

E-TENDER SPECIFICATION

S. No.	E- TENDER SPECIFICATION NUMBER
01	BHE/PW/PUR/KKRN-CNI U#4/2321

FOR

HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, CHECKING OF CALIBRATION, TESTING, COMMISSIONING AND HANDING OVER OF CONTROL & INSTRUMENTATION WORKS FOR TURBINE, GENERATOR AND ITS AUXILIARIES, FOR 2x700 MWe NPCIL KAKRAPAR ATOMIC POWER PROJECT UNIT #4 AT NPCIL (NUCLEAR POWER CORPORATION OF INDIA) KAKRAPAR ATOMIC POWER PROJECT KAKRAPAR, DISTRICT: SURAT GUJARAT.

VOLUME I – TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	Technical Conditions of Contract
Volume-IB	Special conditions of Contract
Volume-IC	General conditions of Contract
Volume-ID	Forms & Procedures
Volume-I-E	Guideline for selection of NDE and Heat Treatment Agencies at site
Volume II	Price Bid



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

CONTENTS		
Volume No	Description	Hosted in website bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled
NIL	Tender Specification Issue Details	(Part of <u>Vol-IA-2321</u>)
NIL	Notice Inviting Tender	(Part of <u>Vol-IA-2321</u>)
I-A	Technical Conditions of Contract	Vol-I-A-2321
I-B	Special Conditions of Contract	Vol-I-BCD-2321
I-C	General Conditions of Contract	(Part of Vol-I-BCD-2321)
I-D	Forms & Procedures	(Part of Vol-I-BCD-2321)
I-E	Guideline for selection of NDE and Heat Treatment Agencies at site	Vol-I-E-2321p
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-2321

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01	BHE/PW/PUR/KKRN-CNI U#4/2321

FOR

HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, CHECKING OF CALIBRATION, TESTING, COMMISSIONING AND HANDING OVER OF CONTROL & INSTRUMENTATION WORKS FOR TURBINE, GENERATOR AND ITS AUXILIARIES, FOR 2x700 MWe NPCIL KAKRAPAR ATOMIC POWER PROJECT UNIT #4 **AT NPCIL (NUCLEAR POWER CORPORATION OF INDIA) KAKRAPAR ATOMIC POWER PROJECT KAKRAPAR, DISTRICT: SURAT GUJARAT.**

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR Refer Notice Inviting Tender
TENDER SUBMISSION

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

M/s.

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PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

AGM (Purchase)

Place: Nagpur

Date:

2321

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



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Date: 21/10/2020

NOTICE INVITING TENDER (NIT)
NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

To,

Dear Sir/Madam,

Sub : NOTICE INVITING E-TENDER

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

1.0 Salient Features of NIT

S No.	ISSUE	DESCRIPTION
i	TENDER NUMBER	BHE/PW/PUR/KKRN-CNI U#4/2321
ii	Broad Scope of job	HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, CHECKING OF CALIBRATION, TESTING, COMMISSIONING AND HANDING OVER OF CONTROL & INSTRUMENTATION WORKS FOR TURBINE, GENERATOR AND ITS AUXILIARIES, FOR 2x700 MWe NPCIL KAKRAPAR ATOMIC POWER PROJECT UNIT #4 AT NPCIL (NUCLEAR POWER CORPORATION OF INDIA) KAKRAPAR ATOMIC POWER PROJECT KAKRAPAR, DISTRICT: SURAT GUJARAT.
iii	DETAILS OF TENDER DOCUMENT	
A	Volume-IA	<i>Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.</i> Applicable
B	Volume-IB	<i>Special Conditions of Contract (SCC)</i> Applicable
C	Volume-IC	<i>General Conditions of Contract (GCC)</i> Applicable
D	Volume-ID	<i>Forms and Procedures</i> Applicable
E	Volume-IE	<i>Guideline for selection of NDE and Heat Treatment Agencies at site</i> Applicable
F	Volume-II	<i>Price Schedule (Absolute value).</i> Applicable
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL website (www.bhel.com) or e-procurement portal (https://bhel.abcprocure.com) as per schedule below: <i>Start : 21/10/2020 ,</i> <i>Closes: 05/11/2020 , Time : 15:00</i> Applicable

Registered Office: BHEL House, Siri Fort, New Delhi – 110 049, India
Website: www.bhel.com

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S No.	ISSUE	DESCRIPTION	
		Brief information of the tenders shall also be available at central public procurement portal. (https://eprocure.gov.in/epublish/app)	
v	DUE DATE & TIME OF OFFER SUBMISSION	Date: 05/11/2020, Time: 15.00 Hrs Place: on E-Tender Portal https://bhel.abcpocure.com	<i>Applicable</i>
vi	OPENING OF TENDER (Techno-Commercial Bid)	Date: 05/11/2020, Time: 16.00 Hrs (within 2 hours of the latest due date and time of offer submission). Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.	<i>Applicable</i>
vii	EMD AMOUNT	Rs 2,83,785/-/- (Rupees Two Lakhs Eighty Three Thousand Seven Hundred Eighty Five Only) Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.	<i>Applicable</i>
viii	COST OF TENDER	<i>Free</i>	
ix	LAST DATE FOR SEEKING CLARIFICATION	One day before due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: P R Chiwarkar Designation:AGM Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Phone: Landline: +91-712-2858-633 Mob: +91-9422805222 Email :prchiwarkar@bhel.in Fax:+91-712-2858600 2) Name: Shivkesh Meena Designation:Dy Manager Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Phone: Land Line: +91-712-2858715 Mob: 9049590486 Email :svm@bhel.in Fax:+91-712-2858600	<i>Applicable</i>
x	SCHEDULE OF Pre Bid Discussion (PBD)		<i>Not Applicable</i>

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

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

3.0 Not Used

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

For Electronic Fund Transfer the details are as below:-

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

(Note :- In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

5.0 Procedure for Submission of Tenders:

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

Registered Office: BHEL House, Siri Fort, New Delhi – 110 049, India
Website: www.bhel.com

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Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

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

b. Price Bid:

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

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 E-Procurement Technologies Limited Helpdesk Contacts:

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

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

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.

Please refer <http://www.mca.gov.in/> → MCA SERVICES → DSC SERVICES for DSC certifying authorities.

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

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

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

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

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

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

	PART-II	
	PRICE BID consisting of the following shall be enclosed	
	<u>ENVELOPE-III</u>	

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

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

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

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

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

9.0 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:

- 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

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'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 I))

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

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

- a) $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ 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 = P_T (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
- 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 ' T_T ' for total similar Packages ' P_T ' for all Regions (i.e. $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
- c) Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5} \dots S_{1-T_1}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (i.e. $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-T_1}$). 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 ' P_T ' for all Regions (i.e. ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$ ')

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- 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

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

- 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 = 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) = T _T
3	Monthly performance scores for the corresponding period (as in Row 2)	S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , ... S _{1-T1}	S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , ... S _{2-T2}	S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , ... S _{3-T3}	S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , ... S _{4-T4}	S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , ... S _{5-T5}		S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , .. S _{N-TN}	-----

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Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
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) $= S_T$

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

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

- 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
- 12 months preceding and including the cut-off month
- 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	$> 60 \text{ and } \leq 65$	0.4
3	$> 65 \text{ and } \leq 70$	0.35
4	$> 70 \text{ and } \leq 75$	0.25
5	$> 75 \text{ and } < 80$	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:

- 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
- For $R_{BHEL} = 60$, $P_{Max} = '1'$
- For $R_{BHEL} \geq 80$, there will be no upper limit on P_{Max}

The Bidder shall be considered 'Qualified' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$

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(Where P is calculated as per clause 'I' above)

IV. Explanatory note:

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

ii). Identified Packages (Unit wise)

Table-1

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

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

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

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

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding

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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 minimum no. of bidders required for conducting RA as per extant RA Guidelines, 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 minimum no. of bidders required for conducting RA as per extant RA Guidelines, 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 minimum no. of bidders required for conducting RA as per extant RA Guidelines, 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 minimum no. of bidders required for conducting RA as per extant RA Guidelines, 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

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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 as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work.

- 10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail and/or through e-procurement portal, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

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- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Void
- 16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 **Reverse Auction.:** "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com on "supplier registration page".) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.
- Price Bids of all the techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 ~~Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre-Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:~~

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- ~~23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement for the said contract with a validity period of six months initially. In case bidder becomes L1, Consortium Agreement valid till contractual completion period shall be submitted to BHEL before signing the contract. Consortium Agreement shall be kept valid till scope of work awarded to consortium partner(s) as per contract is completed.~~
- ~~23.2 ‘Standalone’ bidder cannot become a ‘Prime Bidder’ or a ‘Consortium bidder’ or ‘Technical Tie up bidder’ in a consortium (or Technical Tie up) bidding. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non-compliance, consortium bids of such Prime bidders will be rejected.~~
- ~~23.3 Number of partners for a Consortium Bidding (or Technical Tie up) including Prime Bidder shall be NOT more than 3 (three).~~
- ~~23.4 Prime Bidder shall be as specified in the Pre-Qualification Requirement, else the bidder who has the major share of work.~~
- ~~23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical ‘Pre Qualifying Requirements’ specified for the respective package, (ii) ‘Assessment of Capacity of Bidder’ as specified in clause 9.0.~~
- ~~23.6 Prime Bidder shall comply with additional ‘Technical’ criteria of PQR as defined in ‘Explanatory Notes for the PQR’.~~
- ~~23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified~~
- ~~23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.~~
- ~~23.9 Prime Bidder shall be responsible for the overall execution of the contract.~~
- ~~23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats.~~
- ~~23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL and BHEL shall take necessary action as per extant guidelines. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.~~
- ~~23.12 In case Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL’s interest in the Project /~~

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~~Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL.~~

~~23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of one work with a consortium partner under direct order of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~

~~23.14 The consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 0.5% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. However, Prime Bidder has also option for submission of SD on behalf of consortium partner (s).~~

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

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

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

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

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

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

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

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

28.1.1 **Commitment by BHEL:**

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

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

- (i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
- (ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
- (iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

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

29.0 Micro and Small Enterprises (MSE)

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

Type under MSE	SC/ST-owned	Women-owned	Others (excluding SC/ ST & Women Owned)
Micro			
Small			

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

- a) MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011 MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM-II Certificate along with attested copy of a CA certificate (format enclosed as Annexure — 3) where deemed validity of EM-II certificate of five years has expired applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission.

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~~Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits.~~

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

31.0 PREFERENCE TO MAKE IN INDIA:

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

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

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

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

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

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

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

35.0 Order of Precedence:

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

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

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

For BHARAT HEAVY ELECTRICALS LTD

(Addl. General Manager - Purchase)

Enclosure:

01. Annexure-1: Pre Qualifying Requirements.
02. Annexure-2: Check List.
- ~~03. Annexure-3: Certificate by Chartered Accountant~~ Not Applicable
04. Annexure-4: Reverse Auction Process Compliance Form
05. Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
06. Annexure-6: RA Price Confirmation and Breakup
- ~~07. Annexure-7: Integrity Pact~~
08. Annexure-8: Undertaking as per C4 of Annexure-1 i.e. PQR
09. Annexure-9: Declaration reg. Related Firms & their areas of Activities (x) Other Tender documents as per this NIT.
010. Annexure-10: In-line with Department of Expenditure's (DoE) Public Procurement Division Order vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020
011. Annexure 11: Important information.

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ANNEXURE - 1

PRE QUALIFYING CRITERIA

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JOB	HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, CHECKING OF CALIBRATION, TESTING, COMMISSIONING AND HANDING OVER OF CONTROL & INSTRUMENTATION WORKS FOR TURBINE, GENERATOR AND ITS AUXILIARIES, FOR 2x700 MWe NPCIL KAKRAPAR ATOMIC POWER PROJECT UNIT #4 AT NPCIL (NUCLEAR POWER CORPORATION OF INDIA) KAKRAPAR ATOMIC POWER PROJECT KAKRAPAR, DISTRICT: SURAT GUJARAT.

S No	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	
		Applicability	
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium /Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	Not Applicable	
B	<u>TECHNICAL PQR:</u> Bidder shall essentially meet all the Qualifying Requirements (i.e. B.1 & B.2) as under, in the last seven years as on latest date of bid submission: <u>B.1: Bidder should have executed “Electrical Work(s)” OR “Control & Instrumentation (C&I) work(s)” OR “Electrical and (Control & Instrumentation (C&I)) work(s)” for any one of the following in the last seven years from latest date of bid submission:</u> B.1.1) Executed One work of value not less than Rs 113.51 Lakhs against single work order. OR	Applicable	

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	B.1.2) Executed Two works each of value not less than Rs 70.94 Lakhs against maximum two work orders. OR B.1.3) Executed Three works each of value not less than Rs 56.75 Lakhs against maximum three work orders. AND B.2) Bidder must meet any of the following: B 2.1) Executed “C&I works for BTG/GT” or “C&I works consisting of DCS/DDC/Station C&I” in one unit of 190 MW or above. OR B.2.2) Executed at least one contract of C&I works consisting of DCS/DDC/Station C&I in any industry with its executed value of Rs 190 Lakhs or more.		
C-1	<u>Financial TURNOVER</u> Bidders must have achieved an average annual financial turnover (audited) of Rs 42.56 Lakhs or more over last three Financial Years (FY) i.e. ‘2016-17, 2017-18 & 2018-19’ OR ‘2017-18, 2018-19 & 2019-20’ *To consider last three financial years as ‘2016-17, 2017-18 & 2018-19’, bidder must provide a declaration that they do not have financial (audited) statements for FY 2019-20.	Applicable	
C-2	<u>NETWORTH</u> (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for ‘C-1’ above should be positive.	Applicable	
C-3	<u>PROFIT</u> Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three Financial Years defined in ‘C-1’ above based on latest Audited Accounts	Applicable	
C-4	Bidder must not be under Insolvency Resolution Process or Liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating	Applicable	

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	authority/authorities, which will render him ineligible for participation in this tender, and shall submit undertaking (Annexure-8) to this effect.		
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable). The "Assessment of Capacity of Bidders" for this Tender shall be carried out by considering the identified similar package as "C&I".	Applicable	BY BHEL
E	Approval of Customer (if applicable) Note: Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval	Not Applicable	BY BHEL
F	Price Bid Opening Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
G	Consortium tie-ups	Not Applicable	

Explanatory Notes for the PQR (Unless otherwise specified in the PQR):

- Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above along with all annexures
- In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years i.e. total divided by three.
- C-2:-NETWORTH : Shall be calculated based on the latest Audited Accounts as furnished for C-1 above. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)
- C-3:- PROFIT : Shall be PBT earned during any one of the three financial years as in C-1 above.
- For PQR B.1: The evaluation currency for this tender shall be INR.
- For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria B1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
 - The parent company shall have a controlling stake of $\geq 50\%$ in the subsidiary company (as per Format-1).
 - The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value
 - The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
 - In case Bidder is submitting bid as a Consortium Partner, option of utilizing experience of parent/subsidiary Company can be availed by Prime Bidder only.

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5. Parent Company/ Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder' or as a 'Consortium bidder'.
7. Completion date for achievement of the technical criteria specified in the Technical criteria of PQR (as in 'B' above) should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work.
8. 'EXECUTED' means the bidder should have achieved the criteria specified in the Technical criteria of PQR (as in 'B' above) even if the Contract has not been completed or closed.
9. Unless otherwise specified, for the purpose of 'Technical' criteria of PQR (as in 'B' above), the word 'EXECUTED' means:
 1. "BOILER LIGHT UP" in respect of Boiler/CFBC/ ESP
 2. "SYNCHRONISATION" in respect of STG/GTG and 'SPINNING' in case of HTG
 3. "STEAM BLOWING" in respect of of Power Cycle Piping
 4. "HYDRAULIC TEST/ ANY OTHER EQUIVALENT TEST LIKE "100% RT/UT OF WELDED JOINTS"" of the system in respect of Pressure parts / LP Piping/ CW Piping.
 5. "CHARGING" in respect of Power Transformers/ Bus Ducts, "HT/LT switchgears", "HT/LT Cabling".
 6. Achievement of physical Quantities as per respective PQRs in respect of Civil, Structures, Piling, CHP Civil, AHP Civil and RCC Silo Works.
 7. Readiness for Coal Filling" of at least one Bunker in respect of Mill Bunker Structure Work.
 8. "CHARGING OF ATLEAST ONE PASS" in respect of ESP(R&M)
 9. "GAS IN" in respect of FGD
 10. For C&I works: "SYNCHRONISATION" in case of power project / "WORK EXECUTION of the value as defined in PQR" in case of industry.
10. Boiler means HRSG or WHRB or any other types of Steam Generator
11. Critical/Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.
12. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating in terms of MW shall be considered for evaluation.
13. In case the experience/POWO certificate enclosed by bidders do not have separate break up prices for the E&C portion of Electrical and CI Works, (i.e. the certificates enclosed are for composite order for supply and erection of Electrical & CI and other works if any), then value of Erection and Commissioning for the Electrical & CI portion shall be considered as 15% of the supply & erection of Electrical & CI, unless otherwise specifically indicated in the PQR.

Explanatory Notes for QR 'B1 and B.2.2'

- For QR 'B1' above, actual executed value shall be considered.
- For QR 'B1' 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-

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

Where

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- P = Updated value of work
R = Value of executed work
 X_N = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).
 X_0 = All India Avg. Consumer Price index for industrial workers for last month of work execution.
 Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).
 Y_0 = Monthly Whole Sale Price Index for All Commodities for last month of work execution.

a. Relevant documents, meeting above requirements at C & D, shall be submitted by bidders

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

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

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Format-1

Format-1

Certificate for relationship between Parent Company / Subsidiary Company and the bidder

To,

.....
.....

Dear Sir,

Sub: Bid for NIT Nodated..... for "....." (name of the tender).

We hereby certify that M/s..... is Parent Company/ Subsidiary Company of M/s.....(the bidder) and details of equity holding of the Parent Company in Subsidiary Company as on(not earlier than seven days prior to the Bid Submission Date) are given as below:

Name of Parent Company	Name of Subsidiary Company	Percentage of Equity Holding of Parent Company in Subsidiary Company

(Insert Name and Signature of Statutory Auditor or practicing Company Secretary of the Bidder)

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Format-2

Format-2

Undertaking from the Parent Company/ Subsidiary Company of the bidder

(On the Letter Head of Parent Company/ Subsidiary Company, as applicable)

From,
Name:
Full Address:

Telephone No.:
E-mail address:
Fax/No.:

To,

Dear Sir,

We refer to the NIT No dated for "....." (name of the Tender).

"We have carefully read and examined in detail the NIT/Tender Terms and Conditions, including in particular, Clause of the NIT/Tender, regarding submission of an Undertaking, as per the prescribed Format 1 of the NIT/ Tender.

We confirm that M/s.....(the Bidder) has been authorized by us to use our Technical capability for meeting the Technical Criteria as specified in Clause.....of the PQR of the NIT/Tender referred above.

We agree to submit the Security Deposit equivalent to 1% of the total contract value in addition to Security Deposit to be submitted by Bidder as per Clause.....of the NIT/Tender for fulfillment of all obligations in terms of provisions of the contract, in the event of(the Bidder) being selected as the Successful Bidder.

We confirm that we along with M/s.....(the bidder), are jointly or severally responsible for successful performance of the contract.

We confirm that our company shall not participate in the above tender as a 'Standalone Bidder' or as a 'Consortium bidder' and also shall not authorize any other bidder to use our Technical capability for the above tender.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the referred NIT/Tender.

Signature of Managing Director/Authorized signatory of Parent/ Subsidiary Company

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ANNEXURE - 2

CHECK LIST

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

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

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

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

DATE :

AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

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ANNEXURE-3

Certificate by Chartered Accountant on letter head

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

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

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

1. ~~For Manufacturing Enterprises:~~ Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:
Rs..... Lacs
2. ~~For Service Enterprises:~~ Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the ~~MSMED Act, 2006~~:
Rs..... Lacs
3. ~~For Enterprises~~ (having EM II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)
4. ~~For Enterprises~~ (having EM II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)

~~(Strike off whichever is not applicable)~~

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

~~Or~~

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

~~Or~~

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

~~Date:~~

~~(Signature)~~

~~Name:~~

~~Membership Number:~~

~~Seal of the Chartered Accountant~~

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ANNEXURE-4

Reverse Auction Process Compliance Form

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

To

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

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no.{ BHE/PW/PUR/KKRN-CNI U#4/2321} dt. {.....}

This letter is to confirm that:

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

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

With regards

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

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

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ANNEXURE – 5

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

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

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.....
ANNEXURE – 6

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

To

- M/s. Service provider
- Postal address

CC: M/s BHEL

{Unit-
Address-}

Sub: Final price quoted during Reverse Auction and price breakup

Dear Sir,

We confirm that we have quoted.

Rs.{____in value & in words____} for item(s) covered under tender enquiry No. {
BHE/PW/PUR/KKRN-CNI U#4/2321} dt.{...}

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

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

The price break-up is as given below.

Total

=====

- Rs. in value & in words

=====

Yours sincerely,

For _____

Name:

Company:

Date:

Seal:

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ANNEXURE – 7

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____. 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

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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.

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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.

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- 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.

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.....
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)

Place-----

Date-----

Witness: _____

(Name & Address) _____

For & On behalf of the Bidder/

Contractor

(Office Seal)

Witness: _____

(Name & Address) _____

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ANNEXURE – 8

UNDERTAKING

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

To,

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

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: BHE/PW/PUR/KKRN-CNI U#4/2321

I/We,

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

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

Place:

Date:

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Annexure-9

DECLARATION

To

Date: _____

BHEL, _____

Email:

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

Dear Sir/ Madam,

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

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

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

Regards,

(_____)

From:
Supplier Code:
Address:

M/s _____

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Annexure-10

(To be submitted in the bidder's letter head)

In-line with Department of Expenditure's (DoE) Public Procurement Division Order vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020

Tender no

Job:

"I/ we have read the clauses pertaining to Department of Expenditure's (DoE) Public Procurement Division Order (Public procurement no 1, 2 & 3 vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020) regarding restrictions on procurement from a bidder of a country which shares a land border with India. I/We hereby certify that I/ we the bidder < name of the

bidder.....> is / are

a) Not from such a country and eligible to be considered for this tender.

OR

b) From such country, has been registered with the competent authority and eligible to be considered for this tender. (Evidence of valid registration by the competent authority shall be attached)

For and behalf of _____ (Name of the bidder)

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

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Annexure-11: IMPORTANT INFORMATION

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

Postal Address:

AGM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, Floor No. 5 & 6, 345 KINGSWAY, NAGPUR 440001,
INDIA

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

AGM Purchase, Email: prchiwarkar@bhel.in, Ph: +91 – 712 – 2858 - 633
Dy Manager Purchase, Email: svm@bhel.in Ph: +91 – 712 – 2858 -715/9049590486
Dy Manager Purchase, Email: vivekjha@bhel.in Ph: +91-9429198214
Asst. Engineer Purchase, Email: baijnath@bhel.in , Ph: +91 – 712 –2858 - 652

- 1. Refer Chapter XII of Volume IB Special Conditions of Contract regarding Suspension of Business Dealings: The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/pdf/Suspension_guidelines_abridged.pdf**
- 2. Void**
- 3. All Statutory Requirements as applicable for this project shall be complied with.**
- 4. BHEL Fraud Prevention Policy: "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."**
- 5. Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'**

"In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract"
- 6. Commencement Period for "Performance Guarantee for Workmanship" as per clause no 2.24 of Vol-IC GCC: This period shall commence after the completion of work as certified by Engineer-in-Charge.**
- 7. The clause 2.7.9.1 below is added under the heading "Rights of BHEL" of General Conditions of Contract Volume-IC GCC.**

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

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- i) Two major Intermediate Milestones are mentioned as M1 & M2 in Chapter VI: Time Schedule of Vol IA Technical Conditions of Contract.
- ii) In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.
- iii) In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 2% of Executable Contract Value, will be withheld.
- iv) In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 3% of Executable Contract Value, will be withheld.
- v) Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.
- vi) Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
- vii) Final deduction towards LD (if applicable as per clause 2.7.9 above), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.
- viii) In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery.

* **Executable Contract Value** - Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.

8. The following paragraph has been added in clause 2.7.1 under clause 2.7 “Rights of BHEL” of General Conditions of Contract (Volume-IC GCC)

In case of inadequate manpower deployed by contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor’s responsibly. In case of contractor’s failure to fulfil his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions

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

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

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

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-
- a) Victim: Any person who suffers permanent disablement of dies in an accident as defined below.
- b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works/ during working at BHEL Units/ Offices/ townships and premises/ Project sites.
- c) Compensation in respect of each of the victims:
- (ii) In the event of death or **permanent disability** resulting from **Loss of both limbs**:
Rs 10,00,000/- (**Rs Ten Lakh**)
- (iii) In the event of **other permanent disability**: Rs 7,00,000/- (**Rs Seven Lakh**)
- d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to Section 2(I) of the Employee's Compensation Act, 1923.

11. Acceptance of Bank Guarantee (BG)

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

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

"Bank Guarantee issued by:

- a. Any of the BHEL consortium bank listed below:

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank
Citi Bank N.A.
Corporation Bank
Deutsche Bank
HDFC Bank Ltd.
The Hongkong and Shanghai Banking Corporation Ltd
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

- b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that "**It is enforceable at Nagpur, Maharashtra**".
- c. Any private sector banks, with a clause in the text of Bank Guarantee that "**It is enforceable by being presented at any branch of the bank**".

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

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12. Broad Terms & Conditions of Reverse Auction:

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction:

“BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on [www.bhel.com](http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2020.pdf)) (http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2020.pdf) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.”

~~BHEL shall open the Sealed Envelope Price bid through conventional method (either in E-Procurement Portal or in Hard Copy method) of all the techno-commercially qualified bidders with applicable loading, if any and same shall be considered for their ranking.~~

***Note-01:-** In case the tender is an e-tender and bids are submitted on e-procurement portal of BHEL → <https://bhel.abcpocure.com>, the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.*

***Note-02:** No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com.*

13. Bidder to strictly follow all the necessary guidelines issued by Customer, District Magistrate, State Government and Central government to control Covid-19 outbreak.

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

15. “Towards compliance of Department of Expenditure’s (DoE) Public Procurement Division Order vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020 - Bidder shall submit duly filled & signed Annexure-9 along with their techno-commercial offer. In this connection, following may be noted:

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

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

III. “Bidder from a country which shares a land border with India” for the purpose of this order means:

-

- a. An entity incorporated, established or registered in such a country; or
- b. A subsidiary of an entity incorporated, established or registered in such a country; or
- b. An entity substantially controlled through entities incorporated, established or registered in such a country; or

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- c. An entity whose beneficial owner is situated in such a country; or
 - d. An Indian (or other) agent of such an entity; or
 - e. A natural person who is a citizen of such a country; or
 - f. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

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

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation-

- a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
- b. "Control" shall include the right to appoint the majority of the directors or to control the management of policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who hold the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

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

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

However, in this regard, provision of Clause no 1.15.9 of GCC shall also be applicable

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



S. No.	DESCRIPTION	Chapter
Volume-IA	Part-I: Contract specific details	
1	Project Information	Chapter-I
2	Scope of Works	Chapter-II
3	Facilities in the scope of Contractor/BHEL (Scope Matrix)	Chapter-III
4	T&Ps and MMEs to be deployed by Contractor	Chapter-IV
5	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V
6	Time Schedule	Chapter-VI
7	Terms of Payment	Chapter-VII
8	Taxes and other Duties	Chapter-VIII
9	Specific Inclusion	Chapter-IX
10	Specific Exclusion	Chapter-X
11	Annexures	Chapter-XI
	Technical details & BOQ	Annexure I
12	Industrial Safety	Chapter-XII
13	Schedule of items Quantities and Factor for deriving Item Rate from the accepted Lump sum Price	Chapter-XIII

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – I: Project Information

1.0 PROJECT INFORMATION

1.1 INTRODUCTION

Nuclear Power Corporation of India (NPCIL) intends to set up two (2) nos. of 700 MWe PHWR type Nuclear Power Plants (KAPP-3 and KAPP-4) at Kakrapar near Surat, Gujarat, India. **Erection activity of KAPP-3 is already in progress.** The Kakrapar site is situated on the left bank of the river Tapi, in Mandvi Taluka of Surat District of Gujarat state. The site is accessible by road from Surat from Mumbai-Ahmedabad National Highway (NH-8) and is about 86 km from NH-8. Nearest seaport is Kandla (about 665 km away) but loading and unloading barge facility is available at Hazira which is about 90 km from site. Nearest railway station, Vyara, is about 20 km from Site, on Surat Bhusawal broad gauge section. The nearest airports are at Vadodara and Mumbai which are about 190 km and 300 km away from site respectively by road.

1.2 SITE INFORMATION

a)	Location	Kakrapar, Dist. Surat, Gujarat - 394651
b)	Nearest Railway Station	Vyara and Madhi (Western Railway)
c)	Nearest Air port	Surat
d)	Elevation (RL)	Varies from +47m to +50m

1.3 CLIMATIC CONDITION

1)	Seismic data	
	Seismic Intensity	Acc to BIS - 1893-2002, Part-1
	Zone	III
2)	Ambient Air Temperature	
	Maximum dry bulb temperature with corresponding relative humidity	43.8 °C – 2%
	Minimum dry bulb temperature with corresponding relative humidity	4.5 °C – 98%
	Design temperature for electrical equipment/devices	50 °C
3)	Relative Humidity	
	Maximum during monsoon	98%
	Minimum during Dec-Jan	2%
4)	Wind Pressures	
	Height above mean Retarding Surface, m	Design Wind Speed m/sec

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – I: Project Information

	@ 10m	69.26
	@ 30m	76.26
5)	Rain fall	
	Annual Average	1941 mm
	Maximum intensity for 1 hour	90 mm
	Maximum intensity sustained for 24 hours	482 mm (max rainfall in a day of 24 hours)
	Period	Year 1994 - year 2002
6)	Wind data	
	Wind code	IS-875-1964
	Base wind pressure	150 kg/m ²
	Wind load up to 30 M	150 kg/m ²

- 1.4 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.**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

2.0 SCOPE OF WORK INVOLVING ERECTION, TESTING, COMMISSIONING, CALIBRATION.

CONTRACTOR SHALL ABIDE BY THE SAFETY/ SECURITY RULES AND REGULATIONS AS PER THE REQUIREMENT OF NPCIL/ BHEL. CONTRACTOR SHALL OBTAIN INFORMATION ABOUT ALL SAFETY/ SECURITY NORMS OF NPCIL WELL IN ADVANCE. BHEL WILL NOT ADMIT ANY CLAIMS WHATSOEVER ON ACCOUNT OF CONTRACTOR'S NON-FAMILIARIZATION OF SITE SAFETY/ SECURITY REGULATIONS.

- 2.1.1 The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship, engineering and construction management. The contractor should ensure timely completion of work. The contractor must have adequate quantity of tools, measuring instruments, calibrating equipment etc. in his possession. He must also have on his rolls adequately trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor should match requirement of sophistication involving microprocessor-based max DNA systems.
- 2.1.2 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
- 2.1.3 All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.
- 2.1.4 The services, tests and support to be provided by the agency for the work mentioned in the various sections of this tender are indicative and not exhaustive, but not limited to these for the completion of the work in all respects.
- 2.1.5 Contractor shall calibrate, erect, commission all the equipment, cabinets/panels, instruments and cabling etc. as per sequence prescribed by BHEL at site. The sequence of erection/ commissioning methodology will be decided by the BHEL engineers depending upon the availability of materials/ work fronts etc. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection/

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

commissioning adopted in erection/ commissioning of similar jobs or for any reasons whatsoever.

- 2.1.6 The work to be carried out under the scope of this specification covers the complete work of loading, handling, transporting, unloading, preassembly, erection, calibration, testing, air flushing, pre commissioning tests, commissioning of systems, trial run of various auxiliaries, achieving various activities till handing over of the unit to BHEL's customer, providing maintenance team to cater to guarantee responsibilities and maintenance thereafter. The work shall conform to dimensions and tolerances specified in various drawings that will be provided during the erection. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done departmentally or by engaging other agencies and recoveries will be effected from contractor's bills towards expenditure incurred including 30% departmental charges.
- 2.1.7 The terminal points as decided by BHEL shall be final and binding on the contractor.
- 2.1.8 Descriptions of certain packages appearing in the rate schedule are available in this section and also in Appendix-I, to give general idea to bidder about the type of equipment to be erected, calibrated, tested and commissioned.
- 2.1.9 During the course of erection, testing and commissioning of C&I work, certain rework/ modification/ rectification/ repairs/ fabrication etc., will be necessary on account of feedback from various nuclear power stations or units already commissioned and/or units under erection and commissioning and also on account of design discrepancies and manufacturing defects and site operation/ maintenance requirements. Contractor shall carryout such rework/ modification/ rectification/ fabrication repairs etc. promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours; consumables used etc., shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per GCC.
- 2.1.10 The contractor's scope of work is further described in the clauses hereafter:
- All tools, tackles, fixtures, equipment, materials, manpower, supervisors/ engineers, consumables, electrodes including oxygen, acetylene argon etc. gases, primers, paints etc. required for this scope of work shall be provided by the contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies. Electrodes shall be baked/ dried in the electrode drying oven (range 375 – 425 °C) to the temperature and period specified by BHEL Engineer before their use. Necessary drying oven/ portable oven shall be provided by the contractor at his cost.

The scope of work under this tender specification covers transportation, calibration, erection, testing and commissioning, etc. of control/ instrumentation and electrical equipment of the following packages.

A. Boiler Control & Instrumentation and its Auxiliaries

Digital Distributed microprocessor based max DNA system panels for FSSS, SADC, HP Bypass, auxiliary PRDS, soot blowers, coal milling system, gravimetric feeder remote/ local control panels, Electronic water level indicator, air heaters, electrical panels for DC control supply, electrical heat tracing system, STLD, controlled circulation pumps, starter panel for mill lube oil/ fans and field devices/ instrumentation work for above system, piping, cabling etc.

B. Turbo generator Control & Instrumentation and its auxiliaries

Digital distributed microprocessor based maxDNA system panels consist of TSC, EHTC, LPBP, TSI, ATT, LSR/AS, ATRS, turbine protection and monitoring,

Gamp and field instrumentation work/ cabling, boiler feed pumps/ condensate extraction pump, and misc. System like lube oil, seal oil, hydrogen gas system, vacuum pumps etc.

C. void

2.1.11 Equipment/ instruments required to be erected for this work, though not limited to but are generally as per rate schedule. For any items or class of work not specified herein but required for total completion of work, the same shall be carried out as per BHEL requirement. However, the payment of these items/class of work shall be regulated as per the General Condition of the contract. Contractor shall provide necessary resources for completion of such work within the stipulated time schedule. Value of such work shall be included while computing the total value of work finally executed for all contractual purposes, particularly for contract variation purpose.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

2.1.12 **Collection of materials**

2.1.12.1 The contractor shall take delivery of equipment, materials from the storage yard/ stores/sheds of BHEL/customer. He shall also make arrangements for verification of equipment, safe custody, watch and ward of equipment after it has been handed over to him till these are fully erected, tested and commissioned and taken over by the customer. The contractor should note that the transport of equipment to erection site, assembly yards etc. should be done by the prescribed route in the most professional manner without disturbing other ongoing works of various contractors. Special equipment such as laboratory equipment, measuring and control equipment, gauges, panels, console inserts, switches, transmitters, controllers, power cylinders, cables, conduits etc. shall be stored when taken over by the contractor in appropriate manner as per BHEL's instructions. The contractor should also note that while taking delivery of materials from BHEL stores (open/closed), it may be necessary to handle other items which could be blocking the exit route of the materials. This aspect shall be taken care of in the quoted rates and no extra payment shall be done in this regard. It shall be the contractor's responsibility to arrange necessary cranes/ tractors, trailers, trucks, slings, labour, etc., etc., for transport of equipment.

2.1.12.2 The contractor shall take delivery of the components, equipment and special consumables from the storage area/ sheds of BHEL/ customer after getting the approval of the engineer/ customer on standard indent forms to be specified by BHEL/ customer.

2.1.12.3 The contractor shall handover all parts/ materials remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL stores. In case of any misuse or use over actual design requirements, BHEL reserves the right to recover the cost of parts/ materials used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

2.1.13 **Void**

2.1.14 All works such as cleaning, leveling, aligning, trial assembly, dismantling of certain equipment/components for checking and cleaning, fabrication of tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing of cut outs/ openings for mounting of console inserts, modules, indicators, recorders, drilling of holes for gland entries, reaming, scrapping, cable laying, dressing, fitting up etc. as may be applicable in such erection works

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

are treated as incidentals to erection work and are necessary to complete the work satisfactorily shall be carried out by the contractor as part of the work.

- 2.1.15 Overhauling, cleaning, revisioning, servicing of equipment/ instruments, valves etc. during erection and commissioning stages will be arranged by the contractor. However, gaskets/ packing for replacement will be provided by BHEL free of cost. All equipment shall be preserved and protected before and after erection as per the advice of BHEL engineer.
- 2.1.16 The contractor should take all reasonable care to protect equipment and materials under his custody either in his stores or at site. Copper tubing, brass fittings, brass valves etc. Forming an integral part of equipment or system are liable to greater damages/ pilferages/ theft/ losses. It will be responsibility of contractor to arrange for adequate security round the clock for protection from such damages/ pilferages/ theft/ losses.
- 2.1.17 All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/ or handling of the equipment without the specific written permission of the engineer. The equipment from the storage yard shall be moved to the actual site of erection/ location at the appropriate time as per the direction of BHEL engineer so as to avoid damage/ loss of such equipment at site.
- 2.1.18 The contractor shall collect all scrap materials periodically from various levels of power house, working area of the power station, auxiliary and piping around power station and collect the same at one place earmarked for the same. Loads of scraps are to be shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect.
- 2.1.19 All the surplus, damaged, unused materials, package materials, containers, special transporting frames, gunny bags etc. shall be returned to the BHEL stores/ customer's stores by the contractor.
- 2.1.20 All pipes and tubes, equipment, instruments issued to contractor and kept at site for erection shall be covered with plastic caps/ steel caps or shall be closed with suitable plugs by the contractor.
- 2.1.21 The contractor shall ensure that all the packing materials and protection devices used for the various equipment during transit and storage are removed before they are erected in position.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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- 2.1.22 Contractor shall plan and transport equipment/ components from storage yard/ sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. It may be specifically noted that the space available for putting up the thermal power plant is limited and accumulation of material may lead to the necessity of shifting and restacking the materials to enable other agencies to carry on with their work or to comply with customer's requirements. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL and all charges together with departmental charges at 30% will be recovered from his bills.
- 2.1.23 Housekeeping in the erection and preassembly area is as important as the well-planned and orderly work. The access to site for inspection, approaches by BHEL and customer engineers and leading of the material shall be made available by the contractor at all times. The shifting and re-shifting of erection materials, tools and plants and clearance of restrictions, filling of ditches, undulation near the preassembly and boiler area is the responsibility of the contractor. Contractor should visit the site and acquaint himself with all restrictions and difficulties that he may encounter during erection/commissioning stages.
- 2.1.24 The work under this scope being quite sophisticated and also quite extensive, for proper planning, monitoring, reporting, etc. of ongoing works, the contractor shall establish his own computer(s) and printer(s) at his site office, along with suitable operator(s), consumables, etc. Non-establishment of above equipment will attract penalty @ Rs 10,000/- (Rs Ten thousand only) per month.
- 2.1.25 BHEL uses its own software SOMS (Site Operation and Management System) for total project execution and billing. The contractor shall also provide adequate and suitable manpower for updating/ entries into SOMS in BHEL computers at site.
- 2.1.26 **Troubleshooting during plant operation**
- During pre-commissioning/ commissioning stages when the plant will be under various stages of operation, it will be necessary to have continuous (day and night) presence of suitable manpower along with required tools to attend to any defects etc. that may arise during such operation. The contractor will be required to put such personnel in shifts in both electrical and C&I area. The bidder must also take this aspect into consideration

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2.1.27 **Pre-commissioning/ commissioning and post commissioning activities**

- 2.1.27.1 The work is also inclusive of various commissioning activities of the boiler and turbine package along with its auxiliaries. The various activities, tests, trial runs may have to be repeated till satisfactory results are obtained and also to satisfy the requirements of customer/ consultant/ statutory authorities like boiler inspector, electrical inspector etc.
- 2.1.27.2 In case any malfunctioning and/ or defects are found during tests, trial runs such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects/ malfunctions and take necessary corrective measures. If any readjustment and realignment is necessary, the same shall be done as per BHEL engineer's instructions.
- 2.1.27.3 During each stage of commissioning, if any part of the instrument needs repair/ rectification/ rework/ replacement, the same shall be done expeditiously and promptly by the contractor. Contractor's claim, if any, for such repair/ rectification/ rework/ replacement etc. for reasons not attributable to contractor will be governed by Section-13 of the special conditions of contract. The parts to be replaced shall however be provided by BHEL free of cost.
- 2.1.27.4 The pre-commissioning activities will start prior to light up of boiler and various trials, commissioning operations shall continue till the unit is handed over to customer. Simultaneous commissioning activities will be in progress in various areas, checking of equipment erected, making ready for trial runs, alkali flushing, chemical cleaning, mass flushing etc. All these works need specialized gangs including electricians/ instrument mechanics in each area. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted. The mobilization of these commissioning gangs shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day/ weekly/ monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same. If at any time the requisite manpower, consumables, T&P are not arranged then BHEL shall make alternate arrangements and necessary recoveries with overhead cost will be made from the bills of the contractor.
- 2.1.27.5 Contractor shall cut open works if needed as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

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- 2.1.27.6 In case any rework/ repair/ rectification/ modification/ fabrication etc. is required because of contractor's faulty erection which is noticed during commissioning or at any stage, the same has to be rectified by the contractor at his cost. If any improvement/ repair/ rework/ rectification/ fabrication/ modification due to design improvement/ requirement is involved, the same shall be carried out by the contractor promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by section-13 of Special Conditions of Contract.
- 2.1.27.7 It is the responsibility of contractor to provide for necessary labour, tools and tackles and consumables till the completion of work under these specifications even in case erection, testing and commissioning of this work is delayed due to reasons not attributable to the contractor.
- 2.1.27.8 During commissioning activities and carrying out various tests, minor items like gauges, manometers, etc., have to be temporarily erected and put in service to suit the commissioning activities. BHEL will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and returned to stores. No extra charges will be payable towards these.
- 2.1.27.9 Commissioning**
- During pre-commissioning, commissioning, post commissioning and trial operation stages of various systems, certain category of manpower with T&P and consumables will have to be provided to BHEL commissioning engineers exclusively at their disposal. It shall be the responsibility of the contractor to provide Engineers, Electricians, technicians, Helpers, Fitters etc. along with necessary consumables, hand tools, calibration equipment etc., for the various commissioning activities in progress. During peak months there could be requirements of separate commissioning gangs simultaneously in even up to 12 to 15 areas. Contractor has to augment the manpower as and when required as per work demand and necessity at site. The quoted rates shall include this.
- 2.1.27.10 It shall be specifically noted that contractor manpower may have to be engaged round the clock simultaneously at different areas and hence considerable number of personnel and their overtime payment may be involved. This aspect must be considered by the contractor

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while quoting their rate. No additional compensation by for the same shall be payable, irrespective of number of persons engaged or number of working hours per day.

2.1.27.11 For electrical works, 415 volts and above, the contractor has to bring qualified electricians.

2.1.27.12 Certain systems may be supplied with portable programming units, which are to be connected at various locations during pre-commissioning to handing over. Necessary cabling interconnecting the programming units and other connected panels has to be carried out by the contractor and are to be dismantled after work. For the purpose of testing, monitoring, commissioning, etc., these programming units will have to be repeatedly connected and disconnected at various locations. These will be considered as part of commissioning activities and no separate payment will be entertained for the above.

2.1.27.13 Calibration, Testing & Commissioning

Calibration, testing & commissioning activity as specified in this technical specification and rate schedule against various equipment, devices, systems etc. are broadly classified below. However, there may be some overlapping between the activities (erection, calibration and testing, commissioning.) The classification of activity is only a guideline for understanding the total volume of work in each activity. The contractor shall have no claim for performing or providing manpower for such overlapping work, which is also within the scope of the work.

A Calibration

- Verification after drawing of material of various types, range of the field devices with respect to instrument schedule, data sheet or system document.
- Codification of instruments as per system tag numbers.
- Calibration/ adjustment of instrument as per system requirement/ set values.
- Providing head correction in case of pressure measurement as per calculated values or actual measured value for the instrument, which are used for interlock protections/ monitoring. This is generally applicable for turbine/ generator, lube oil systems, lube oil system of fans etc.
- Verification of installation of instruments for range, type, tag number as per physical location of process point as per process, instrumentation diagram.

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- Checking and ensuring the proper function of instrument.
- All the recorders shall be made functional with proper chart movement and ink marking.
- Preparation of computerized calibration certificates in the formats specified by BHEL Engineers and getting those signed by the customer is in the scope of the contractor.

B Erection

- Drawal of material from store, verification, inspection as per shipping list, drawings and documents.
- Preservation, up keeping, safe custody of the erected equipment till handing over to the customer.
- Verification of installation as per drawing and document for the correctness of cabling, JB's, impulse pipe, various field device, panels, instruments etc.
- Continuity check and IR value check of cables.
- Verification of correction of cable termination with respect to instrument, electrical hook-up diagram, panel interconnection diagram, JB schedule.
- Checking earthing of the equipment and cable shield wire continuity.
- Energizing the functional group control panels and field devices.
- Flushing of impulse pipe before making the instruments process connections through.
- Any leakages, damages to impulse pipe, field device connections, air connections etc. shall be fully attended by contractor.
- All cable glands/piping/tubing to be fixed as per installation requirement before commissioning.

C Testing, Commissioning & Trial Operation

- Checking/verification of binary/ analogue input and output signal from field and panel and up to recording/indicating instrument/ HMI monitors.

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- Adjustment, testing, calibration of pneumatic drive (control valve, trip valve, power cylinder for gate/ dampers), electrical actuator operated valve/ gate/ dampers of other functional elements.
- Checking the operating electrical/ pneumatic drive through functional group panel, remote control desk, HMI, CRT operation and repeatability and smooth operation to be checked.
- Checking the interlock, protection and alarm for various process by simulation of field devices/ process changes.
- Functional check of sub-loop control, sub group control and auto loop and fine tuning.
- Adjustment of limit switches/ feedback position transmitter checking the actuator for correct Limit switch operation for correct position indication and repeatability shall be ensured.
- Motor IR value measurement, bearing/ winding RTD checking, drying out of motor, providing assistance for trial run of motor which includes monitoring temperature rise winding/ bearing during trial run.
- Contractor shall prepare calibration/ testing report/ protocols.
- During trial run of various systems, if the performance of any instrument is found erratic, unsatisfactory and requires re-adjustment, re-calibration etc., the defect shall be attended by contractor.
- Observing and checking the performance of the various devices on load/ process variation. Any deficiencies/ defect noticed during the variable load conditions, the same should be attended properly.
- Observe the proper functioning of sub-group/ sub-loop control.
- Check the operation of various controls in manual/ auto mode for smooth functioning.
- Clearing of all bad/ invalid signals noticed during commissioning.
- Providing necessary assistance for Trial Operation of the unit is in scope of this specification. Trial Operation shall be considered successful on completion of operation of the respective units for a continuous period of 720 hours at maximum available load. Out of this period, 72 hours shall be at full rated load of the unit. Smooth operation and availability of all instrument/ controls of the systems installed under the scope herein, shall be ensured by the contractor. Contractor shall provide adequate number of skilled manpower and T&P for this purpose. Interruption in Trial Operation for reasons attributable to the Contractor shall result

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in re-start of the Trial Operation all over again, consequential extension in Time Schedule/ Contract Period shall be to the contractor's account.

- If any small wiring correction or minor modification in control panel wiring is noticed during the commissioning, it shall be carried out as a part of commissioning activity.

D Post-commissioning

- Contractor shall rectify the defect observed/ informed by customer during the trial run.
- Contractor shall submit the as- built drawing as per guidelines and instruction of BHEL engineer.
- After trial run/ handing over of the equipment, if due to unforeseen reasons, certain works crop up, the contractor shall provide all the assistance.

E PG Test Assistance

- In case PG test is to be conducted, laying of impulse pipes, cables, etc. and installation of instrument tapping points shall be done by the contractor. Payments will be made as per item rates of comparable similar or identical items in the rate schedule. Such temporary installations shall have to be dismantled and returned to BHEL Stores, after the completion of PG Test for which no separate payment is admissible.

BRIEF DESCRIPTION OF WORK

2.2.1 Cable trays/cable ducts

- 2.2.1.1 Various types of sheet metal, galvanized cable tray, i.e. Perforated, ladder type, seal metal duct, solid bottom tray, shall be provided in standard lengths along with accessories like hardware, bends, reducers, coupler plate, tray covers and tray clamps etc.
- 2.2.1.2 Installation of cable tray/ cable duct shall include cutting, laying, jointing, supporting, drilling holes in the support, providing tees/ reducers/ bends/ clamps as per tray route layout, fabrication of bends/ tees/ reducers from straight length, fixing of tray covers, welding of tray on support, cleaning and application of cold galvanizing paint on weld joints (supply of paint

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is in the scope of contractor). Installation of tray/ duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.

- 2.2.1.3 In case cable trays are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instance.
- 2.2.1.4 Cable trays/ ducts have to be routed underground in cable trench, over head on structure, valves, floors etc. for various application such as cable laying, copper tubes, conduits, thermocouple, temperature gauge capillary etc.
- 2.2.1.5 Installation of Copper tubes/ SS tubes/ copper pipes shall include cutting into required length, laying, bending, cleaning, brazing wherever required, fixing of brass fittings like compression fittings/ tees/ end connectors/ straight connectors/ bulk heads/ valves etc., supporting clamping including supply of clamps and hardware, flushing and conducting leak test.
- 2.2.2 Cable laying (power/ control/ instrumentation shielded/ unshielded cables/ plug-in cables/ coaxial/ UTP/ STP/ data highway, armoured/ un-armoured, single/ multi-core, PVC/HR PVC/FRLS/TEFLON/XLP insulation, optical fiber)**
 - 2.2.2.1 Cable laying includes cutting to the required length, laying in overhead/ underground cable trench/ through pipes/ flexible conduits, dressing/ clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JB's, providing PVC numerical/ alphabetical/ printed ferrules, termination by using crimp type copper tinned/ aluminium lugs, insulated/ un-insulated, termination (crimp, soldering, etc.), plug-in connections with insert type crimping, providing identification PVC/ aluminium cable tags (at both the ends and at 15m intervals throughout the route length and also at each bend), continuity checking, insulation resistance checking, high voltage test on HT cables.
 - 2.2.2.2 Laying, etc. of Optical fiber cables on cable trays/ cable trench shall necessarily be done using flexible conduit
 - 2.2.2.3 Entry to the panels and JB's may be at top, sides or bottom. All cables are required to be properly supported and clamped near to the JB/ panel.
 - 2.2.2.4 Wherever cable glanding is not possible, either due to the gland plate size limitations or more number of cable entries, prefab plug-in cables, etc., for such cases cables may have to be

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lifted inside the panel by either making cut-out in gland plate and providing rubber profile for sharp edge protection or alternatively, providing 4" or 6" PVC pipe coupling gland and these pipe coupling gland shall be supplied by contractor within the quoted rate of cable laying.

- 2.2.2.5 Copper tinned lugs of various types (pin, ring, fork, snap-on) up to 4 sq. mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the quoted rates for cable laying. The quality of material shall be got approved from BHEL engineer prior to their use on job.
- 2.2.2.6 All care should be taken to avoid abrasion, tension, twisting, kinking, stretching of cables during installation.
- 2.2.2.7 Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/ field device end and continuity is maintained through JB's and grounded at panel end only. While terminating the shield wire either in panel or JB's, PVC sleeves are to be used to avoid two-point earthing.
- 2.2.2.8 Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/ weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be sealed. The required material for doing so shall be included by contractor in the cabling scope.
- 2.2.2.9 Many of the cable trays and cables have to be laid in cable trenches. For this purpose, the covers of the trenches have to be opened for working in site and whenever the cables are to be laid in existing cable tray, all safety precautions have to be observed.
- 2.2.2.10 After completing the work, the trenches have to be cleaned and covers put back into position. Contractor shall also carry out de-watering from the trenches if required and arrange pumps etc., at his cost.
- 2.2.2.11 Looping wire at terminal block of panels and electrical actuator as shown in the inter-connection diagrams or as required is to be done by contractor at no extra cost.
- 2.2.2.12 Contractor shall carefully plan the cutting schedule of each cable drum in consultation with site engineer such that wastage is minimized.
- 2.2.2.13 The erection contractor shall make every effort to minimize wastage during erection work. In any case, the wastage shall not exceed the following limits:

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S. No.	Item	% Wastage on issued Qty
1.	Fabrication steel	2
2.	Each size of power cables	1
3.	Each size of control/ Inst cables	2
4.	Impulse pipe/tubes/GI pipes/copper tube	1

However, if the bidder quotes for more wastage than specified above, the excess portion will be considered for adjustment during the tender evaluation at the quoted supply rate of material.

If the actual wastage be more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.

2.2.2.14 Terminal Connections:

The types of cable terminations are generally as detailed below:

SG package, TG package, and Auxiliaries

- a) All field cables in SG package are crimp type of different sizes.
- b) All JB's are both side screw type.
- c) All console tiles wiring: screwed or plug-in type to be fabricated at site.

2.2.3 Junction Boxes

Different type of junction boxes are to be erected by the contractor like junction boxes below 48 ways and above 48 ways. The junction boxes are to be located at the locations jointly decided at site during erection. The junction boxes are to be erected on the frames fabricated at site.

2.2.4 Laying of pipes and tubes (impulse pipe & instrument air pipe)

- 2.2.4.1 Root valves are generally provided on process pipe line by other agencies. Prior to starting impulse pipe, contractor to identify the process point with respect to PIDs.
- 2.2.4.2 Installation of impulse pipe of CS/ AS/ SS material shall include cleaning, air flushing, cutting to length from running meter, edge preparation, cold bending, welding of sockets/ reducers/

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tee/ cross/ isolating valves/ union, nut and tail pieces/ nipples, condensing and other pots, etc., mounting of SS/ CS valve manifolds and compression fittings, providing supports, clamping, conducting leak test/ hydraulic pressure test, (if applicable) DPT, painting as per colour code (primer and two coats) and erection and commissioning of other standard accessories as per instrument hook-up diagram. Piping works shall involve either arc or TIG welding. Paint, primer etc. supply is in the scope of the contractor. Colour codes for impulse piping, etc. will be as per standard codes. Contractor to follow the BHEL supplied welding schedule and welding procedures. The decision of BHEL engineer will be final in this regard.

2.2.4.3 IBR certified welders shall be deployed for welding of impulse pipe and contractor shall take approval for welder and welding consumables from BHEL site engineer.

2.2.4.4 Laying of GI pipe for instrument airline shall include air blowing, cutting from the running meter length, threading, installation of elbows/ tee/ reducer/ moisture traps/ auto drain pot/ check valves/ isolating valves, supporting clamping, conducting leak test and also seal welding of threaded joints, if required.

2.2.4.5 Threaded joints of airline shall be made leak proof by using Teflon tapes or sealing compound. All consumables shall be in the scope of contractor.

2.2.4.6 All fittings and accessories for impulse pipe and airline shall be provided by BHEL. Quoted rate for piping shall include cost of installation of such fittings and no separate rates are envisaged.

2.2.4.7 Contractor shall provide GI “U” clamps for impulse pipe and GI pipes within the quoted rates for installation of the same.

2.2.4.8 Impulse pipes shall be applied with one coat of primer red oxide paint and two coats of synthetic enamel of prescribed shade of final paint. BHEL may prescribe a time gap between first coat and second coat of final paint.

2.2.5 Structural steel fabrication and installation

2.2.5.1 Structural steel material like MS angles, channels, beams, flats, plates etc. shall be supplied in running meters and same shall be used for fabrication of panel base frame, cable tray supports, canopies, instrument and junction box frames, impulse pipe/instrument air pipe supports and instruments etc.

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- 2.2.5.2 This shall include cutting into size, conduiting of end connections, if required, welding, grinding of excess weld deposits, drilling of holes for mounting of device/instrument, installation at location, levelling, alignment, providing bracings, painting etc. No gas cut holes will be permitted. Contractor to follow the BHEL supplied welding schedule and welding procedures.
- 2.2.5.3 All the fabricated supports/frames shall be applied with one coat of primer red oxide paint before installation and two coat of synthetic enamel of prescribed shade of final paint. If required, BHEL shall prescribe time gap between first and second coat of final paint. Paint, primer etc. supply is in contractor's scope.
- 2.2.5.4 Frame installation/cable tray accessories' installation at site may involve mounting either on concrete floor by grouting/using anchor fasteners or on steel structure by welding etc. All consumables including anchor fasteners shall be arranged by the contractor.
- 2.2.5.5 In certain packages, galvanized members of junction box frames and instrument racks shall be supplied in cut to sizes and frame assemblies are required to be done as per drawing by bolting/welding. The installation rate as quoted shall include the assembling of the frames.
- 2.2.5.6 Gas cutting of tray/impulse pipe support and gas cut holes in frame shall be avoided. Only drilled hole shall be permitted in frame etc.
- 2.2.6 Installation of panels**
- 2.2.6.1 Electrical control panels, electronic control panels, etc., are normally supplied in suit of either one/ two/ three or loose shipping sections with integral base frame or loose supplied. These panels may have to be installed as stand alone or in groups consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.
- 2.2.6.2 Installation of panel shall include fixing of base frame, fabrication of base frame if required, levelling, alignment, fixing of anti-vibration pads, removal of side covers, fixing of cubicle interconnection hardware, bus bar jointing, wiring interconnection, welding and grouting of panels and base frames, mounting of panel canopy wherever supplied as part of panel, drilling of gland plates and sealing of cable entries. In certain case where canopies are not supplied but have to be fabricated out of MS sheets provided by BHEL, payment will be done on square meter basis.

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- 2.2.6.3 Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. which shall be part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc. Panel have to be erected at different locations and elevation in boiler, TG, GTG hall, LT & HT switchgear room, unit control room, ESP control room etc.
- 2.2.6.4 Panel and instruments once erected in position should be properly protected using necessary care to prevent ingress of dust/moisture. This will have to be periodically cleaned and surroundings have to be kept tidy.
- 2.2.6.5 Wherever the panels to be mounted on cable trenches, channel supports have to be provided across the cable trench over which the base frame of panel shall be mounted. For such work, structural steel fabrication, installation rates shall be applicable.
- 2.2.6.6 Normally the panels shall be supplied with instruments, relays, meters, electronic modules etc. mounted and pre-wired. However, if these are supplied loose/ separately for safety in transit, contractor shall mount/wire such devices as part of the panel installation work and no separate rates shall be applicable unless otherwise specially listed in the rate schedule.
- 2.2.6.7 No separate payment shall be made for replacement of any devices like electronic modules, relays, conductors, terminal block, push buttons etc. which are found defective during pre-commissioning/ post-commissioning of any equipment/ item.
- 2.2.6.8 For the panels erected by other agencies, commissioning/ calibration work and troubleshooting has to be carried out by the contractor as part of testing and commissioning work as per the quoted rates.
- 2.2.6.9 Minor civil works like drilling, chipping, punching holes and opening in concrete floors, slabs and brick walls, grouting, related to Rack, support installation, minor civil works required for installation of control panels, Junction boxes etc., shall be included in the erection cost of such items. Also all miscellaneous civil works like chipping away and making good as necessary in floor slab/wall for cabling/ earthing etc., as required are included in the scope for which no separate payment is applicable. The scope also includes supply of grouting material, if any.
- 2.2.6.10 Suppliers' instruction manuals, packing slips, door keys etc. received along with the panels should be promptly handed over to BHEL's engineer on opening of the panels.

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2.2.7 Control panels

SG, TG, system panels are based on Max DNA/MetsoDNA distributed digital control philosophy. Max DNA/MetsoDNA system is having communication through UTP cables amongst themselves. The system consists of computer network with servers and workstations and various peripherals like printers, etc. Optical fibre cables are also used for communication, especially for larger distances. The various components/devices are generally located in control room/computer room/diagnostic and shift in charge room. Some panels (viz. network panels) are also located in outdoor plants and other units.

The entire work of erection, testing, commissioning of the connected devices/equipment as listed in rate schedule is to be carried out including laying of peripherals cables (either plug-in or plugs to be fabricated at site), placement of computer furniture in computer room as per lay out. The computer furniture shall be supplied either assembled or in knocked down condition, which have to be assembled at site. The quoted rate shall be inclusive of cable laying, termination and placement of furniture against each device as given in the rate schedule.

2.2.8 Battery/battery charger/UPS

2.2.8.1 HDP Tubular 550/600AH or Ni-Cd (or similar type) or Lead Acid Batteries will be supplied loose along with battery interconnection in the series/ parallel links/ bus bar, lugs, steel/ wooden battery stand either assembled or knocked down condition, cables and associated charger and UPS system.

2.2.8.2 In case of Lead acid battery, the electrolyte shall be supplied in plastic cans. After installation, the electrolyte has to be filled in batteries and charging/ discharging shall be carried out to achieve specific gravity of electrolyte and stability of battery/ battery bank. If required, discharging of the charging cycle shall be repeated to achieve the desired results. However, BHEL engineer's decision shall be final. Any preparatory arrangement required to be done for charging and discharging of battery, the contractor shall arrange consumables, safety equipment etc., at his own cost.

2.2.8.3 In case of Ni-Cd (or similar type) batteries are normally supplied in charged condition, due care shall be exercised while handling/ installation of the same. If the battery charge is found to be less than the required level, the charging/ discharging cycle shall be carried out as per instruction of BHEL engineer.

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- 2.2.8.4 Battery charging/ discharging is a continuous process and skilled manpower shall be deployed by the contractor round-the-clock.
- 2.2.8.5 Contractor shall arrange suitable load, cables, safety equipment and consumables for discharging the battery during charging and discharging cycle at his cost.
- 2.2.8.6 Contractor shall provide skilled manpower for periodic maintenance after the battery are fully charged for the activities such as checking of electrolyte level, specific gravity, topping up with distilled water and cleaning till the set is handed over to customer and record of the same shall be maintained and submitted before handing over of the system.
- 2.2.9 Vibration monitoring system for boiler auxiliaries**
Not in the scope.
- 2.2.10 Void**
- 2.2.11 Flue gas Analyzers**
- 2.2.11.1 Oxygen Analyzers
- The system consists of Zirconia probes, electronic units Panel for mounting electronic unit, purging and calibration gas arrangements, etc. The probes are meant for direct mounting on duct/ chimney, etc., at suitable elevation.
- Commissioning support will be provided by vendor.
- 2.2.11.2 NOX, SOX, CO Analyzers
- Not in the scope
- 2.2.11.3 Opacity Monitor
- Not in the scope.
- 2.2.12 Field instrumentation**
- 2.2.12.1 Various type of primary/ secondary indicating/ recording instrument for pressure, temperature, flow, level and analytical measurement shall be supplied either loose or mounted along with the equipment.

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- 2.2.12.2 Scope of work under erection/ calibration/ testing/ commissioning shall include calibration, setting, adjustment, writing instrument tag number with paint, report making, installation, servicing, minor repairs/ servicing, putting instrument into service, signal checking from field up to the functional group panels and remote indicating instrument, functional checks, interlock and protection/ alarm checks by simulating the field devices, troubleshooting during pre-commissioning/ post-commissioning till system is handed over to the customer.
- 2.2.12.3 It is the responsibility of contractor to make erection, calibration/testing protocols for various C&I equipment/devices and they should get duly certified by customer/BHEL engineer and should be submitted to BHEL engineer regularly. However, sample formats will be given by BHEL and have to be printed by contractor in adequate numbers.
- 2.2.12.4 Contractor shall establish calibration laboratory with adequate facilities and they should arrange standard test instruments duly calibrated from recognized agencies and calibration report of the same to be submitted prior to start of calibration of the field instruments/devices.
- 2.2.12.5 Wherever thermowells are supplied along with temperature gauges, thermocouples, temperature switches, thermostats, etc., the contractor has to co-ordinate with the mechanical contractor for identification and fixing of thermowells on the pipeline. However actual fixing of thermowells on pipeline and seal welding shall be done by mechanical contractor and is not a part of instrument installation.
- 2.2.12.6 Installation of instrument shall also include drilling of holes and tapping for mounting of instrument and local instrument frames/ panels and supply of hardware for mounting of the instrument.
- 2.2.12.7 Some devices line solenoid valves, position feedback transmitters, limit switches, air filter regulators, airlock relays, positioners etc., are supplied assembled along with mechanical equipment like pneumatic control valves, power cylinders, trip valves, dampers, motorized actuators, etc. These will need removal, calibration/ testing, re-fixing, adjustment, etc., and commissioning. Separate payment shall not be made for this. The rates quoted for the commissioning of these equipment (viz., pneumatic control valves, power cylinders, trip valves, dampers, etc.) should take care of the above. Also, the contractor shall remove such devices prior to erection either at site or at store to avoid damages/ pilferages and keeping in safe custody and the same shall be installed prior to commissioning of such equipment.

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- 2.2.12.8 Transmitter enclosure/ open racks for various packages which are to be erected and commissioned at various locations of the Boiler, turbine and outdoors, shall be supplied with internal tubing, air filter regulators, rotameters, provision of continuous or intermittent purging arrangements wherever required, etc. The quoted rates for these racks/ enclosures shall include the erection and commissioning of all such items inside these racks/ enclosures.
- 2.2.12.9 Sometimes recalibration of equipment may become necessary due to reasons not attributable to the contractor, e.g. Lapse of Time after first calibration, Need for change in range/ parameter, etc. If re-calibration is required due to no fault of the contractor, the rates payable for re-calibration shall be as under:

Recalibration Charges = 60% of the Percentage Stage Payment for Calibration as per split-up defined in Terms of Payment (Chapter-7)

The contractor shall keep record of such instrument with the reason for re-calibration and certified by the BHEL Engineer.

Note: For recalibration of skid mounted items or other systems where lump sum rates are quoted, the recalibration charges, if admissible, will be calculated from the relevant unit rates quoted for same/ similar items elsewhere in the rate schedule. The decision of BHEL Engineer shall be final and binding on the contractor.

- 2.2.12.10 For the very few cases where required, the contractor shall carry out re-orientation of bottom/top entry arrangement for process connection if needed due to site condition in existing instrument rack/enclosure/JB and re-location of existing instrument including removing of the existing tubing and re-installation of the same at appropriate location due to any change in grouping of the instrument and no extra payment shall be applicable.
- 2.2.12.11 In certain cases, instruments/ devices are supplied on equipment or drawn by other agencies as part of mechanical package. The same are to be received or to be collected from other agencies for keeping in safe custody to avoid damages. The same are to be erected back after calibration for which unit rate shall be applicable for erection and calibration. Contractor shall maintain record of such instrument duly certified by BHEL engineer. However, for removal of such instrument, no separate rate/payment shall be applicable.

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2.2.13 Unit control desk and components

Not in scope.

2.2.14 Final painting

2.2.14.1 All the fabricated frames, instrument racks, Junction box frame, trays/ impulse pipes, supports, panel base frame, etc., wherever applicable shall be first painted with one coat of primer paint (metal red oxide) and then two coats of synthetic enamel paint of approved shade (decided by BHEL Engineer) after thoroughly cleaning the surface of dust, rust, scale, grease, oil, etc., by wire brushing, scrapping or any other suitable method. The quoted rates should be inclusive of all these including supply of paints and consumables.

2.2.14.2 Other equipment like JB's, Panels, transmitter racks, Local gauge boards etc., shall be painted with two coats of synthetic enamel paint. The quoted rates should be inclusive of application of two final coats of synthetic enamel paint. All the consumables such as wire brush, other cleaning materials, painting implements, etc., is to be arranged by the contractor at his own cost. All equipment painting will be done by spray painting. The quoted rates should be inclusive of all these including supply of paints and consumables.

2.2.14.3 All the weld joints of GI cable trays and GI structural members shall be applied with a coat of cold galvanizing zinc paint. Paint, etc. shall be arranged by contractor at his cost.

2.2.15 Misc. Other instrument/ equipment erection, calibration and commissioning.

2.2.15.1 Wherever panels, pneumatic power cylinders and control valves have been erected by the mechanical contractor, calibration/ commissioning has to be carried out by the contractor.

2.2.15.2 SADC power cylinders are to be erected by contractor in coordination with other agencies as per instructions of BHEL. For SADC power cylinders, copper tubing and accessories will be supplied by BHEL. The copper tubing work from the instrument line header to the power cylinder and the internal connection to be carried out by the contractor as per site requirement. Necessary security against pilferage is to be arranged by contractor.

2.2.15.3 In the case of electronic water level indicator, electrodes may be supplied loose and the same need to be fixed in the pressure vessel as per the drawings. No extra charges will be payable.

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- 2.2.15.4 The calibration of position transmitters of the NRVs in the turbine extraction system has to be carried out by the contractor. Position transmitters are to be erected by contractor if supplied loose.
- 2.2.15.5 The solenoids in the corner valves/ HEA will be received in mounted condition and will be erected by the mechanical contractor. The contractor has to provide the services required for dismantling the solenoids and reinstalling the same after servicing/adjustment. Payments will be made as per testing/commissioning portion of the rate quoted for these items and no extra charges will be payable for removal and re-fixing. Small items like speed regulators, etc. will have to be fitted in the copper tubing route of corner stations. No separate rate will be applicable for such devices.
- 2.2.15.6 Dimension and weight as mentioned against control panels, MCCs, etc. in rate schedule are only approximate and there may be changes in dimension and weight in actual supply of the equipment and no rate variation shall be applicable on this account.
- 2.2.15.7 Wherever brief description of the system is given under various sub-heads, it is only for the understanding system requirements. It does not indicate the total specification of work. For such system, other clauses are also applicable wherein work details are specified.
- 2.2.15.8 VOID
- 2.2.15.9 Normally, cable glands on junction boxes side are received in mounted condition. While terminating the cables as per drawings, the cable glands are to be removed and fixed. Wherever cable glands are not received along with junction boxes, the cable glands as per the requirement will be provided by BHEL and the contractor has to make necessary holes/adjust the available holes in the JB for fixing these. No separate payment will be made for drilling of holes and fixing the cable glands to the junction boxes. Nameplates for JB's will be supplied separately. These are to be suitably written and fixed onto the JB's. Wherever nameplates for JB's are not supplied, the JB no. are to be written with paint on JB's for identification. Separate payment will not be made for this.
- 2.2.15.10 The push buttons and indicators in C&I systems are provided as loose with different type of connectors. The fixing of connectors and their wiring from push buttons to indicators shall be the responsibility of contractor. No separate payment will be made for fixing of connectors. The cable laying and termination charges will be paid as per applicable rate schedule.

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2.2.16 Guidelines for erection

- 2.2.16.1 All impulse lines, air lines shall be thoroughly cleaned by removing the dust, burrs etc., and any foreign matter inside the pipe/airline is to be cleaned by compressed air or any other suitable means before installation.
- 2.2.16.2 The routing of pipe lines shall include sufficient flexibility near tap off points to allow for thermal expansion of process equipment.
- 2.2.16.3 The pipes shall be cold bent using hydraulic bending machines only.
- 2.2.16.4 The horizontal impulse lines shall be laid with proper slopes towards the tapping point.
- 2.2.16.5 Support for piping and tubing shall be adequate and in no case exceed limits shown below: -
- | | | |
|----|-------------------------|------------|
| A) | 1/4" OD/ 3/8" OD copper | continuous |
| B) | 1/2" NB pipe/tube | 5 ft. |
| C) | 3/4" NB pipe/tube | 5 ft. |
| D) | 1" NB pipe/tube | 8 ft. |
- 2.2.16.6 All CS impulse line welding shall be done through welding generator/ rectifier and only structural welding may be done with welding transformer.
- 2.2.16.7 Impulse pipes of alloy steel/ SS/ carbon steel etc. shall be TIG welded. Contractor shall arrange for necessary TIG welding sets, electrodes etc.
- 2.2.16.8 Minimum number of fittings shall be used on all lines wherever possible, to keep threaded joints to a minimum wherever threaded connections are to be made.
- 2.2.16.9 **Testing**
On completion of pipeline installation, the pipelines shall be hydraulically tested. Contractor shall arrange for water filling pump, hydraulic test pump and standard gauges and conduct the test satisfactorily.
- 2.2.16.10 The impulse lines shall be isolated from instruments and tested at 2 times the maximum working pressure. The fall in pressure shall not be more than 1 kg/cm² or 1% of the working

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pressures whichever is less, in 30 minutes and there shall be no leaks at any of joints/welds when isolated from source of pressure.

2.2.16.11 **Air Piping**

All instrument air pipelines shall be isolated from the instruments and pressurized pneumatically to maximum work pressure. They shall then be isolated from the source of pressure and fall shall be less than 1 PSI in 20 minutes.

2.2.16.12 **Pneumatic Signal Lines**

All pneumatic signal lines shall be disconnected and blown through with instrument air. The line shall be blanked off and pressurized pneumatically 20 psi and checked with soap solution for leaks and attended accordingly.

2.2.17 **Electrical cabling/ wiring**

2.2.17.1 All the cables will be properly laid in cable trays, dressed and clamped with aluminium flats. The cable will be terminated at both ends with suitable lugs and printed ferrules and will be glanded properly. Suitable equipment and consumables for ferrule printing has to be arranged by the contractor at his own cost. For cable identification, the contractor shall provide at his cost aluminium tags at regular intervals (15 m) through each run of cable.

2.2.17.2 All electrical connections shall be tested for polarity and proper connections.

2.2.17.3 Insulation test of the various circuits shall be done.

2.2.17.4 The checking of operation of individual equipment and instruments to which the cabling/wiring connected shall also be done by the contractor.

2.2.17.5 Wherever supplied, GI cable trays shall be of bolted construction only with fixing screws and coupler plates.

2.2.17.6 To the extent possible, all the trays shall be fixed in vertical orientation

2.2.17.7 Sharp bends of cable trays shall be avoided in all type of cable trays.

2.2.17.8 Installation of cable racks and supports structure shall be carried out in all the required areas. Steel embedment shall be provided in the cable trenches, ceiling slabs and concrete blocks for installing the cable racks and support structures.

a) Ladder perforated type cable trays shall be used in cable trenches and vertical risers.

b) Perforated cable trays shall be used in higher elevations in boiler and TG area.

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- 2.2.17.9 Cable racks in the trenches and control room are to be shared with other contractors installing cables in different areas wherever required. Contractor shall cooperate with the other contractors in sharing the cable trays and proper dressing and clamping the cables.
- 2.2.17.10 Where power and control cables are to be laid in the same route, suitable barriers to segregate them physically shall be employed.
- 2.2.17.11 Space equal to the diameter of cable shall be provided between power cables of six over 50 mm in diameter.
- 2.2.17.12 When cables pass through floors, walls etc., it shall be passed through a pipe for mechanical protection and the pipe ends sealed suitably.
- 2.2.17.13 Care shall be taken to avoid short bending and kinking of conductor damaging insulation and stressing the cable beyond pulling force recommended by the manufacturer. Cable shall be protected at all times from mechanical damage.
- 2.2.17.14 The minimum radius of formed bend of an insulated cable shall be 12d for un-armoured cables and 15d for armoured cables where 'd' is the overall diameter of the cables.
- 2.2.17.15 No cable shall be laid in ducts or trenches where other services such as oil pipes, steam or water pipes are laid.
- 2.2.17.16 Where cabling passes through brickwork or concrete work, the contractor shall provide suitable local protection against mechanical damage wherever necessary.
- 2.2.17.17 The layout of all cables shall be arranged to give adequate clearance from other services and cables shall be routed to avoid hot zones.
- 2.2.17.18 Jointing of cables shall be avoided as far as practicable. However, jointing if at all necessary shall be done by crimping type cable joints after getting approval of BHEL engineer.
- 2.2.17.19 The cable schedules indicating cable sizes, tentative cables routing information will be furnished by BHEL at site to the contractor. Required steel inserts on cable trenches, ceilings of the platforms in TG hall for erecting the cables will be provided by BHEL. The contractor shall design number of cable/racks to accommodate the cables on racks/trays properly.

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2.2.18 Earthing installations

- 2.2.18.1 All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all equipment supplied by BHEL.
- 2.2.18.2 The earthing conductors shall be of mild steel/GI strip/ wires. All connections from equipment to main earthing conductors shall be made as illustrated in earthing drawing/ as per instruction of BHEL engineer.
- 2.2.18.3 A continuous earthing conductor shall be installed in all cable trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power cables run in parallel, a continuous earthing conductor shall be provided on trays only with tap offs to the control cable trays. All valve and damper motors and rapping motors will be earthed to this conductor.
- 2.2.18.4 All joints in the earthing system shall be welded type. Earthing connections to all equipment including motors shall be bolted type.
- 2.2.18.5 Earthing connections shall be free from tinning scale paint, enamel, grease, rust or dirt at the time of making joint.
- 2.2.18.6 Metallic sheaths, screens/ shields and armour of all multicore cables shall be bonded and earthed.
- 2.2.18.7 Earthing conductors along their run on columns, beams, walls etc. shall be supported by suitable cleats at intervals of 750 mm.
- 2.2.18.8 Welded joints on GI earthing conductors shall be coated with one coat of bituminous paint in case of buried earth grid or earth flats to be laid in cable trench. For site welded GI strips/wires which are exposed these are required to be painted with one coat of cold galvanizing zinc paint. Contractor to arrange the required paints and other items at his cost.

2.2.19 Instruments and equipment

- 2.2.19.1 All field mounted instruments are to be located in such a way as not to obstruct walk-ways or plant equipment access but shall be easily accessible for maintenance. Hand rails shall not be used for mounting or supporting instruments.

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- 2.2.19.2 Racks/ stands and supports for instruments and transmitters shall be fixed on RCC column/ floor by chipping and grouting or by welding to steel structure. In no case these shall be welded to floor grills.
- 2.2.19.3 The power cylinders' support/ base erection will be welded to steel structure or by grouting. The power cylinder will be properly aligned and linkage mechanism wherever required shall be connected to the driven equipment. All accessories for power cylinders' line air sets, solenoid valves, air lock, limit switches, if supplied loose, shall be fixed, aligned and connected up.
- 2.2.19.4 When installing flow and pressure transmitters/switches for Liquid/ steam/condensate vapour services, the instrument is to be mounted below its primary element or tapping point. For gas service applications, the instrument is to be mounted above Primary element tapping point.
- 2.2.19.5 During erection and commissioning stage, the site mounted instrument shall be protected suitably. Contractor shall provide suitable security arrangement in main control room, and other areas where equipment are positioned, at no extra cost.
- 2.2.19.6 All brackets/racks and support steel work for tubing impulse lines/instruments shall be painted with two coats of primer and two coats of final colour prior to installation. Paints, etc. supply in the scope of contractor.
- 2.2.19.7 Contractor shall arrange for own firefighting equipment for the materials stored under contractor's custody.
- 2.2.20 Guidelines for handling and storage of electronic cubicles/ subassemblies/ loose items.**
- 2.2.20.1 Immediately after unloading at site, the electronic equipment should be kept in a covered area. Handling and lifting of package should be done without jerks or impacts. Packing case should not be dropped or slid along the floor under any circumstances. Suitable forklift should be used to move the case to its final position. All above points are to be strictly followed as electronic equipment may get damaged due to vibration and shock.
- 2.2.20.2 After unloading at site, the package of the equipment shall be inspected for external damage. In case the package is damaged, package number and details of damage should be noted. The details of damage should be reported to concerned site engineer.

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2.2.20.3 Cases should be opened/unpacked using correct nail pullers. While opening the planks, care should be taken to see that equipment inside is not damaged. Cases should not be unpacked in areas where they are exposed to rain, water/liquid splashing, dust or other harmful materials like chlorine gas, sulphur dioxide etc.

2.2.20.4 After opening the case, all supports provided for transport are to be removed with due care.

2.2.20.5 Hinged frames should not be opened when equipment is not secured to floor as this is likely to cause it to topple over. The hinged frame can be opened only if the equipment is still fixed on to bottom wooden pallet.

2.2.21 Storage

2.2.21.1 The equipment should be preferably in its original package and should not be unpacked until it is absolutely necessary for its installation or advised by BHEL engineer. The equipment should be best protected in its cases. It should be arranged away from walls.

2.2.21.2 The wooden pallet provided for packing itself can be retained for raised platform to protect equipment from ground damp, sinking into ground and to circulate air under the stored equipment. This will also help in lifting packing with fork-lifter.

2.2.21.3 Periodic inspection if silica gel placed inside the equipment is necessary. It has to be replaced or regenerated when de-colorization takes place.

2.2.21.4 Due care should be taken to ensure that the equipment is not exposed to fumes, gases etc., which can affect electrical contacts of relays and terminal boards.

2.2.21.5 The storage room and the equipment should be checked at regular interval to ensure protection from termites, mould growth, condensation of water etc., which can damage the equipment.

2.2.21.6 All the equipment, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site engineer.

2.2.21.7 The packing material shall be retained if the cubicle is to be repacked after inspection.

2.2.22 Sub-assemblies

2.2.22.1 All subassemblies should be kept in a separate place where it is easily accessible.

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2.2.22.2 Subassemblies should have a protective cover in case it is stored without wooden packing/case to prevent accumulation of dust. Silica gel packets should also be kept along with it.

2.2.22.3 Subassemblies should not be stacked one above the other.

2.2.23 Loose items

The loose items supplied for the main equipment falls into various categories like tools, cables, prefabricated cables, console inserts, recorders, VDU/ CRT, other display units, printers, sensors and transducers, cable glands, cable ducts, frames, racks, etc. These are to be categorized and stored separately.

2.2.24 Guidelines for handling of electronic modules

2.2.24.1 All the modules shall be handled by qualified persons only.

2.2.24.2 Electronic modules should only be touched when it is absolutely essential to do so.

2.2.24.3 Before touching any electronic module, the operator should discharge the static electricity by earthing himself or better still, ensure constant discharge by wearing an earthed wrist strap.

2.2.24.4 The operator should not wear clothing made entirely from synthetic fibres, but a mixture containing at least 65% cotton.

2.2.24.5 The PCB should always be held by front panel or by module frame and electronic components/ connectors should never be touched.

2.2.24.6 The electronic modules should not be placed close to television sets or CRT units.

2.2.24.7 Soldering irons and any other tools used must be grounded.

2.2.24.8 All modules using CMOS components are packed in antistatic bags when transported loose to avoid ESD failures. The antistatic bags must always be used to transport modules at site from one place to the other.

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2.2.25 STATUTORY CLEARANCES

- 2.2.25.1 Contractor should have/ Obtain valid Electrical Contractor-ship License to carry out the Erection, Testing & Commissioning work on High/ Low Voltage electrical equipment from the appropriate statutory authority of concern state or Central Electricity Authority, as the case may be. All the fees and expenses in this regard shall be in the contractor's account.
- 2.2.25.2 Contractor shall arrange inspection of concerned Statutory Authority for the installation, testing & commissioning of High/ Low voltage equipment covered under this tender specification and obtain their approval in appropriate format prior to charging of the equipment.
- 2.2.25.3 Contractor shall be responsible for all necessary liaisoning work with Statutory Authority towards the certification of installation/ works. BHEL shall reimburse Statutory Fees as per actual on submission of original receipt, however all incidental expenses shall be borne by Contractor. BHEL/ BHEL's Customer shall be providing technical assistance, drawing & document for submission to Statutory Authority. Contractor shall provide all logistics services in this regard.
- 2.2.25.4 The installation of all electrical equipment shall be carried out only by persons holding valid certificates of Competency for the voltage classes as defined in this tender specification, issued by appropriate state or central Statutory Authority. Contractor shall submit the particulars of Licenses held by him.
- 2.2.25.5 The contractor has to arrange electrical license to work of the concerned state where the project being executed within a 6 weeks of mobilization at site for carrying out the works covered under this contract.

Note: - Obtaining statutory clearance from Electrical Inspector for Generators is in the scope of the agency. The quoted rates shall include the same and no separate payment shall be done for obtaining statutory clearance.

2.2.26 BRUSHLESS EXCITATION SYSTEM

System comprises of DAVR Panel which is connected by Input cable from DAVR to PMG, DAVR to Main Exciter, DAVR to axis coil, Mounting of Local Instrument in Exciter Enclosure, winding resistance & IR value of PMG, Main Exciter, Q axis coil, Diode wheel, checking healthiness of diodes/ Fuses, commissioning of stroboscope, Exciter Heater/ Blower, Rotor earth fault brush

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checking/ setting, lighting inside exciter enclosure, Flap actuator commissioning (If provided). Any other work inside exciter enclosure, mounting of loose components supplied for Brushless exciter system, Dummy load test of DAVR, checking from Control desk & Field related inputs/ outputs to commission the excitation system fully operational,

No separate item rate is applicable. Rate quoted by contractor shall be inclusive of all above related to Excitation system.

2.2.27 INTEGRATED ELECTRICAL TESTING/COMMISSIONING

The brief scope of work under is defined as below, but not limited to the following. Contractor shall discuss & finalize testing procedure with BHEL Engineer In-Charge for the test to be conducted on Generator system. Drawing & documents shall be provided by BHEL at the time of testing. BHEL decision in this regard shall be final and binding on the contractor.

The contractor shall prepare all erection/ commissioning log sheets and protocols/ test certificates as per field quality plan/ Commissioning check list, get it signed by the concerned BHEL/customer engineer and submit the same to BHEL engineer as per his instruction.

Contractor shall maintain the charged and commissioned equipment till the same is taken over by customer.

Contractor's quoted rates for all concerned items shall include Integrated Testing as defined hereinafter.

2.2.28 GENERATOR SYSTEM TESTING

The following major works also shall be in the scope of the Contractor:

- a) Generator stator winding resistance and PI value measurement/ check.
- b) Generator rotor winding resistance, impedance, IR value measurement before and after rotor insertion.
- c) Generator Bushing HV test.
- d) Main exciter winding resistance, IR value measurement/ check.
- e) PMG winding resistance, IR value measurement/ check.
- f) Testing and commissioning of generator and exciter accessories viz., heaters, blowers, stroboscope, diodes, enclosure lighting, potential measurement of bearings (TE &EE) etc.
- g) Meggering during drying out of generator.

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- h) Meggering of generator bushing and its accessories. This test has to be conducted many times during erection and commissioning stages.

Note: - Obtaining statutory clearance from Electrical Inspector for Generators of both the units is in the scope of the agency. The quoted rates shall include the same and no separate payment shall be done for obtaining statutory clearance.

2.2.29 Equipment/ instruments etc., under the above scope of erection and commissioning are generally dispatched from BHEL's manufacturing units/ vendor's works at site well before start of erection. Sometimes, such dispatched materials may get stuck up with transporters/railways. The contractor shall provide support/ manpower for necessary chase up for removal of such bottlenecks in transportation. Also, for smaller items, it could be necessary to depute his person to personally carry certain items from works to site. Requirement of such activities, which will be decided by BHEL engineer and chase up activities, if required, shall be performed under authorization by BHEL. The above services shall be provided within the quoted rates.

2.2.30 HOUSE-KEEPING

After the completion of major civil work, area/fronts will be released to the contractor in phased manner for maintaining and up keeping. While handling over the area from the civil Contractor, it will be ensured that civil works have been substantially completed. This point of time onwards till all works of the contractor in the building is completed, notwithstanding the fact that other contractors are also working in the same area; it shall be the responsibility of the contractor to maintain general cleanliness in the area assigned to him.

In order to maintain general cleanliness in the area, the contractor may take the Help/ assistance from the agencies working in the same area and he shall also extend all cooperation to other Contractors for such works. However, overall responsibility of Housekeeping of the assigned area shall lie with the contractor.

The total area allocated is approximately 20,000 square meters in the Control building covering all elevations above 106 meters (above MSL) and is spread over 2 and more floors.

The contractor to provide additional manpower supply of - 04 persons - towards housekeeping. The brief scope of work is as below:

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2.2.30.1 General description of work:

S. No	Operation	Min. Frequency
1	Cleaning and sweeping of all control room floors, staircase, Platform, lifts and wiping of handrails, equipment, JB's, pipes, cable shafts, etc.	Twice Daily
2	Wet mopping of floors	Daily
3	Vacuum cleaning of Panels, JB's, ceilings	Weekly
4	Cleaning of Glass panels, doors and polished surfaces with NPCIL approved cleaning agents	Weekly
5	Vacuum cleaning of Cable Trays	Monthly
6	Debris removal from dust bin, baskets placed in the respective building.	Daily or as and when required

2.2.30.2 Procedures for execution of work:

- Cleaning and sweeping of floors, staircase, platform, anything and everything up to ceiling height and ceiling, as per the frequency indicated in the table. Cleaning activity shall start in the morning and complete all the cleaning/ mopping work as per schedule to be worked out jointly at site.
- Continuous sweeping to be done at entrance of building and cleaning/ wiping of equipment and system located at various floors of the building during working hours with lunch break and tea break.
- Removal of cobwebs, putting the collected debris other than structural materials in the dustbin kept at the specified location on every day basis. Disposal of collected structural materials within a distance of 1.5 km on daily basis.
- Lifting, carrying and disposal of all generated debris such as structural pieces, cable pieces, Cable trays, ducts, wooden pieces, packing materials, piping material etc. and all other generated scrap from allotted building within a distance of 1.5 km on daily basis.
- Disposal of debris from dust bins/baskets placed in the respective building within a distance of 1.5 km once in a monthly basis or as and when required.
- In order to maintain quality service and minimize operational problems, the contractors must rotate the staff once in six months with prior written intimation to Engineer-In-charge.

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- g) The contractor shall arrange his own equipment's and tools required for this work like trolleys, Ladder, buckets, dust bins, brooms, industrial vacuum cleaner, brushes, wiping cloths or any other Material required for the cleaning.
- h) The storage and security of this material and equipment shall be the sole responsibility of the Contractor and shall have no right to claim for any loss/theft or damage of the same.
- i) The exclusive work force shall be deputed for this work and work force Deployed for this General housekeeping shall not be diverted to works other than housekeeping.
- j) All deployed work force shall be provided with proper uniform, safety and cleaning Gears and in no case work should stop for want of gears. Uniform colour is subject to approval by M/s BHEL/ NPCIL.
- k) Contractor shall arrange for cutting and removal of vegetation growth/grass etc. in the storage yard as and when called for by BHEL as incidental to work. BHEL will take appropriate action at the risk & cost of the contractor in case of failure in this regard

2.2.30.3 List of Consumables for house-keeping:

List of equipment consumables to be deployed/ maintained for housekeeping work.

S. No.	Description	Min. Qty. reqd (in nos)
1	Industrial vacuum cleaner (with wet mopping facility)	4
2	Cob webs remover	10
3	Brooms	30
4	CS Dustbin	15
5	Trolley	4
6	Ladders (3mtrs)	3
7	Waste carrying baskets	20
8	Ladders (6mtrs)	1
9	V type ladders	1
10	Cleaning brushes	30
11	Caution board (wet cleaning and cleaning in progress)	6+6
12	Wet and dry cleaning duster/cloths	50
13	Cleaning Agents/ Disinfectants	As required

The above services shall be provided within the quoted rates. 2% of monthly RA bill shall be released on satisfactory housekeeping and cleaning of control room.

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2.2.31 ADDITIONAL REQUIREMENTS/QUALIFICATION OF MANPOWER DEPLOYED

The contractor to provide qualified manpower as per details below:

A) Electrician:

- Only qualified electrician – ITI
- Must possess electrician/ wireman license
- At least 6 years of experience

B) Welder:

- Only qualified welder will be deployed for welding. Welder test is taken by NPCIL; test piece is sent to Vadodara for testing. Based on this, interview is conducted by NPCIL quality for final approval of welders.
- Welder test piece to be arranged by contractor.

C) Fitter:

- Only qualified fitter – ITI.
- At least 2 years' experience.

D) NDT:

- Qualified Level-1 & 2 NDT operators/ engineer are required for NDT testing.

E) Quality Engineer:

- Qualified quality engineer is required. NPCIL quality dept. will conduct written test and interview and then authorize.

F) Safety:

- AERB safety rules are followed.
- Certified safety officer is to be deployed from start of work.

G) HR:

- Central labour laws are applicable here and labour payment has to be done accordingly. NOT AS PER GUJARAT STATE LABOUR RATES.
- Gate pass is issued to labours/staffs having original IDs like passport, driving license, voter ID, Aadhar card, ration card, etc.

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Chapter – II: Scope of Works

H) Documentation:

- Documentation requirement will be very stringent. Various protocols have to prepared for work done.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

S. No.	Description PART I	Scope/ to be taken care by		Remarks
		BHEL	Bidder	
3.1	ESTABLISHMENT			
3.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability).	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability).	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services.		Yes	
d	Bidder's all office equipment, office/ store/ canteen consumables.		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
f	Firefighting equipment like buckets, extinguishers etc.		Yes	
g	Fencing of storage area, office, canteen etc. of the bidder.		Yes	
3.1.2	FOR LIVING PURPOSES OF THE BIDDER			
a	Open space for labour colony (as per availability)	Yes		There may be space constraint; contractor shall manage/ adjust his requirements within the space area as provided by NPCIL.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	Hygienic labour colony with proper sanitation, access road, electricity, water arrangement as per BHEL/ NPCIL requirements.
3.2.0	ELECTRICITY			
3.2.1	For construction purposes Voltage 415/440 V			Free

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

S. No.	Description PART I	Scope/ to be taken care by		Remarks
		BHEL	Bidder	
a	<i>Single point source</i>	Yes		At a distance of 500m from site (Distance is only estimated, it may vary up to an extent depending on site condition)
b	<i>Further distribution including all materials, Energy Meter, Protection devices and its service.</i>		Yes	To be taken care by bidder
c	<i>Duties and deposits including statutory clearances if applicable.</i>		Yes	
3.2.2	Electricity for the office, stores, canteen etc. of the bidder			Chargeable
a	<i>Single point source.</i>	Yes		Chargeable
b	<i>Further distribution including all materials, Energy Meter, Protection devices and its service.</i>		Yes	
c	<i>Duties and deposits including statutory clearances if applicable.</i>		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc.			Chargeable as per standard rates
a	<i>Single point source.</i>	Yes		Chargeable
b	<i>Further distribution including all materials, Energy Meter, Protection devices and its service.</i>		Yes	
c	<i>Duties and deposits including statutory clearances if applicable</i>		Yes	
3.3.0	WATER SUPPLY			
3.3.1	For Construction purposes:			Chargeable
a	<i>Making the water available at single point.</i>	Yes		Construction water will be on chargeable basis on charges as charged by NPCIL. At present, the charges are Rs. 12.10 per 1000 litres and this rate is subject to revision from time to time. The charges as charged by NPCIL shall be charged to contractor.
b	<i>Further distribution as per the requirement of work including supply of materials and execution.</i>		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

S. No.	Description	Scope/ to be taken care by		Remarks
		BHEL	Bidder	
	PART I			
3.3.2	<u>Water supply for bidder's office, stores, canteen etc.</u>			Chargeable
a	<i>Making the water available at single point.</i>	Yes		Chargeable
b	<i>Further distribution as per the requirement of work including supply of materials and execution.</i>		Yes	
3.3.3	<u>Water supply for Living Purpose</u>			
a	<i>Making the water available at single point.</i>		Yes	
b	<i>Further distribution as per the requirement of work including supply of materials and execution.</i>		Yes	
3.4.0	LIGHTING			
a	<i>For construction work (supply of all the necessary materials)</i> 1. At office/ storage area 2. At the preassembly area 3. At the construction site/ area		Yes	Contractor has to make his own arrangement.
b	<i>For construction work (execution of the lighting work/ arrangements)</i> 1. At office/ storage area 2. At the preassembly area 3. At the construction site/ area		Yes	Contractor has to make his own arrangement.
c	<i>Providing the necessary consumables like bulbs, switches, etc. during the course of project work.</i>		Yes	Contractor has to make his own arrangement.
d	<i>Lighting for the living purposes of the bidder at the colony/ quarters.</i>		Yes	
3.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	<i>Telephone, fax, internet, intranet, e-mail etc.</i>		Yes	
3.6.0	COMPRESSED AIR wherever required for the work.		Yes	
3.7.0	Demobilization of all the above facilities.		Yes	
3.8.0	TRANSPORTATION			
a	<i>For site personnel of the bidder.</i>		Yes	
b	<i>For bidder's equipment and consumables (T&P, Consumables etc.)</i>		Yes	

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Chapter – IV: T&P's and MMEs to be deployed by Contractor

A: TOOL & PLANTS

**List of major testing & measuring equipment/ tools and tackles to be arranged/
brought by contractor.**

S. No.	Description	Quantity
I. Instruments		
01	Dead weight tester rated 400 kg/cm ² and with weights and test gauge facility. Make 'Budenberg or 'Ravika'	2 nos.
02	Oil temperature bath suitable to calibrate the instruments range 0 – 200 °C with standard temperature gauges and thermostatic control	4 nos.
03	Muffle furnace – 800 °C with standard temperature gauges	2 nos.
04	Standard gauges 12" dial size make "Budenberg" or "H Guru" or "Odin"	
	A) – 1-0 kg/cm ² pressure gauge (vacuum gauge)	2 nos.
	B) 0 – 5 or 6 kg/cm ² pressure gauge	2 nos.
	C) 0 – 10 kg/cm ² – do –	2 nos.
	D) 0 – 25 kg/cm ² – do –	2 nos.
	E) 0 – 60 kg/cm ² – do –	2 nos.
	F) 0 – 100 kg/cm ² –do –	2 nos.
	G) 0 – 250 kg/cm ² – do –	2 nos.
	H) 0 – 600 kg/cm ² – do –	2 nos.
	I) 0.2 to 1 kg -- do --	2 nos.
05	Manometers (+/-) 1000 mm water column With hand bulb for lab and small manometers for field purpose.	4 nos.
06	Manometer (+/-) 500mm mercury column with hand bulb for lab and small manometer for field purpose.	2 nos.
07	Inclined manometer (+/-) 300 mm water column	2 nos.
08	Portable air compressor with drier and regulator make "Toshniwal"/ "Khosla" rated for 7 to 10 kg/cm	5 nos.
07	Soldering iron "Soldron" make 25 watt	5 nos.
09	Vacuum pump	2 nos.
10	Multimeters	
A)	Digital, 3 1/2 digit Motwane/ HIL/ Fluke	12 nos.
B)	Analog: Motwane make	6 nos.
C)	Digital, 4 1/2 digit Motwane/ HIL/ Fluke	8 nos.
11	Standard milliamps/ millivolts source of reputed make. Range 0 to 50 mA and 0 to 100 mV.	4 nos.
12	Insulation tester hand operated 250V/ 500V/ 1000V rated mains/ battery operated.	2 nos. Each
13	DC power supply 0-50 VDC, 5 A make "Aplab" or equivalent (variable source)	4 nos.
14	Single phase Variac 250 V, 8 A	2 nos.
15	3 phase Variac rating 5 A	2 nos.
16	Glass thermometer 0-120 °C, 0-200 °C and 0-600 °C	2 nos. Each

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Chapter – IV: T&P's and MMEs to be deployed by Contractor

S. No.	Description	Quantity
17	Tong tester AC 5/10 and 25/60/300 amp of reputed make	2 nos. Each
18	Tong tester DC 30/60/300 amp	2 nos.
19	Secondary current injection kit up to 300 amp	1 no.
20	Tarpaulin fire proof	20 nos.
21	DC shunt 400 A 75 mV	2 nos.
22	Tachometer non-contact type 0 to 4000 rpm	2 nos.
23	Industrial type vacuum cleaner	2 nos.
24	RTD/Pt 100 source	4 nos.
25	Decade resistance box	4 sets.
26	Teletalk 2 wire system/ Group Mobiles	12 sets
27	Equipment and consumables for LPI/ MPI test on impulse pipes	2 sets
28	Function generator	2 nos.
29	Torque screw driver for cable termination	As per requirement

Note: Instruments shown above are for the regular works only. However, separate sets of tools and instruments are to be arranged and provided to commissioning gang. If contractor fails to arrange the testing instruments as listed above, BHEL site will arrange the instruments at the cost of contractor. Contractor to submit calibration report from recognised agency prior to deployment of it at site and periodical calibration of the same to be arranged by contractor as per procedure of BHEL.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&P's and MMEs to be deployed by Contractor

S. No.	Description	Quantity
II. Handling equipment		
1	Turn buckles	As per requirement
2	D-shackles	
3	Steel wire ropes	
4	Manila ropes	
5	Chain pulley block/turfer	
6	Hand travel hydraulic lifting machine for lifting and transport of panels.	
III. Major T&P		
1	Pipe bending machine – 2” size	6 nos.
2	Grinding machine	12 nos.
3	Drilling machines 1/4”, 1/2”, 3/4” & 1”	2 nos. Each
4	Copper tube bender and cutter sizes 6mm, 8mm, 1/2”, 1/4”	2 nos. Each
5	Die sets for threading up to 2” pipe.	4 nos.
6	Spirit level	4 nos.
7	Tap sets for both BSP and NPT threads up to 1” each	2 sets each
8	Measuring instruments like micrometres and callipers	2 sets each
9	Welding generators	8 nos.
10	Welding transformer	8 nos.
11	TIG welding set	4 nos.
12	Mechanical tool kit for fitters	12 sets
13	Electrician tool kit	16 sets
14	Crimping tool	8 nos.
15	Flood light fittings	16 nos.
16	Fire extinguishers as required	2 sets
17	Distribution boards with power cable complete as required	2 sets
18	Painting brush	As per rqmt.
19	Fire proof tarpaulin	As per rqmt.
20	Safety belts and safety helmets	As per rqmt.
21	24V AC transformer & hand lamps	16 nos.
22	Ferrule printing machine	4 nos.
23	Electrode drying ovens	As required
24	Personal computer and accessories, Printer	1 set
25	Cranes, trucks etc. for transportation and erection of equipment	As required

Note: The list of instruments/ equipment to be brought by the contractor as shown above is only indicative. Any other instruments/MMD and equipment required for the execution of the work is to be necessarily arranged by the contractor. The testing/calibration instruments that are used shall be duly calibrated in the interval prescribed by BHEL engineer from the BHEL approved agencies. And test certificate to be furnished.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&P's and MMEs to be deployed by Contractor

The following materials/consumables are to be arranged by the contractor as part of the contractual scope.

S. No.	Description
01	Welding electrodes for welding AS/CS/SS pipe and other welding from BHEL approved vendors only
02	Filler wire for argon welding
03	Argon, oxygen and acetylene gas
04	Provision for temporary scaffoldings.
05	GI "U" clamps with nuts and washers for impulse and GI pipe clamping.
06	Round aluminium tags (30mm dia x 3mm thick)
07	Teflon tape and insulation tape.
08	Hold tight/ bitumen tape for GI pipe coupling.
09	Required paints and primer from BHEL approved vendors only.
10	Solder wire (60/40)
11	Protocol/calibration report sheets as per BHEL format.
12	Panel/JB sealing compound material (for cable entry from bottom/top of panel).
13	PVC cable tie, aluminium strip and hardware for clamping of cables, copper tube, and temperature gauge capillary.
14	Copper lugs up to 4 sq. mm. PVC sleeve of different size, PVC button & tape
15	All Paints, primers etc. for all paintable equipment in the scope
16	NPCIL approved cleaning agents for cleaning of Glass panels, doors and polished surfaces

Note: The above list is only indicative. The contractor to arrange consumables as required as per scope of contract.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – V: T&Ps and MMEs to be deployed by BHEL on sharing basis

List of T&P/instruments and consumables that will be made available by BHEL free of hire charges (on sharing basis).

01	EOT crane in TG hall shall be made available on sharing basis for handling panels	1 no
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Note:

Above T&P will be provided for specific erection/commissioning activities wherein this equipment will be required. While taking delivery, contractor shall check for proper working of the equipment and the same shall be returned after the work is completed to BHEL stores in good working condition subject to normal wear and tear.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.0 TIME SCHEDULE AND MOBILIZATION:

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION AND TENTATIVE SCHEDULE

Contractor shall reach site, make his site establishment and be ready to commence the work within **two weeks** from the date of fax Letter of Intent or as per directions of Construction Manager/ Project Manager of BHEL.

The contractor has to subsequently augment his resources in such a manner that the entire related works are completed to achieve the following tentative schedule:

S. No.	Activity	Unit-4
1	Start of work	Dec-2020
2	Turbine Barring Gear	June-2021
3	Synchronization	Sept-2021
4	Capacity Addition	Nov-2021
5	Trial Operation	Nov-2021
6	PG Test	Dec-2021
7	Completion of Facilities	Dec-2021

6.1.2 In order to meet above schedule and other intermediate targets/ activities as set by BHEL Engineer In-charge at site, to meet customer requirements/ project schedule, contractor shall arrange all necessary resources and work force in consultation with BHEL engineer at site to undertake works concurrently in all possible fronts as made available to the contractor.

6.1.3 Contractor shall specifically note that there is likely to be some delay in supplies of materials/ release of work fronts/ other reasons. Contractor shall have to work round the clock on such critical activities as a part of catch up programme to meet the project requirement to the extent possible and shall also provide required resources as part of scope of work.

6.2 CONTRACT PERIOD

The total contract period for completion of entire work will be **13 (Thirteen) months** from the date of start of Erection of the first major equipment. Erection, Testing, Calibration and Commissioning of permanent equipment required for completion of system shall be completed within the time schedule given above.

The contract shall commence from the date of deployment of contractor's T&P, proper site setup and erection of first equipment. All the above three conditions are to be fulfilled (certified by BHEL engineer) for deciding the date of commencement of the contract.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

The contractor shall complete all the work in the scope of this contract within the contract period.

6.3 DEFINITION OF WORK COMPLETION

The contractor's scope of work under these specifications will be deemed to have been completed in all respect, only when all the activities are completed satisfactorily and so certified by BHEL site in charge. The decision of BHEL in this regard shall be final and binding on the contractor.

6.4 SCHEDULE COMPRESSION

BHEL, owing to its commitment to their customer, may ask contractor to compress the total completion schedule by up to 10%. This will result in revision of various milestones. For achieving the same, contractor shall plan his activities and mobilise additional resources accordingly to the satisfaction of BHEL engineer within the quoted rates.

6.5 MATERIAL RE-CONCILIATION

The contractor shall do unit-wise material re-conciliation periodically.

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

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

Milestones	Activities	To be completed by
M1	Synchronization	Sept-2021
M2	Trial Operation	Nov-2021

Note A: Refer clause no 7.0 of ANNEXURE-11 IMPORTANT INFORMATION of the NIT regarding modalities against provision of penalty in case of slippage of Intermediate Milestones.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: Terms of Payment

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

<u>TERMS OF PAYMENT FOR C&I</u>		
Sl. No.	Activity/Work Description	% of unit rate
A	Main E&C Equipment/Items	
I	PRO RATA PAYMENTS (85%)	
1.0	Cable tray and accessories	
1.1	Fabrication and fixing/welding/bolting in position	60%
1.2	Earthing of cable trays	15%
1.3	Tagging of cable trays (painting cable tray numbers on sides)	5%
1.4	Covering of trays where ever envisaged	5%
	Total =	85%
2.0	Cable laying (Power Cables)	
2.1	Laying of cables	45%
2.2	Glanding, Termination and tagging of cables	15%
2.3	Dressing and clamping of cables	10%
2.4	Testing and charging of cables	15%
	Total =	85%
3.0	Cable laying (Control and Signal Cables)	
3.1	Laying of cables	45%
3.2	Glanding, Termination and tagging of cables	15%
3.3	Dressing and clamping of cables	10%
3.4	Shielding of cables	5%
3.5	Testing and charging of cables	10%
	Total =	85%
4.0	Junction box/Push button station (local)	
4.1	Erection including fixing of terminal blocks where ever applicable	75%
4.2	Name plate fixing where ever applicable, Labelling (both inside and outside) and Commissioning of connected equipment	10%
	Total =	85%
5.0	Conduits/Impulse pipe/tubes	
5.1	Fabrication, Laying and Erection	50%
5.2	Leak Test/Hydraulic Test (where ever applicable, otherwise clubbed with next activity)	20%
5.3	Dressing, clamping, tagging and painting where ever applicable	8%
5.4	Testing & commissioning of associated equipment/system	7%
	Total =	85%
6.0	Miscellaneous Structural steel including frames for Panels/Racks/Instruments, supports for cable tray/pipes/tubes, Canopies etc.	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: Terms of Payment

6.1	Fabrication, Erection, Alignment, Welding/bolting and where ever applicable chipping/grouting/painting	65%
6.2	Erection of associated Items/Equipment/Systems as applicable	20%
	Total =	85%
7.0	Panels/Cubicles/Desks/Racks/Enclosures/Monitors/Computers/Computer peripherals/PLCs/UPS/Batteries	
7.1	Erection and alignment	50%
7.2	Fixing of loose items/instruments where ever applicable	5%
7.3	Pre commissioning checks, Charging of panel and Loop testing etc.	15%
7.4	System commissioning	15%
	Total =	85%
8.0	Instruments/Devices including Sensors/Cells/Probes etc.	
8.1	Calibration/Testing/Pre erection checks	30%
8.2	Erection/Placement and fixing of loose items/accessories	30%
8.3	Pre commissioning checks/loop testing/Simulation testing as required	10%
8.4	Remote/local commissioning as required	15%
	Total =	85%
9.0	Commissioning and Testing activities for Equipment erected by other agencies, like control valves, on/off valves, electrical/pneumatic valves, actuators, solenoid valves, valves, limit switches, ERV controllers, power cylinders, Pressure & Temperature Gauges/Transmitters, etc.	
9.1	Removal & re-fixing/Fixing loose supplied components, including tubing/hose, regulators, etc.	30%
9.2	Calibration/Local testing - commissioning readiness	30%
9.3	Local Commissioning & Loop Testing as required	10%
9.4	System Commissioning or Remote Commissioning as required	15%
	Total =	85%
10.0	Power Cylinders	
10.1	Erection and alignment of Power Cylinders	30%
10.2	Fixing of loose items and Commissioning readiness	30%
10.3	Loop Checking, Calibration and Local commissioning	20%
10.4	System/ Remote commissioning as required	5%
	Total =	85%
11.0	Miscellaneous items (items not covered under above heads)	
11.1	Erection	50%
11.2	Alignment	10%
11.3	Testing	15%
11.4	Completion	10%
	Total =	85%
II	STAGE/MILESTONE PAYMENTS (15%) % of unit rate	
1	House-keeping & Cleaning of Control Room, Area cleaning, temporary structures cutting/removal and return of scrap	2%
2	Safety compliance	2%

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Chapter – VII: Terms of Payment

3	Oil Flushing (TG)	0%
4	Barring Gear (TG)	1%
5	Rolling and Synchronization	2%
6	Full Load	2%
7	Trial Operation of Unit	2%
8	Painting	1%
9	Area cleaning, temporary structures cutting/removal and return of scrap	0%
10	Punch List points/pending points liquidation	1%
11	Submission of 'As Built Drawings'	0%
12	Material Reconciliation	1%
13	Completion of Contractual Obligation	1%
Total for Milestone/ Stage payments (15%)		15%

B OTHERS

1	Laboratory Instruments installation and demonstration where ever applicable.	100%
2	PG Test Instruments installation (50%) and removal (50%)	100%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: TAXES AND OTHER DUTIES

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

1. All taxes excluding GST, GST Cess & BOCW Cess **but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.**
2. Any increase of the taxes excluding GST, GST Cess & BOCW Cess, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.
3. **GST** :
The successful bidder shall furnish proof of GST registration .GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.
4. GST charged in the Tax Invoice/Debit note by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return
5. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.
If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.
6. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:
BHEL GSTN – As per **Annexure -1**
NAME -- Bharat Heavy Electricals Limited
ADDRESS – Site address

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: TAXES AND OTHER DUTIES

7. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-
Email id ---- to be intimated later on.
In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.
8. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.
9. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.
10. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.
11. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.

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

12. **New taxes and duties:-**Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties. Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.
In case any new tax/levy/duty etc. becomes applicable after the date of bidder's offer but before opening of the price bid, the bidder must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VIII: TAXES AND OTHER DUTIES

price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

13. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.
14. **TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.**
15. **TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.**
16. **TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions**
 - i. Buyer shall be as per clause (a) of section 206C- (1H)
 - ii. Seller shall be as per clause (b) of section 206C- (1H)
 - iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling

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under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

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

17. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

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

ANNEXURE-2

BOCW Act & Cess Act

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

1. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
2. It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
3. It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
4. It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may , by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.

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5. It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.
6. It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
7. It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
8. It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics :
 - (i) Number of Building Workers employed during preceding one month.
 - (ii) Number of Building workers registered as Beneficiary during preceding one month.
 - (iii) Disbursement of Wages made to the Building Workers for preceding wage month.
 - (iv) Remittance of Contribution of Beneficiaries made during the preceding month
9. BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
10. It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.
11. Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%) on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.
12. The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and

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Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

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Chapter-IX: Special Inclusions

9.0 SPECIAL INCLUSIONS:

Consumables/items to be provided by BHEL free of charge

1. Metallic Cable glands.
2. Steel for fabrication.
3. Lugs beyond 4 sq. mm size.

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Chapter-X: Special Exclusions

10.0 Exclusions

The following are specific exclusions from this work.

1. Attachment welding of thermocouple pads for boiler tube metal temperature measurement and fixing of thermo wells in the pipelines.
2. Erection of flow nozzles.
3. Erection of valves, actuators along with valves, damper actuators along with dampers, burner tilt power cylinder, seal air dampers and scanner air emergency dampers and control valves. (However, SADC power cylinder installation will be in the scope of the contractor if applicable)
4. Erection of electro hydraulic actuators.

Note: The aforesaid exclusions should not be construed as exhaustive. They are meant for general guideline. BHEL reserves the right to include or exclude any item which is required for completing the job as per rates indicated in rate schedule. Contractor should carry out all such jobs as per the instructions of BHEL engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Annexure-I: Technical details & BOQ

Annexure- I

Details (wherever required) of items listed in the rate schedule:

Note:

1. All the items in general are to be erected and commissioned by the contractor, unless specifically mentioned otherwise.
2. In such cases where systems are described with component quantities (viz., Vibration monitoring systems, Lube Oil skids, etc., etc.) lump sum rates are to be quoted. No separate payment will be made for the component items of those systems, although these systems may have certain items for which separate unit rates are also available elsewhere.
3. The dimensions and weights mentioned are only approximate. No extra claims will be entertained due to change in dimensions/weight.

❖ **Cable trays and accessories**

Flexible GI cable support system, consisting of single/double channels, base plates, cantilever arms as per BOQ given. Wherever necessary, the base plate and beam clamps will be supplied for bolting. Otherwise, the base plates are to be welded to the racks or beams. Necessary 90 deg. angle fittings, flat plate fittings, clamps for single & double channels, fasteners etc. will be supplied for fixing trays and cantilever arms and for this no separate erection charges will be paid. Rates shall be accommodated in support channel and cantilever arm erection. Support channels will be supplied in standard running lengths, and shall be cut at site depending on requirement, and exposed metal portion shall be painted as per specification given in the relevant sections. Payment for erection will be made on per meter basis. No separate rate will be paid for cutting & painting.

Cantilever Arm for 150 mm tray, complete with 4 Nos. spring nuts, 2 Nos. bolts & washers for fixing to main channel support and for fixing cable tray.

Cantilever Arm for 100 mm tray, complete with 4 Nos. spring nuts, 2 Nos. bolts & washers for fixing to main channel support and for fixing cable tray.

Base Plate (For Single Channel) complete with 2 Nos. spring washers, bolts and nuts for fixing main support channel.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Annexure-I: Technical details & BOQ

❖ **S. No. I5.0: Impulse Pipes/ Tubes**

All site erected impulse lines are subject to hydrotest, radiography test in line with mother pipe requirements. All weld joint in CS, SS, AS line are subject to 100% radiography test with minimum two shots per joint. Same shall be in erection agency scope. Vendor shall generate all testing reports/ documentation required for final acceptance of customer.

❖ **S. No. I7.0.2 to I7.0.4 & I7.0.6: Control panels**

These are microprocessor based sophisticated electronic control panels in majority. Weights range from 400 to 1600 kg from I7.0.2 to I7.0.4 respectively.

❖ **S No I7.0.5: Network panels**

These panels are used basically for housing Ethernet switches which are to be wired up with various other max stations. System interface network panels also house computer CPUs, monitors, etc.

❖ **S. No I7.0.17: Vibration Monitoring, Analysis & Diagnostic system for Main turbine/ Generator:**

1 set of Vibration Monitoring, Analysis & Diagnostic system for Main turbine consist of following (approximate quantities):

IMPORTED ITEMS:

- Standard 19" Rack containing various cards like power supply cards, CPU card, condition monitoring cards, etc. supplied mounted or loose – 07 nos.
- Software for configuration of Machinery Protection System – 01 nos.
- Software for Analysis & Diagnostics – 01 nos.

HP Admission Valve:

- Piezo-Accelerometer Probe with 10 Meter Cable – 08 nos.
- Charge Amplifier for Piezo-Accelerometer – 08 nos.

Rotor Eccentricity:

- Proximity Probe with 2 m Integral Cable – 01 nos.
- 8 Meter Extension Cable – 01 nos.
- Signal Conditioner – 01 nos.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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Absolute Bearing Vibration:

- Accelerometer Probe – 33 nos.
- 10 Meter Extension Cable – 33 nos.
- Signal Conditioner – 01 nos.

Relative Shaft Vibration:

- Proximity Probe with 2 m Integral Cable – 22 nos.
- 8 Meter Extension Cable – 22 nos.
- Signal Conditioner – 22 nos.

HP/LP3 Rotor Absolute Expansion:

- Probe Assembly – 03 nos.
- 9 Meter Extension Cable – 03 nos.
- Signal Conditioner – 03 nos.

HP Casing Absolute Expansion:

- 50mm LVDT Expansion Probe – 01 nos.
- Extension Cable – 01 nos.
- Signal Conditioner – 01 nos.

Rotor Axial Displacement:

- Probe Assembly – 03 nos.
- 8 Meter Extension Cable – 03 nos.
- Signal Conditioner – 03 nos.

Phase Reference:

- Probe Assembly – 03 nos.
- 8 Meter Extension Cable – 03 nos.
- Signal Conditioner – 03 nos.

INDIGENOUS ITEMS:

- Fully Wired & Assembled System Panel with Marshalling Panel (approx. dim. 1500 x 800 x 2250 mm) – 03 nos.
- Junction Boxes (approx. dim. 300 x 250 x 121 mm) – 23 nos.
- Mounting Brackets for mounting of above sensors like Brg. Abs. Vibration, Brg Relative Shaft Vibration, Phase measurements, etc. – 01 set
- Signal Isolators – 65 nos.
- SS conduits for transducer extension cables – 74 nos.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Annexure-I: Technical details & BOQ

- Intelligent Ethernet Switch – 02 nos.
- HMI consisting of Server PC, Monitor, Printer – 1 set
- Fibre Optic Cable 300 meter – 2 nos.
- Calibration Equipment (Portable Shaker Table, Micrometer Kit & Laptop) – 1 set

Lump sum rate per set is to be quoted.

❖ **S. No I7.0.18: Condition Monitoring System Panels**

Condition monitoring system panels consists of the following (approximate quantities):

- Fully Wired & Assembled System Panel (approx. dim. 800 x 800 x 2250 mm) – 01 nos.
- VMS Rack (approx. dim. 543 x 300 x 220 mm) – 03 nos.

Lump sum rate per set is to be quoted.

❖ **S. No I7.0.19: Generator End Winding Vibration Monitoring System**

Generator End Winding Vibration Monitoring System consists of (approximate quantities): Panel, pre-amplifier units, Junction Boxes, special cables for interconnecting the probes and amplifiers, PC based vibration monitor, printer, etc.

Approximate size & weight of the panel: 800 x 800 x 2200 mm; 250 kg.

Lump sum rate per set is to be quoted.

❖ **S. No I7.0.15: Condenser Vacuum Pump (CVP) system**

Removal, calibration and commissioning of CVP skid mounted instruments including CVP PLC and motor mounted on the skid. The approximate quantity of skid mounted instruments shall be

- Pressure Indicators – 2 nos.
- Flow Switches – 1 nos.
- Level Switches – 2 nos.
- Pressure/DP Switches – 2 nos.
- Temperature Switch – 1 nos.
- Limit Switch – 1 nos.
- Temp. Indicators – 2 nos.
- Flow Indicators – 1 nos.
- Solenoid valves – 2 nos.

Lump sum rate per set is to be quoted.

❖ **S. No I7.0.8: LIRs**

Local instrument racks are open type housing for field instruments. These have to be located in suitable places, impulse piping and cabling to be done. Number of instruments in each LIR will vary.

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Chapter-XI: Annexure-I: Technical details & BOQ

❖ S. No I7.0.11: Computer Furniture

Details of Computer Furniture (approximate quantity) are as below:

- Computer Table (approx. dimension 750(W) x 765(H) x 1100(D) mm – 5 Nos.
- Printer Tables (approx. dimension 1500(W) x 750(H) x 750(D) mm – 4 Nos.
- Chairs – 7 Nos.

The furniture will be delivered in knocked down condition and will have to be assembled at site by contractor.

Lump sum rate is to be quoted.

❖ S. No I7.0.21: 24 V DC Battery charger, DCDB, Battery bank:

Each set comprising of:

- 24 VDC/ 625A Battery Charger Dual FCBC along with DCDB (approx. overall dimension 2800 x 800 x 2300 mm) - 2 nos.
- 24 VDC/ 625A Standby Charger (approx. overall dimension 2100 x 800 x 2300 mm) - 1 nos.
- Battery Bank (Battery Tx1300P HDP cells – 13 nos., Electrolyte – 28 litre/cell, approx. wt. 138 kg/cell with electrolyte) along with stands – 2 nos. including BHMS (approx. overall dim. 1910 x 1210 x 1010 mm, approx. weight 2 MT) - 2 nos.

Battery accessories & commissioning spares, copper termination plates with proper support arrangements, assembling of battery stand of mild steel, battery discharge resistor bank, etc.

Lump sum rate per set is to be quoted.

❖ S. No I7.0.22: 220 V DC Battery charger, DCDB, Battery bank:

Each set comprising of:

- 220 VDC/ 90A Battery Charger Dual FCBC along with DCDB (approx. overall dimension 1800 x 800 x 2300 mm) - 2 nos.
- Battery Bank (Battery TX250P HDP cells – 110 nos., Electrolyte – 5.5 litre/cell, approx. wt. 28 kg/cell with electrolyte) along with stands – 7 nos. including BHMS (approx. overall dim. 6015 x 1730 x 847 mm, approx. weight 4.26 MT) - 2 nos.

Battery accessories & commissioning spares, copper termination plates with proper support arrangements, assembling of battery stand of mild steel, battery discharge resistor bank, etc.

Lump sum rate per set is to be quoted.

❖ S. No I7.0.23: 220/240VAC UPS System and ACDB

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: Annexure-I: Technical details & BOQ

Parallel Redundant UPS Power supply system with isolation transformer, inverter and SCVS, 2 X 30 kVA rating consisting of:

- 2x30kVA UPS along with ACDB (approx. overall dimension 3200 x 1000 x 2500 mm, approx. wt. 2.5 MT).
- Battery Bank (Battery TX500P HDP @500AH – 2x110 nos.) along with stands – 7 nos. (approx. overall dim. 6005 x 866 x 2022 mm per set, approx. total weight 11.11 MT).

Scope includes laying and termination of power cables between the panels, battery banks, ACDBs, cable connectors, etc.

Commissioning supervision is in the scope of the supplier. Contractor to provide erection and commissioning support only.

Lump sum rate per set is to be quoted.

❖ **S. No I9.0.12: Rack mounted Instrument Commissioning**

The scope of work includes removal of instruments, calibration, refixing, checking cable connection from JB to instruments, motor connection, meggering and improving IR value of motor etc. and commissioning the skid.

Lump sum rate per set is to be quoted.

❖ **S. No I11.0.2: DIGITAL AUTOMATIC VOLTAGE REGULATOR (DAVR) PANELS**

One set of DAVR Panel consist of Regulation Cubicle, Thyristor Cubicle and Field suppression cubicle. The approx. overall dimension shall be 2300 x 2300 x 1200 mm, total approx. weight – 2 MT. PC, LCD monitor, interfacing cables, etc. shall be supplied loose which are to mounted in the DAVR panel.

Erection, calibration (as the case may be) testing and commissioning of various equipment located in these panels will be considered as a part of DAVR panel erection and commissioning and no separate payment will be done for the same.

Lump sum price is to be quoted.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII: Industrial Safety

12.1 INDUSTRIAL SAFETY

The contractor shall comply with all provisions of “AERB Safety Guide for Works Contract” Document No. AERB/SG/IS-1 (annexure-3) and other safety requirements as applicable to specific site. The Contractor shall meet statutory requirements as well as regulatory requirements applicable to the project, in general and NPCIL in particular, especially the requirements as per Factory Act-1948 (amended in 1987). Atomic Energy Factories Rule-1996 (AEFR-1996 or latest version applicable at the time of work execution), safety guidelines for Job Hazard Analysis (JHA) and AERB notifications on Industrial Fire & Safety. The copies of the same can be obtained from BHEL/NPCIL on request.

12.2 SAFETY GUIDELINES

- 12.2.1 The contractor shall ensure minimum first aid arrangements available at all times at site and other arrangements in collaboration with local health authorities. The contractor shall establish a first aid center at site with full time ambulance facility with a male nurse/first aider.
- 12.2.2 The contractor shall provide and maintain all lights, fencing, guards, warning signs and caution board and similar items as required to ensuring safe working conditions at work site.
- 12.2.3 The contractor shall comply with the instructions given by departmental safety officer or his representative regarding safety precautions, protection measures and housekeeping etc.
- 12.2.4 The contractor shall comply with all provisions of AERB Safety Guide for Works Contract Document no. AERB/SG/IS-1 and other safety requirements as applicable to specific site. A copy of guide can be requested from BHEL/NPCIL on request.
- 12.2.5 The contractor shall provide proper access and working platforms for all place of work as per laid down standards or as advised by Engineer –in-charge or Head-IS&F.
- 12.2.6 The contractor shall ensure that all floor openings in his work are guarded/barricaded during the course of work and at the end of each day's work.
- 12.2.7 The contractor shall meet statutory requirements applicable to the project in general and NPCIL in particular especially the requirements as per Factory Act-1948 (amended in 1987), Atomic Energy factories rule-1996 (AEFR-1006 or latest version available at the time of work execution) safety guidelines for Job Hazard Analysis (JHA) & AERB notifications on Industrial & Fire safety. The copies of the same can be obtained from BHEL/NPCIL on request.
- 12.2.8 The contractor's safety professionals shall be aware about Acts, Rules connected with Industrial Safety and practices particularly applicable to the project and to threat effect they have to undergo an assessment the project within 15 days of their placement at the project at the cost of the contractor and then only he/she would be given permanent entry pass and considered in required strength of the safety professionals.
- 12.2.9 All PPE procured and provided to workers shall confirm to relevant Indian Standards and should be maintained in healthy condition by suitable storage, maintenance and inspection.

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Chapter-XII: Industrial Safety

12.2.10 Contractor working at the height of more than 2.5 metres above stable floor or ground floor must acquire height pass as per procedure including the worker's medical fitness certificate by certifying surgeon (having MBBS qualification) and worker's height qualification etc. If in any height work, the worker is found without having height pass, it will be recorded for regulation of payment. The decision of BHEL engineer with regards to the regulation of payment shall be final and binding.

12.2.11 Contractor shall ensure safe movement of man and material as well as vehicles in site premises as per rules/regulations applicable at or issued by plant. In case of violation of the rules/regulation it will be recorded for regulation of payment. The decision of BHEL engineer with regards to the regulation of payment shall be final and binding.

12.3 SAFETY PLAN

12.3.1 Contractor at his cost shall perform following tasks for the job having high risk as identified by Department Safety Group:

- a) Prepare Safe Working Procedures and ensure its implementation in field.
- b) Carry out Job Hazard Analysis (JHA) and implement in field.
- c) Based on JHA, the safe working procedures should be modified specially to include checklists as necessary checkpoints for job safety supervision.
- d) Worker (s) must be trained based on safe working procedure and explained about DOs and DON'Ts prior to assigning him the job.
- e) The workers must adhere to the safe working procedure for the job.
- f) Contractor shall ensure that all Tools, Appliances, erecting equipment and their safe use by the contractor work force shall be meeting Indian Standards. The contractor must ensure that necessary authorization exist with workmen prior to their deployment on a particular appliance/tool/equipment. The workmen would be required to acquire additional authorization for crane operation, crane signaling, blasting operation, welding and cutting operation, electrical work etc. And then only workmen shall be deployed for such job. He shall maintain all record of tools and equipment for their healthiness and safe use with a copy to departmental safety group.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XIII: Schedule of items Quantities and Factor for deriving Item Rate from the accepted Lump sum Price

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

CONTENTS	
Description	Remarks
Part A: Instructions to the Bidders	Instructions
PART B: % weightage for amount of individual items of Schedule of quantity	Refer Latest Chapter-XII: Schedule of items Quantities and Factor for deriving Item Rate from the accepted Lump Sum Price (Please Refer Separate Document uploaded as "Chapter XIII BOQ and Percentage Weightage'-2321").

Part A: Instructions to the Bidders

1. Bidders shall quote Total Lump-sum Price for the entire scope of work at the place implanted in the E-Procurement Portal titled as “Part-C of Vol-II Price Bid”. Any other entry elsewhere in the offer of the bidder shall be treated as Null and Void.
2. BHEL has fixed the Factors of individual items of Schedule of Quantity w.r.t. the total lump sum price (as quoted by the bidder in Part C). These item wise factors are available in Chapter-XIII of Volume I TCC. Also schedule of items & Quantities are also available in Chapter-XIII of Volume I TCC.
3. Based on the pre-fixed factors and the quoted total lump sum price, individual item rates shall be derived by BHEL by multiplying the respective factors with total lump sum price.
4. Item rates thus derived shall be rounded off to zero decimal places. Rounding off may lead to minor variation in the total lump sum price. This will be adjusted by BHEL by very minor adjustment of the derived item rates. This will be done to arrive at the exact quoted/ accepted Lump sum price given by the bidder.
5. For only the convenience of bidders, BHEL has issued an excel sheet with all requisite formulae as detailed above. However, this excel sheet shall not form part of contract document

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

Note: This Chapter-XII is uploaded as file titled ‘**Chapter XIII BOQ and Percentage Weightage’-2321**.