S. with ELMEX type terminals, glands etc. complete as per specifications, drawings and as directed by engineer	Sets	110	0.2645401	-	-
i	Providing & fixing 415 V Lighting Distribution Board fabricated from 2 thk sheet steel, dust and vermin proof and removable gland plates at top and bottom with ELMEX type connectors and with suitable earthing including 2 nos. 63A TPN incomers, HRC fuses and 2 nos. 63A, 4 nos. 16 A outgoing connections with HRC fuses. Two incomers from CWPH will have to be connected to this LDB by the contractor. Automatic change over with suitable delay timers with Auto/Manual operation will have to be provided The DB shall be designed for 50 KVA Fault Level and must also include a transformer of 100 KVA rating	Sets	1	33.5053773	-	-
j	Providing & fixing Temporary aviation warning lights as per specifications, during construction, once the costruction reaches beyond 50m level from general ground level as per specifications, drawings and as directed by engineer	LS	1	14.6781841	-	-
2.0	**LIGHTNING PROTECTION SYSTEM conforming to IS: 2309**				-	-
a	Providing & fixing Air terminator / Lightning arrestor made of 20mm dia. x 2.0m ht Cu rod with pointed end and welded to base plate for fixing on top platform complete as per specifications and as directed by Engineer	Sets	15	1.3369759	-	-

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
b	Providing & fixing of 75 x 10 thk GI flat Coronal band connecting all air terminator on one side and to the down conductor on the lower side as per specifcation complete with all the necessary fixtures, hardware, etc. required for installation. The clamps used shall be GI and heavy duty and shall be fixed approx 1m below the top of the cooling tower and clamped at the spacing not more than 750 mm C/C	RMT	301	0.0765574	-	-
c	Providing & fixing of 75 x 10 thk GI flat Down conductor complete with all the necessary fixtures, hardware, etc. required for installation. The down conductors on the top shall be connected to the coronal band and on the lower side they shall be connected to the test links. The clamping shall be at 750 mm C/C with heavy duty GI clamps. The down conductors shall be in one piece as far as possible. The necessary joints shall be of fully welded type and not bolted type exept at the test link. These conductors shall be laid over the concrete surface so that visual inspection and repair, if necessary during maintenace is possible	RMT	3053	0.0765574	-	-
d	Providing & fixing 75x10 thk GS flat Test links (complete assembly) with enclosure anchored to Raker column as directed by engineer	Sets	15	0.7514252	-	-
e	Providing & fixing 4.5 m long, Dia. 40mm MS rod buried down conductor as per specifications and as directed by engineer	Sets	15	0.5924990	-	-
f	Providing & fixing 100 dia. x 1.5m Class-1 grade PVC pipe to be filled with PCC after enclosing down conductor below test link (approx. 10m length) as per specifications, drawings and as directed by engineer	Sets	15	0.9016344	-	-
2.1	**EARTHING conforming to IS :3043**				-	-
a	Providing & fixing of Earth conductor made out of 40 mm Dia. MS round bar complete with all the necessary fixtures, hardware, etc. required for installation shall be supplied and installed between test link on one side and to the earth mat on the other side as per specifications, drawings and as directed by engineer	RMT	100	0.1032136	-	-
b	Providing & fixing 70x10 thk GS flat coronal band on top platform cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	RMT	301	0.0765574	-	-
c	Providing & fixing 70x10 thk GS flat down conductors from top platform to earth mat, cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	408	0.0760521	-	-
d	Laying of Earthing Mat (Main Grounding Conductor @ 1m below FGL approx. at about 6 m outside the NDCT periphery), transportation from yard stores, loading, unloading, cutting to length, welding, protective painting of joints etc. all complete. (Excavation & Back filling shall be paid separately under respective item of earth work. **Note: Earthing mats/rods shall be supplied by BHEL free of cost.**	RMT	502	0.0915910	-	-
e	Construction of Treated Earthing pit as per drawing with charcoal & salt, GI pipes (40 dia, 3 m long) as per IS- 3043, earth electrodes, GI wire, GI strips, brick chamber with covers including associated earthwork etc. all complete. **Note: Material for GI pipes, earth electrodes, GI wire, GI strips shall be supplied by BHEL free of cost.**	Sets	5	2.0444374	-	-
f	Providing & fixing Dia. 40mm MS rod buried grounding inter connector between cooling towers and to nearest main plant grounding mat as per specifications, drawings and as directed by engineer	RMT	200	0.1029609	-	-
g	Providing & fixing 25x6mm thk GS flat for cage ladders, hand rails and all non-current carrying metal parts as per specifications, drawings and as directed by engineer	RMT	65	0.0149072	-	-
h	Providing & fixing 50x6 thk GS flat for non-metal parts such as basin, CWC, drain box etc. and cable trays as per specifications, drawings and as directed by engineer	RMT	100	0.0272878	-	-
i	Providing & fixing 25x3mm thk.GS flat for control panels (AWL) as per specifications, drawings and as directed by engineer	RMT	10	0.0099803	-	-
j	Providing & fixing 8 SWG GI wire for Junction boxes / pull boxes, receptacles, conduits etc. as per specifications, drawings and as directed by engineer	RMT	25	0.0007580	-	-
2.2	**Temporary lightning protection system**				-	-
a	Providing & fixing of Temporary lightning protection system during construction as per specifications, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	LS	1	4.9809081	-	-
b	Conducting tests on circuit as per specifications, drawings and as directed by engineer	LS	1	7.2049902	-	-
3.0	**INSTRUMENTATION**			-	-	-
a	Providing & fixing SS Thermowells complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	4	1.0373154	-	-
b	Providing & fixing SS Temperature Guages complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	2	2.1146783	-	-
c	Providing & fixing SS Pressure Gauges complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	2	1.8397789	-	-
d	Providing & fixing of 3-hole type Pitot Tube procured from IIT Delhi, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	1	55.4115441	-	-
e	Providing & fixing SS Level Switches in Sludge Pit complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	1	3.0677300	-	-

ANNEXURE-I

BOQ CUM RATE SCHEDULE FOR NDCT FOR 1X660 MW PANKI TPS

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

SL. NO.	DESCRIPTION OF ITEM	UNIT	QTY	Factor (F)	RATE (Rs.) = FACTOR (F) * A / 100000 (Rounded off to two place after decimal)	AMOUNT (Rs.) = RATE *QUANTITY
f	Providing & fixing rotating type Anemometer for wind speed measurement as per specifications, drawings and as directed by engineer	Sets	1	2.2455586	-	-
g	Providing & fixing Mechanically Aspirated Psychrometer for wetbulb temparature measurement as per specifications, drawings and as directed by engineer	Sets	1	42.2805531	-	-
IV	**THERMO-HYDRAULIC ITEMS:**				-	-
24	**FILLS AND FILLS SUPPORTING ARRANGEMENT**	LS	1	22,506.1403350	-	-
25	**DISTRIBUTION SYSTEM AND SUPPORTING ARRANGEMENT**	LS	1	8,314.9179697	-	-
	GRAND TOTAL AMOUNT (INR) 'A'					**-**

Notes:

1	Bidder's quoted price above shall be complete in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.
2	Contractor shall fully understand description and Specifications of items mentioned in BOQ CUM RATE SCHEDULE.
3	Conditional price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.
4	Quantities mentioned in BOQ CUM RATE SCHEDULE are approximate only and liable for variation on either side depending upon site / design requirement. The tentative contract value (CV) of entire scope of work shall be calculated as per finally quoted / accepted rates & the Quantities indicated in BOQ CUM RATE SCHEDULE.
5	Contractor's total quoted price as per rate schedule will be taken as tentative only. The contractor undertakes to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same.
6	In case of any mis-match in rate and amount on price discrepency, the same will be dealt as per clause no. 1.4 of GCC.
7	Taxes (GST) shall be payable extra as per relevant clauses in Technical Conditions of Contract.

Annexure-II

NAME OF WORK: CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, C&I WORK OF NATURAL DRAUGHT COOLING TOWER (NDCT) INCLUDING SUPPLY OF MATERIALS (EXCLUDING CEMENT, STRUCTURAL STEEL & REINFORCEMENT STEEL FOR CIVIL WORKS), LABOUR, TOOLS AND PLANTS ETC., REQUIRED FOR 1X660 MW PANKI THERMAL POWER STATION, PANKI, KANPUR, U.P.

(Approximate quantities of Thermo-hydraulic components based on BHEL design)

24	**FILLS**	Unit	Quantity
24.1	Providing & fixing UV stabilized PVC V Bars (85 mm bottom width x 42.5 mm height as shown in GA drwg) manufactured from virgin material of approved make in light greay/white/cream colour with 1.5 mm minimum uniform thickness and meeting the requirements of CTI code STD-136, including cutting, hoisiting, erection, etc. complete as per specification , data sheet and as directed by engineer	RMT	2412534
24.2	Providing & fixing SS316L Weld Mesh - (Top 2.4m 100 x 100 Mesh and Balance 2.8m with 200 x 100 Mesh) with 2.5 thk Vertical Wires x 2.5 thk Horizontal Wires, including cutting, hoisiting, erection, etc. complete as per specification , data sheet and as directed by engineer	Sq.M	91705
24.3	Providing & fixing SS 316 Sleeves with Bolts & Nuts for fastening SS weld mesh assembly to RCC beams, including hoisiting, erection, etc. complete as per specification , data sheet and as directed by engineer	Sets	70542
24.4	Providing & fixing PP Clips and SS 316 Tying Wire for fastening PVC Bars to weld mesh assembl, including hoisiting, erection, etc. complete as per specification , data sheet and as directed by engineer	Sets	2680594
24.5	Providing & fixing 14 SWG SS 316 Binding Wire for tying adjecent weld mesh assemblies and also to tying bottom of all weld meshes to RCC beams to result in a rigid assmebly, including cutting, hoisiting, erection, etc. complete as per specification , data sheet and as directed by engineer	RMT	8500
24.6	20 mm wide x 1 mm thk SS316 Straps with Clips for fixing pipes to RCC Beams	MT	2.51
25	**DISTRIBUTION SYSTEM**		
25.1	Providing & fixing OD 250, 225, 200 & 180 PVC pipes of 3 kg/cm2 Pr. Rating as per AWWA C 950 with spigot end including drilling of holes for fixing nozzles, hoisting, grouting in RCC ducts, erecting, jointing with required accessories, testing, etc. complete as per specification and as directed for the full functionality of the system	RM	14108
25.2	Providing & fixing PVC Puddle Pipes suitable for OD 250, 225, 160 & 110 pipes, in RCC Ducts. The puddle pipes shall be of same class as of the pipes. Accessories as required for jointing as per manufacturer's recommondation and as directed by engineer shall be included	Sets	516
25.3	Providing & fixing End caps with glue and additional rivets, if necessary for OD 250, 225, 200 & 180 PVC pipes of same class rating as of the pipes, including accessories required for jointing as per manufacturer's recommondation and as directed by engineer	Sets	516
25.4	Providing & fixing Polypropylene Nozzles of down-spray type with solid-conical or solid-square spray pattern and of capacity and pressure head as per specifications, complete with all the necessary hardware required for fastening the nozzles to the PVC pipes including accessories, hardware, etc. as per specification & as directed. Several nozzle discharge diameters as per drawing shall be included	Sets	15676
25.5	Providing & fixing PVC drift eliminators (wave shaped - 3 pass type (SPECTRA MODEL or equivalent with 77 mm pitch for low pressure drop) with necessary spacers, etc., to meet drift loss stipulation of 0.01% as per specification & as directed by engineer	Sq.M	9500