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NOTICE INVITING TENDER

(Document No PS:MSX:NIT)

Bharat Heavy Electricals Limited



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NOTICE INVITING E-TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

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To

Dear Sir/Madam

Sub : NOTICE INVITING E-TENDER

Sealed offers in two part bid system (National competitive bidding (NCB) 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

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	TENDER NO. BHEL/NR/SCT/KHURJA/ELECTRICAL/1269	
ii	Broad Scope of job	ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF HT/LT ELECTRICAL SYSTEM AND ILLUMINATION WORKS FOR UNIT#1 & UNIT#2 OF 2X660 MW KHURJA SUPER THERMAL POWER PROJECT, KHURJA, U.P.	
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>	<i>Applicable</i>
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i>	<i>Applicable</i>
c	Volume-IC	<i>General Conditions of Contract (GCC)</i>	<i>Applicable</i>
d	Volume-ID	<i>Forms and Procedures</i>	
e	Volume-II	<i>Price Schedule (Absolute value).</i>	<i>Applicable</i>
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL eProcurement portal (https://eprocurebhel.co.in) till due date of submission: Start : 14/06/2022 , Time : 10:30 Hrs Closes: 27/06/2022, Time: 10:00 Hrs Brief information of the tenders shall also be available at BHEL website (www.bhel.com)	<i>Applicable</i>
v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 27/06/2022 , Time : 10:00 hrs Place : on https://eprocurebhel.co.in	<i>Applicable</i>

vi	OPENING OF TENDER	Date : 27/ 06/2022, Time : 15:30 hrs Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.	Applicable
vii	EMD AMOUNT	Rs. 20,39,000/-	Applicable
viii	COST OF TENDER	Free	
ix	LAST DATE FOR SEEKING CLARIFICATION	Five days before bid submission due date Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: Shabana Parveen Designation: Manager Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline/Mobile) 0120 - 2416444 Email : shabana.parveen@bhel.in 2) Name: G.V.RAJASEKHAR Designation: Sr. Manager Deptt: SCT Address: BHEL-PSNR, PLOT NO. 25, SECTOR – 16A, NOIDA - 201301 Phone: (Landline/Mobile) 0120-2416232 Email : gvr@bhel.in	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)	Date :	Not applicable.
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	Please refer clause no. 15.	Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc. to Tender Specifications will be hosted in BHEL webpage (www.bhel.com -->Tender Notifications →View Corrigendums), BHEL eProcurement portal (https://eprocurebhel.co.in) and not in the newspapers . Bidders to keep themselves updated with all such information.	

- 2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed digitally using Class III DSC & uploaded in E-Procurement Portal, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**
- 3.0 **Not Used.**
- 4.0 Unless specifically stated otherwise, bidder shall deposit EMD as per clause 1.9 of General Conditions of Contract.

For Electronic Fund Transfer the details are as below:-

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

b) Bank Particulars

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

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

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

Documents Comprising the e-Tender

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

a. Technical Tender (UN priced Tender)

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

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

b. Price Bid:

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

- 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**)

The contact details of the service provider are given below:

For any technical related queries please call at 24 x 7 Help Desk Number

0120-4001 002, 0120-4001 005 & 0120-6277 787

International bidders are requested to prefix 91 as country code

Email Support - Technical - support-eproc@nic.in

Note: For any Issues or Clarifications relating to the published tenders, bidders are requested to contact the respective Tender Inviting Authority

The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate)**

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

The contact details of the DSC Certifying Authority as given below:

Sl. No.	Name	Website Link
1	GNFC	www.ncodesolutions.com
2	e-Mudhra	http://www.e-Mudhra.com
3	Safescrypt	www.safescrypt.com

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

- 6.0 Not used.
- 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:**

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

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

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

Total number of Packages in hand = Load (P)

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

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

(Note: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table 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 P₂, T₃ for package P₃, 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 = T₁ + T₂ + T₃ + T₄ + ..T_N)

- c) Sum 'S₁' of 'Monthly Performance Evaluation' Scores (S₁₋₁, S₁₋₂, S₁₋₃, S₁₋₄, S₁₋₅.... S_{1-T1}) for similar package P₁, for the 'period of assessment' 'T₁' (i.e. S₁ = S₁₋₁+ S₁₋₂+ S₁₋₃+ S₁₋₄+ S₁₋₅+...S_{1-T1}). Similarly, S₂ for package P₂ for period T₂, S₃ for package P₃ for period T₃ 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' = S₁+ S₂+ S₃+ S₄+ S₅+.... S_N.)
- d) **Overall Performance Rating 'R_{BHEL}' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

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

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

- e) **Bidders to note that the risk of non-evaluation or non-availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder.**
- f) **Table showing methodology for calculating 'a', 'b' and 'c' above**

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No. of similar packages for all Regions = 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}	-----

Sl. No.	Item Description	Details for all Regions							Total
		(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	
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 and ≤ 65	0.4
3	> 65 and ≤ 70	0.35
4	> 70 and ≤ 75	0.25
5	> 75 and < 80	0.2
6	≥ 80	NA

- iv). Performance Systems: The performance rating as mentioned in II (i) and (ii) above, shall be calculated as per Online Systems i.e. Contractor Performance Evaluation System (CPES) and Safety Performance Evaluation System (HSEPES). The scores assigned in HSEPES shall be scaled down to 10 and assigned in CPES against the category "HSE" (mentioned in Form F-15).

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} ≥ 80, there will be no upper limit on P_{Max}

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

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

In addition to above, in case contractor fails to score more than 5 (five) marks in the scaled down scores of HSEPES for "more than 2 months in a period of 6 months preceding and including the cut-off month in any single package", the contractor shall be considered disqualified for ongoing tender(s) of BHEL. Qualification of bidder for further tendering process shall be subject to qualifying this condition in addition to qualifying requirements mentioned in PQR. Bidders who did not qualify this condition shall not be considered under the provisions of clause 9 IV (iv) of NIT.

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	i). Electrical	i). Boiler & Aux (All types including CW Piping if applicable)
ii). Pile and Pile Caps	ii). C&I	ii). Power Cycle Piping/Critical Piping
iii). Civil Works including foundations	iii). Others (Elect. and C&I)	iii). ESP
iv). Structural Steel Fabrication & Erection		iv). LP Piping
v). Chimney		v). Steam Turbine Generator set & Aux
vi). Cooling Tower		vi). Gas Turbine Generator set & Aux
vii). Others (Civil)		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 and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

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

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

- iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than four, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders' and for this, procedure described in following three options shall be followed:
- a) All the bidders having Overall Performance Rating (R_{BHEL}) ≥ 60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
 - b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥ 60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
 - c) If even after using option "a" and "b", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

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

- v). 'Under execution' shall mean works in progress as per the following:
- a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages
 - b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages
 - c. Up to Synchronization in all Balance Packages
- Note: BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (a), (b) and (c) above, depending upon the balance scope of work to be completed.

- vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.
- vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 27th of Evaluation Month or 5 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.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at Clause no. 1, Salient Features of NIT, Sl. no. (xi) above.**

“Integrity Pact (IP)”

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

Sl. No.	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

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

- 16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
- 19.0 BHEL 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 Not Applicable
- 24.0 The bidder shall submit documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.
- 25.0 The bidder may have to produce original document for verification if so decided by BHEL.
- 26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.

- 27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "supplier registration page".
- 28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.
- 28.1 Integrity commitment, performance of the contract and punitive action thereof:
- 28.1.1 **Commitment by BHEL:**
BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.
- 28.1.2 **Commitment by Bidder/ Supplier/ Contractor:**
- (i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
 - (ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
 - (iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

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

- 29.0 Not Applicable
- 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 in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.
- 31.1 **Compliance to Restrictions under Rule 144 (xi) of GFR 2017**

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means:-
 - a. An entity incorporated established or registered in such a country; or
 - b. A subsidiary of an entity incorporated established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose *beneficial owner* is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- IV. The *beneficial owner* for the purpose of (III) above will be as under:
 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
Explanation
 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
- VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Note:

- (i) The bidder shall provide undertaking for their compliance to this Clause, in the format provided in Annexure-11.
- (ii) Registration of the bidder with Competent Authority should be valid at the time of submission of bids and at the time of acceptance of the bids.

32.0 Not used

- 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 **Not used**

36.0 Order of Precedence:

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

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

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

for BHARAT HEAVY ELECTRICALS LTD
(SCT)

Enclosure:

- (i) Annexure-1: Pre Qualifying Requirements.
- (ii) Annexure-2: Check List.
- (iii) Annexure-3: Not used
- (iv) Annexure-4: Reverse Auction Process Compliance Form
- (v) Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
- (vi) Annexure-6: RA Price Confirmation and Breakup
- (vii) Annexure-7: Integrity Pact
- (viii) Annexure-8: Undertaking as per C4 of Annexure-1 i.e. PQR
- (ix) Annexure-9: Declaration reg. Related Firms & their areas of Activities
- (x) Annexure-10: Declaration reg. minimum local content in line with revised public procurement
- (xi) Annexure-11: Declaration by the Contractor
- (xii) Other Tender documents as per this NIT.

ANNEXURE - 1**PRE QUALIFYING REQUIREMENTS (PQR)**

JOB	ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF HT/LT ELECTRICAL SYSTEM AND ILLUMINATION WORKS FOR UNIT#1 & UNIT#2 OF 2X660 MW KHURJA SUPER THERMAL POWER PROJECT, KHURJA, U.P.
TENDER NO.	TENDER NO. BHEL/NR/SCT/KHURJA/ELECTRICAL/1269

SL. NO.	NAME AND DESCRIPTION OF PRE QUALIFICATION CRITERIA	
A	Submission of Integrity Pact	Applicable
B	Technical Bidder who wish to participate should have	Applicable
B-1	Executed similar work for any one of the following in the last seven (7) years from latest date of bid submission:	Applicable
B-1.1	One (01) work of value not less than Rs. 831.20 Lakhs. OR	
B-1.2	Two (02) works each of value not less than Rs. 519.50 Lakhs OR	
B-1.3	Three (03) works each of value not less than Rs. 415.60 Lakhs. The word 'Similar Works' means 'Electrical' OR 'C&I' OR 'Electrical and C&I' works.	
B-2	Executed Electrical works consisting of: a) Power Transformers of at least 156 MVA rating b) HT Bus ducts c) HT Switchgears 'Executed' means charging of Power Transformers/ Bus ducts/ " HT/ LT Switchgears" / " HT/LT Cabling".	Applicable
C	FINANCIAL:	Applicable
C-1	TURNOVER: Bidders must have achieved an average annual financial turnover (Audited) of INR 311.70 Lacs or more over last three Financial Years (FY) i.e. (2018-2019, 2019-2020, 2020- 2021).	
C-2	NET WORTH: Net worth (only in case of companies) of the bidder should be positive. Note: Net worth shall be calculated based on the latest Audited Accounts, as furnished for 'C-1' above. Net worth = Paid up share capital + Reserves.	Applicable

C-3	PROFIT: Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'C-1' above based on latest Audited Accounts. Note: <i>PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above.</i>	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 authority/authorities, which will render him ineligible for participation in this tender, and shall submit undertaking (Annexure-8) to this effect.	Applicable
D	Assessment of Capacity of bidder to execute the work as per clause 9.0 of NIT	Applicable
E	Approval of Customer	Applicable
F	Price Bid Opening Note: <i>Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E</i>	BY BHEL
G	Consortium Criteria	Not Applicable

Explanatory Notes for QR :

1. 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.
2. 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.
3. For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria 'B-1' above, bidder may utilize the experience of its Parent/Subsidiary Company along with its own experience, subject to following:
 - a. The parent Company shall have a controlling stake of $\geq 50\%$ in the subsidiary company (as per Format-1).
 - b. The parent company/subsidiary company of which experience is being utilized for bidding shall submit Security Deposit (SD) equivalent to 1% of the total contract value.
 - c. The parent/Subsidiary Company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2)
4. 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. Completion date shall be reckoned from the "FY quarter of bid submission".
5. For Sl. No. 'B-1' above, actual executed value shall be considered.
6. For Sl. No. 'B-1 & B-2' above, the bidder should have achieved the specified technical criteria even if the Contract has not been completed or closed.
7. For sl.no. 'B-1' above, actual executed value shall be considered. The evaluation currency for this bid shall be **INR**. For sl.no. 'B-1' above, Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula-

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

Where

P = Updated value of work

R = Value of executed work

X_N = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

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

Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

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

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

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

Format-1**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)

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 Nodated..... 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 fulfilment 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

ANNEXURE - 2**CHECK LIST****NOTE:- Tenderers are required to fill in the following details and no column should be left blank**

1	Name of the Tenderer		
2	Address of the Tenderer		
3	Type of the Firm/ Company		
(i)	In case of Individual Tenderer	His / her full name, address and place & nature of business shall be furnished along with the offer.	
(ii)	In case of Partnership Firm	The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership duly certified by the Notary Public shall be furnished along with the offer..	
(iii)	In case of Companies	a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished). b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.	
4.a	Details of Contact person for this Tender	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID:	
4.b	Details of alternate Contact person for this Tender	Name : Mr/ Ms Designation: Telephone No: Mobile No: Email ID:	
5	EMD DETAILS		
6	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
7	Whether all pages of the Tender documents including annexures, appendices etc are read and understood	Applicable	YES / NO
8	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE – 1) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
9	Audited Balance Sheet and profit & Loss Account for the last three years	Applicable	YES / NO
10	Copy of PAN Card	Applicable	YES / NO
11	Copy of GST registration	Applicable	YES / NO

SL. NO.	DESCRIPTION	APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
12	Organization Chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.	Applicable	YES / NO
13	Integrity Pact (Annexure – 7 of NIT)	Applicable	YES / NO
14	Annexures – 5, 8, 9, 10 & 11 of NIT	Applicable	YES / NO
15	Offer forwarding letter / tender submission letter [Form No. F-01 (Rev 00)]	Applicable	YES / NO
16	Declaration by Authorised Signatory [Form No: F-02 (Rev 00)]	Applicable	YES / NO
17	Declaration by Authorised Signatory regarding Authenticity of submitted documents [Form No: F-02A (Rev 00)]	Applicable	YES / NO
18	No Deviation Certificate [Form No: F-03 (Rev 00)]	Applicable	YES / NO
19	Declaration confirming knowledge about Site Conditions [Form No: F-04 (Rev 00)]	Applicable	YES / NO
20	Declaration for relation in BHEL [Form No: F-05 (Rev 00)]	Applicable	YES / NO
21	Non-Disclosure Certificate [Form No: F-06 (Rev 00)]	Applicable	YES / NO
22	Bank Account Details for E-Payment [Form No: F-07 (Rev 00)]	Applicable	YES / NO
23	Format for seeking clarification [Form No: F-08 (Rev 00)]	Applicable	YES / NO
24	Capacity Evaluation of Bidder for current Tender [Form No: F-09 (Rev 00)]	Applicable	YES / NO
25	Power of Attorney for Submission of Tender/Signing Contract Agreement [Form No: F-25 (Rev 00)]	Applicable	YES / NO
26	Analysis of Unit rates [Form No: F-26 (Rev 00)]	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 :

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

ANNEXURE – 3

Not used

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.{.....} dt. {.....}

This letter is to confirm that:

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

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

With regards

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

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

ANNEXURE – 5**Authorization of representative who will participate in the on line Reverse Auction Process:**

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

ANNEXURE – 6

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

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. {...} 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:**

ANNEXURE – 7

INTEGRITY PACT

Integrity Pact format attached separately

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:

I/We, _____

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

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

Place:

Date:

ANNEXURE-9

DECLARATION

Date: _____

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

Annexure-10

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

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

To,

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No:
2) All other pertinent issues till date

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

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

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

Thanking you,
Yours faithfully,

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

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

Note:

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

ANNEXURE-11

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017
(To be typed and submitted in the Letter Head of the Entity/ Firm providing certificate as applicable)

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

Dear Sir,

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

Ref : 1) NIT/Tender Specification No:,
2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ **(SPECIFY THE NAME OF THE ORGANIZATION HERE)**, is not from such a country/ has been registered with the Competent Authority (*attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT)*); and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. (*attach relevant valid registration, if applicable*)

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

Thanking you,
Yours faithfully,

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

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

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 Erection, Testing, Commissioning, Trial operation & Handing over of HT/LT Electrical system & Illumination works for unit 1 & 2 of 2 x 660 MW Khurja STPP, Khurja, U.P. Tender No: BHEL/NR/SCT/ KHURJA/ELECTRICAL/1269 (hereinafter referred to as "Contract"). 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 panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

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

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



Shabana
SHABANA PARVEEN
Manager /SCT

BHEL-IP

- 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 shall 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, terminate the contract, if already awarded, exclude from future business dealings and/ 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 (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.



Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) 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 or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

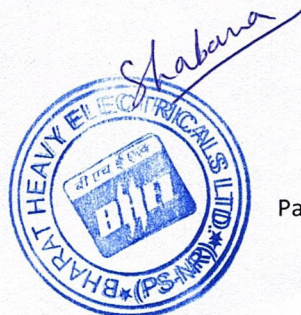
- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity 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 panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are 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 IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs 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 IEMs the option to participate in such meetings.



BHEL-IP

- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a 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 or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, 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 the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs 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 Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have 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 IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact 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. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.



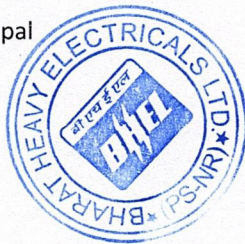
Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

Shabana
Manager/SCT

For & On behalf of the Principal
(Office Seal)

Place Noida
Date 10/06/2022



Witness: _____
(Name & Address) _____

For & On behalf of the Bidder/ Contractor
(Office Seal)

Witness: _____
(Name & Address) _____

Rev 01
1st June
2012

TECHNICAL CONDITIONS OF CONTRACT (TCC)

(Document No PS:MSX:TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC)

TECHNICAL CONDITIONS OF CONTRACT (TCC)

FOR THE

**ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING
OVER OF HT/LT ELECTRICAL SYSTEM AND ILLUMINATION WORKS FOR
UNIT#1 & UNIT#2 OF 2X660 MW KHURJA SUPER THERMAL POWER PROJECT,
KHURJA, U.P.**



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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

THE TECHNICAL CONDITIONS OF CONTRACTS (TCC) ARE DEFINED AS:

SI No	DESCRIPTION	Chapter
	Contract specific details	
1	Project Information	Chapter-I
2	Scope of Works	Chapter-II
3	Facilities in the Scope of BHEL/Contractor	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	Important condition applicable to this Project	Chapter-IX
10	Rate Schedule	Chapter-X
11	UNPRICED RATE SCHEDULE	Chapter-XI
12	Annexures	Chapter-XII
A	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMP S AND MISCELLANEOUS ITEM SPECIFICATIONS	
B	OGA OF STATION TRANSFORMER	
C	OGA OF GT	
D	OGA OF REACTOR	
E	ELECTRICAL SINGLE LINE DIAGRAM FOR AUXILIARY POWER DISTRIBUTION	
F	ANNEXURE-A	
G	NTPC SAFETY RULES	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter I: Project Information

2X660MW KHURJA STPP- STG PACKAGE

THDC, a joint venture of Government of India & Government of UP, has awarded the work to BHEL for supply, erection and commissioning of “Turbine Generator and Associated packages” for 2x660MW Khurja STPP at Khurja, U.P.

Sl. No.	Title	Description
1	Owner	THDC India Limited (THDCIL)
2	Consultant	NTPC Limited
3	Project Title	Khurja Super Thermal Power Project (2X660 MW)
4	Project Site Location	Khurja STPP is located in Bulandshahar district of Uttar Pradesh. The site is situated near villages Dushhara-kherli, Jahanpur, Naiphal (Unchagaon) and Rukunpur. The district Headquarters Bulandshahar is about 32Kms. Distance of the project site from Delhi is about 90Kms.
5	Nearest Railway Station	The nearest railway station Danwar on Delhi-Kolkata section (via Aligarh) is approx. 5Km away from the project site. The nearest major railway station is Khurja at a distance of about 11kms.
6	Nearest Airport	The nearest commercial airport is Delhi at about 120 km by road
7	Nearest Highway	NH34
8	Nearest Water Body	The upper Ganga canal passes near by the Khurja STPP at a distance of about 13 Kms
9	Seismic Data	The area falls in Zone III (Moderate), according to the Indian Standard Seismic Zoning Map

Note: - 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 Work

2.0	SCOPE OF WORK
2.1	BHEL has been awarded the work of Design, Engineering, Supply, Erection, Testing & Commissioning of 2X660 MW TG Generator and its associated auxiliary package of Khurja Super Thermal Power Plant ,Khurja,U.P.
2.2	<p>Scope of these specifications cover complete work of handling, transportation of materials from Project storage yard / stores to erection site / place of erection , storage at erection site, preservation, watch and ward, dressing, chipping and leveling of foundations, cleaning , checking, testing, pre-assembly, erection, calibration, alignment, grouting, welding, DPT wherever required, preservative/ touch-up painting including supply of paints etc, plant earthing , Plant Illumination Work, including other activities required for erection, testing, commissioning, post commissioning, trial operations & handing over of all ELECTRICAL and items indicated in the rate schedule covered within the scope of these specifications for 2X660 MW Khurja of following system.</p> <ol style="list-style-type: none"> 1. Cable Tray & accessories. 2. Power cables (HT&LT) 3. Control Cables. 4. Junction boxes and Push button. 5. Structural Steel. 6. 11KV/3.45 KV /0.415 KV Switch gear/PMCC/EPMCC. 7. Starter panel/local starter boxes/power distribution boxes /marshalling boxes. 8. Dry type transformers. 9. Control & Relay Panels. 10. 220V DC Battery System 11. Digital Automatic Voltage Regulation 12. Above ground earthing and lightening protection system in TG package. 13. LT Bus Duct. 14. 11 KV Segregated Phase Bus Duct 15. Isolated Phase Bus Duct 21 KV ,SPVT & LAVT Cubical 16. Oil Filled Power Transformers (GT, ST, Reactor Transformer & UT) 17. Station Lighting 18. 415V DG set 19. Other Misc. associated equipment's.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter II: Scope of Work

	<p>20. Trefoil Clamp</p> <p>21. Jointing & termination kits</p>
2.3	This contract scope broadly consists of following works as described below but not limited to following:
2.3.1	Taking delivery of the materials from the project storage yard /stores /sheds to erection site.
2.3.2	The contractors' scope is receipt of material from BHEL store yard at Khurja Site, other place of storage at Khurja site etc. and transportation of the material to erection site.
2.3.3	All the erection material is stored at BHEL Khurja site premises. The contractor has to plan his material shifting in a way that there is no delay in shifting of material and the E&C is carried out as per planned monthly/weekly/daily program.
2.3.4	The storage yard is located within the plant boundary. ODC consignments will be unloaded near to erection site as per the space availability. Some other materials may also be unloaded near to erection site as per space availability. All other materials have to be transported from storage yard to construction area by the contractor at his own cost.
2.3.5	Any T&P's, Cranes, Slings, D-shackles and other lifting tackles, Trailers required for shifting of material from store to site shall be arranged by contractor over and above T&P's/ crane provided by BHEL. The contractor has to arrange for trailers (Low Bed and normal) of required capacity for shifting of the material from stores, yard and any other place of unloading of material/equipment.
2.3.6	Cranes are only for erection purpose and shall not be available for material transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.
2.3.7	For all material required to be erected in this contract scope, unloading of material at site is in the scope of this contract. Accordingly, all arrangements are to be made by the contractor.
2.3.8	Items stored outdoors shall be stored in such a way that item is at least six inches (6") above the ground. Motors, valves, electrical equipment, control equipment and instruments etc. shall be stored indoors in warehouse safe keeping, watch and ward at site.
2.3.9	Preservation, safe keeping, watch and ward of the material at site.
2.3.10	Pre-assembly, erection, alignment of various equipment's, machining and grouting.
2.3.11	Contractor shall calibrate, erect, commission all the equipment's, 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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter II: Scope of Work

	the methods of erection / commissioning adopted in erection / commissioning of similar jobs or for any reasons whatsoever.
2.3.12	Contractor shall, transport all materials to site and unload at site / working area for inspection and checking. All material handling equipment required shall be arranged by the contractor.
2.3.13	Hydraulic testing, air/gas leak test, air tightness test, other pre commissioning tests as per approved quality plan/drawings/ documents
2.3.14	Insulation and finish painting including supply of paints etc.
2.3.15	The customer or their Consultant will depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works, without any cost implications to the BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
2.3.16	After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in a packed condition to BHEL stores. In case of any use over actual design requirements, BHEL reserves the right to recover the cost of material used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.
2.4	SITE VISIT
2.4.1	Contractor should visit site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint themselves with the conditions prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
2.5	DEWATERING
2.5.1	Contractor shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL.
2.6	Void
2.7	The contractor shall comply with following towards Social Accountability
2.7.1	The contractor shall not employ any employee less than 15 years of age in pursuant to ILO convention. If any child labour were found to have been engaged, the Contractor shall be levied with expenses of bearing his education expenditure which will include stipend to substantiate appropriate education or employ any other member of family enabling to bear the child education expenditure.
2.7.2	The contractor shall not engage Forced/ Bonded Labour and shall abide by abolition of Bonded Labour System (Abolition) Act, 1976.
2.7.3	The contractor shall maintain Health & safety requirement as stipulated in the Contract and Contract Labour (Regulation & Abolition) Act, 1970.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter II: Scope of Work

2.7.4	The Contractor shall abide by UN convention w.r.t. Human Rights and shall be liable for Discrimination / Corporal punishment for failure in meeting with relevant requirements.
2.7.5	The Contractor shall abide the requirement of Contract Labour (Regulation & Abolition) Act, 1970 for working hours.
2.7.6	The Contractor shall abide by the Statutory requirement of Minimum Wages Act 1948, payment of Wages Act 1936.
2.7.7	The Contractor shall arrange potable drinking water to its employees & workers.
2.7.8	TRAINING OF WORK FORCE The contractor shall arrange induction safety training for all employees before assigning work. In addition, awareness programme, mock drill at regular intervals and daily tool box meetings shall be arranged. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats. All the contractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Contractor should nominate his supervisor to coordinate and implement the safety measures.
2.8	SITE ORGANISATION
2.8.1	The contractor shall provide adequate staffing in the following areas in addition to the staffing requirements of execution as instructed/informed by BHEL: 1. Overall planning, monitoring & control. 2. Quality control and quality assurance. 3. Materials management. 4. Safety, fire & security. 5. Industrial relations and fulfilment of labour laws and other statutory obligations.
2.8.2	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.
2.8.3	On award of contract, the contractor shall submit to BHEL site organization chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. The persons, whose bio-data have been approved by BHEL, will have to be posted at site and deviations in this regard will not generally be permitted.
2.8.4	The contractor should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities in consultation with BHEL. These tools & tackles shall not be removed from site without written permission of BHEL
2.8.5	The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields in erection, commissioning etc as applicable. For proper supervision of the work, the contractor shall ensure providing one qualified supervisor against deployment of 15 workmen.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter II: Scope of Work

2.8.6	<p>Contractor to ensure services of qualified and experienced Diploma / Degree Electrical/Instrumentation Engineer having experience in respective field with sufficient nos. as desired by site entirely for the commissioning activities from second month of mobilisation till contract completion. This shall be indicated separately in manpower deployment plan to be submitted by contractor. These Engineers shall be reporting directly to the BHEL Engineer for the main work.</p> <p>All Supervisors/ Engineers shall have to be supported individually by all independent groups comprising of workers like electrician, technicians and helpers etc. and required T & P and IMTE's.</p>
2.9	ERECTION SCHEDULE
2.9.1	<p>Contractor shall submit within 30 days of LOA date, detailed program (L3 schedule) of construction / erection / commissioning along with matching resources T&P Deployment and manpower deployment schedule for approval to Site In-Charge/Project Manager-Noida. L3 schedule shall be the working level document demonstrating contractor's ability and methods of completing the work within the key milestones identified in the tender specification These program would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detailed monitoring, the three monthly rolling program with the first month's program being tentative based on the site conditions would be prepared based on these program. The Contractor shall also be involved along with the Customer/BHEL to tie up detailed resource mobilisation plan over the period of time of the contract matching with the performance targets.</p>
2.9.2	<p>The program would be jointly finalised by the site in-charge of the contractor with BHEL/Customer's project coordinator as well as the site planning representative. The erection program will also identify the sequential erectable tonnages.</p>
2.9.3	<p>Contractor shall submit daily work program based on above schedule. Deferment of above schedule is not acceptable. Contractor will adhere to schedule & augment resources to ensure completion as per schedule.</p>
2.9.4	<p>Bidder shall note that as the place of work is inside the plant and being manned by Security Forces of CUSTOMER, all necessary system related to entry of men, vehicle, material, safety & security systems, work permit system etc. as applicable will have to be followed by the contractor. CONTRACTOR shall abide by all safety regulations of the plant. The work shall be carried out inside the plant as per safety practices enforced by CUSTOMER's/ BHEL's safety section and instructions of Engineer-in-charge issued from time to time.</p>
2.10	General Scope for Electrical works
2.10.1	<p>It is not the intent to specify herein all details of material. Any item related to this work not covered, but necessary to complete the system will be deemed to have been included in the scope of the work.</p>
2.10.2	<p>All the work shall be carried out as per 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</p>

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2.10.3	Contractor shall erect all items/materials etc. as per sequence prescribed by BHEL at site. BHEL engineer depending upon the availability of materials/work fronts etc will decide the sequence of erection/commissioning methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection/commissioning adopted in erection/commissioning of similar job or for any reasons whatsoever.
2.10.4	Site testing wherever required shall be carried out for all items/materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.
2.10.5	Contractor shall co-ordinate and responsible for satisfactory testing, pre-commissioning, commissioning and trial run of the connected equipment under overall guidance of BHEL and shall locate any cause of malfunction and rectify the same for proper operation. Testing shall also include any additional tests, which the Engineer feels necessary because of site conditions and also to meet system specification.
2.10.6	The work shall be executed under the usual conditions without affecting power plant construction and in conjunction with other operations and contracting agencies 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.
2.10.7	Contractor shall have valid ELECTRICAL LICENSE to carry out the electrical works. All necessary certificates and licenses required to carry out this work from competent authority like CEA, State Electricity authority are to be arranged by the contractor expeditiously at his cost.
2.10.7.1	Contractor is responsible for getting Electrical Inspector/statutory authority's approval for all electrical installation covered in his scope. This also includes the Electrical equipment's that are erected by mechanical contractor for which commissioning assistance is to be provided by the Electrical contractor.
2.10.7.2	Contractor Electrical License for Extra High Voltage System installation work from State authorities.
2.10.7.3	Supervisory Competency Certificate to deal with Electrical High Voltage equipment's for their erection, testing & commissioning. During the execution of work minimum two persons should be posted at site that has valid Supervisory Competency Certificate.
2.10.7.4	The installation of all electrical equipment's 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.
2.10.7.5	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.
2.10.8	Contractor shall take delivery of item, materials, from the storage yard / stores/ sheds of BHEL / customer which are within plant premises after getting approval of engineer / customer in the prescribed indent forms of BHEL / customer. Contractor shall make arrangements for, safe custody, watch and ward of equipment after it has been issued to him till they are fully erected, tested and commissioned till the contract period. The

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	contractor shall note that items/materials shall be transported to erection site / assembly yard etc. by the prescribed route without disturbing and causing damage to other works in the most professional manner. All items, Hardware, etc. shall be stored in appropriate manner as per BHEL's instructions.
2.10.9	After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in packed condition to BHEL stores. In case of any use over actual design requirements, BHEL reserves the right to recover the cost of material used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.
2.10.9.1	The contractor shall ensure that all the packing materials and protection devices used for the various equipment's during transit and storage are removed before these equipment's are erected in position.
2.10.9.2	Overhauling, cleaning, revisioning, servicing of equipment's during erection and commissioning stages will be arranged by the contractor. All equipment's shall be preserved and protected before and after erection as per the advice of BHEL engineer.
2.10.10	Contractor shall retain all T&P/Testing instrument/Material handling instrument etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge
2.10.11	The contractor shall collect all scrap materials periodically from various levels of powerhouse, 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.
2.10.12	Contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor's construction equipment and materials. The contractor may consult the Engineer-in-Charge on the arrangements made for general site security for protection of his machinery equipment tools etc.
2.10.13	Contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in- Charge.
2.10.14	Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances.
2.10.15	Scope of work covered under this specification requires quality workmanship, engineering and construction management. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments, calibrating equipment etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployed by contractor shall match with above scope of works.

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2.10.16	All the surplus, damaged, unused materials, package materials, containers, special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.
2.10.17	Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer and no compensation shall be payable in case fault of contractor.
2.10.18	BHEL will provide vendor's technical support for commissioning of various proprietary type special instruments/systems like Analysers etc. The contractor shall carry out the works as per instructions of BHEL/ Vendor Engineer.
2.10.19	Contractor shall ensure that all the documents provided to them like O&M Manuals, Manufactures Test Certificates, etc. for all instruments/equipment under calibration are stored properly and are easily accessible/producing.
2.10.20	Contractor shall calibrate all field instruments in workshop, before field installation.
2.10.21	Necessary calibration report shall be generated for each tag/instruments and approval of competent site personnel shall be taken before installation
2.10.22	Contractor shall provide necessary assistance /co-operation to other vendors for system integration, as required.
2.10.23	The contractor shall carry out trial run of all motors including checking the direction of rotation in the uncoupled condition.
2.10.24	All electrical panels, motors, Bus ducts, Generator and such other devices shall be properly dried by heating to improve IR value, before they are energized. Bearings, slip rings commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.
2.10.25	If the contractor or his workmen shall break, deface injure or destroy any part of a building, road, Serbs, fenced enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees, stored components or any other property or to any part of erected equipment etc., the contractor shall make the same good at his cost or in default the Engineer may cause the same to be made good by other workmen/agency or by other means and deduct the expense (of which the BHEL Engineer's decision is final) from any sum that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.
2.10.26	All the equipment shall be handled very carefully to prevent any damage or loss. No untested wire ropes/ slings etc. shall be used for unloading / handling. The equipment shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the stores shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.
2.10.27	BHEL shall have lien on all T&Ps, IMTEs & other equipment of the Contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of Contract. No material brought to the site shall be removed from the site by the Contractor and/or his Sub-contractors without the prior written approval of the Engineer.
2.11	Void

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2.12	Detailed scope of the work will comprise but not limited to the following:
2.12.1	TRANSFORMERS
	<p>Different types of transformers like oil immersed type shall be supplied as Indicated below. Oil filled transformer will be Located adjacent to their respective location/Service building.</p> <p>POWER TRANSFORMERS</p> <hr/> <p>1. 260 MVA, 21/420 kV GT (Overall dimension & Wt.) Size 6150 x 4770 x 4870 mm Wt.192000</p> <p>2. 120 MVA, 420 kV Station Transformer (Overall dimension & Wt.) 8000 x 4000 x 4500 mm Wt.130000</p> <p>3. 125 MVA, 420 kV Bus Reactor (Overall dimension & Wt.) Size 7500 x 3600 x 3700 mm Wt.120000</p> <p>2.12.1.1 4. Unit Transformers 36/45 MVA 21/11.5 KV (Overall dimension & Wt.) 4200X3000X3150 Wt.49000</p> <p>SERVICE TRANSFORMERS</p> <p>1. 2500 KVA, 11/0.433 KV DTT 2. 2000 KVA, 11/0.433 KV DTT 3. 1600 KVA, 11/0.433 KV DTT</p>
2.12.1.2	Contractor shall transport the transformer tanks & accessories of transformers from BHEL stores/ Storage yard/place of unloading to respective foundation of unit.

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2.12.1.3	The shifting operation may require dragging either on ground with suitable arrangement OR dragging after fixing of wheels on rail track. It may also require turning of transformer at suitable locations enroute to foundation. Contractor shall arrange wooden sleepers, winches, jacks, rails, crane, plates etc at his cost for this operation. However all loose accessories (other than Transformer Tank) shall have to be shifted from stores / storage yard.
2.12.1.4	The transformers shall be handled in such a manner so that no jerk is transferred to the core, winding and internals of the transformer.
2.12.1.5	Transformers are generally supplied in partly assembled condition either filled with oil up to the core level / winding level or gas filled. Accessories, like radiators, conservator tank, pipes, fittings, hardware, gaskets, buchholz relay, marshalling box, relief vent, valves, pumps, cooling fans, cables, bushings, radiator headers/fans, rollers, tap changer drive unit, cables of various sizes for interconnection from marshalling control box to field devices, bushing turrets and oil in 205/210 liters, barrels shall be supplied loose.
2.12.1.6	Cable trays (for transformer local cabling, if not supplied along with transformer) shall be issued separately by BHEL site and the installation charges is inclusive in rate schedule for Transformer and no extra charges shall be paid on this account
2.12.1.7	All the accessories should be thoroughly cleaned prior to installation and same shall be assembled/mounted as per OGA drawings.
2.12.1.8	Placement on plinth, alignment with respect to the foundation and lay out drawings.
2.12.1.9	Internal inspection to verify the intactness of core and winding, tap changer leads, off-load switch/on load tap changer, measurement of core and core bolt insulation.
2.12.1.10	Auxiliary Service transformers shall be bolted to the adopter panel/bus duct on the LT sides and the bus bars shall be connected together. The contractor shall carry out any modification required to match the bus bar or bus duct connection.
2.12.1.11	In case transformers are supplied partly oil filled/gas filled, after internal inspection, the transformer shall be kept under vacuum (for a period to be decided by site engineer) and treated oil to be filled up to required level.
2.12.1.12	Each drums of oil to be tested for BDV. After getting BDV/ withstand value, this treated oil to be filled in the transformers and auxiliaries.
2.12.1.13	Contractor shall arrange filtering & storage tank of suitable capacity, internally sand blasted or approved method and with one coat of oil resistance paint. Oil from drums to be transferred in storage tank and filtration to be carried out to achieve the required BDV/ withstand value. This treated oil to be filled in the transformers and auxiliaries. However, for low capacity transformer, a separate storage tank for filtration may not be required.
2.12.1.14	Drying out of transformer and filtration of oil in cooling bank, pipeline, diverter tank of tap changer etc. to be done with ultra-vacuum filtering machine of adequate capacity (760 mm HG). Drying out process shall be carried out round-the-clock and contractor shall deploy trained manpower for this purpose

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2.12.1.15	During dry out process, contractor has to plot the curve for insulation resistance value/time/oil temperature. Hourly reading to be recorded till completion of the dry out.
2.12.1.16	The criteria for deciding completion of drying out shall be breakdown value of oil, PPM value of contaminants in oil, resistivity of oil, insulation resistance value and polarization index as per the approved FQP. All the test to be conducted as per the approved FQP.
2.12.1.17	Filter machine capacity if found to be inadequate, or in case of failure of an existing machine, alternative arrangement is required to be made to meet the required result and time schedule. It is to be particularly noted that that as per exigencies of site working, contractor will have to arrange more oil filtration machines as per site requirement.
2.12.1.18	Contractor shall discuss and finalize installation and testing activity procedure with BHEL/CUSTOMER prior to starting the work.
2.12.1.19	In case of Transformers if any leakage / sweating is observed from field assembled / shop assembled gasket joints, valves, welded joints the same shall be attended by the contractor including draining of oil, refilling of oil & centrifuging if required at no extra cost to BHEL till handing over period. Sealing compound and any other consumable, if needed, shall be arranged by the contractor with in the quoted rates.
2.12.1.20	Tests are required to be conducted on Current Transformer, Potential Transformer & prior to / after installation. Contractor shall also carry out oil processing / filtration to achieve the desired results before charging and handing over of the entire system.
2.12.1.21	Contractor shall arrange required testing equipment for carrying out electrical test like voltage ratio, turn ratio, vector group, magnetic balance, winding resistance measurements, BDV value of oil, tan delta measurement of bushings & winding, insulation resistance, measurement of oil PPM, Acidity, Resistivity and Tan Delta and DGA test. The contractor shall arrange oil sample testing for PPM / resistivity or any other tests applicable for oil sample at approved testing laboratory/BHEL Bhopal at his own cost including all incidental expenses. Checking of Buchholz Relay, oil level indicator PRV, calibration of OTI, WTI etc.
2.12.1.22	Till the start of erection of respective transformers, supplied oil / Gas filled, it will be contractor's responsibility to maintain the gas pressure and replace/ reactivate silica gel. Silica gel will be arranged by contractor within the accepted rates. However the N2 gas, if required, will be provided by BHEL free of cost & filling etc. will be arranged by the contractor with in the accepted rates for transformer erection & commissioning.
2.12.1.23	DGA analyses for power transformers oil Frequency of DGA test to be carried out as under. 1. Within 24 hours of charging/ operation. 2. Within one week of 1st charging or operation. 3. Within 1 month of 1st charging or operation. 4. Every 3 months 5. Log book to be maintained all records of DGA test report. 6. Record of Online DGA trends to be recorded 7. Precautionary measure to be taken before taking oil sample
2.12.1.24	NGR

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2.12.1.24.1	<p>The scope of erection includes minor civil works such as chipping / grouting of support structure, final painting etc.</p> <p>Note: Responsibility of contractors to obtain customer protocols with respect to Field quality plan</p>
2.12.1.24.2	<p>The neutral grounding resistor shall be inspected for any damage to the resistor grid & other components. The resistor shall be leveled & installed. All covers etc. shall be checked for tightness to ensure that the enclosure of the resistor is dust, vermin & weather proof. Earthing conductors shall be taken from the out end terminal of the resistor, for connection to earth electrodes & to the main grid. Check IR, operation of space heater, operation of motorized isolator, earth resistance shall be done before the commissioning. Termination of HT cables, GI Flat termination, control wiring checking & operational & functional check of all items & further commissioning and handing over to customer shall be part of contractor scope.</p>
2.12.1.25	<p>Final painting shall be carried out for all Transformers. The scope of final painting shall include supply of paints, thinner and other consumables as detailed in the painting clause. No separate rate shall be paid for painting.</p>
2.12.1.25.1	<p>Contractor shall arrange to paint/stick good quality danger boards where ever required. Required boards shall be arranged by contractor. Name of the equipment erected by the contractor shall be painted boldly as per the agreed colour scheme on the equipment.</p>
2.12.2	11 KV SEGREGATED PHASE & 415 VOLT LT BUS DUCT
2.12.2.1	<p>11 KV Segregated phase bus duct and 415 Volt Bus Duct (NSP) shall be supplied in loose shipping section along with hardware & other items. Each section shall be complete with AL alloy enclosure and conductor with epoxy bus support insulators arrangement. However other items such as silica gel breathers, inspection windows, rubber bellows, flexible & solid copper / aluminum connector, bi-metallic strips, GI pre-fabricated supporting structure, wall frame assembly, set of hardware etc shall be supplied loose. Galvanized iron earth bus shall be provided for enclosure continuity.</p>
2.12.2.2	<p>Erection of Busduct Structures after Foundation checking and carrying out minor modification wherever required, erection of structures, Bus duct sections, LAVT & NG / NGT cubicles, hot air blowing equipment and other loose items as per relevant drawings / documents, alignments and jointing by bolting of total Bus duct, fixing of Rubber Bellows, seal Off Bushings, wall frame assembly, Flexible & rigid Bus connections, CTs, VTs, NGT & NGR , erection of earth conductors,, cabling up to JB / Marshalling Box , testing of CTs, VTs, NGT & NGR contact resistance checks on bus duct, Hi-pot of Bus duct, earthing of system with main earth conductor / riser.</p>
2.12.2.3	<p>All bolted joints shall have high tensile zinc plated steel hardware.</p>
2.12.2.4	<p>Each set of 415 Volt Bus Duct (NSP) is meant for interconnection from low voltage side of LT Auxiliary Transformer (11 / 0.433 KV) to MCC & switchgear board.</p>
2.12.2.5	<p>Bus duct consists of conductor made of aluminum alloy supported on post insulator and housed in aluminum sheet metal rectangular enclosure. The bus bar / enclosures are having bolted joints.</p>

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2.12.2.6	In the indoor portions, the bus duct shall be supported from floor / roof beams or steel inserts in upper floors. In the outdoor portions, they shall be supported from the ground, by means of steel structures, unless indicated otherwise in the specification drawings.
2.12.2.7	Bus duct assemblies, supporting structures shall be pre-fabricated and to be assembled as per layout drawing. Erection and testing requirement shall be as per the approved FQP of Khurja.
2.12.2.8	Each set of bus duct shall be supported with supporting structure, which shall be fabricated from standard steel section and hot dip galvanized. All structure & bus duct assemble shall be erected as per drawings.
2.12.2.8.1	Fixing of wall bushings/wall frame assembly
2.12.2.8.2	Providing earthing connections as per site conditions.
2.12.2.8.3	Grouting of bus duct and support structures and connecting to earth grid/earth pits as detailed in the relevant bus duct drawings.
2.12.2.8.4	Fixing of Space Heaters wiring from space Heaters terminal to junction box, taking through rigid/flexible conduit pipe, Fixing of flexible joints, seal off bushing, rubber bellows, CTs wiring ,conduit/GI pipes breather tapping etc. after testing.
2.12.2.9	Measurement of contact resistance of joints, bus bar loop resistance etc.
2.12.2.9.1	Millivolt drop test is to be carried out for all bolted joints.
2.12.2.10	Testing of CTs, VTs, NGT including primary and secondary injection tests.
2.12.2.11	Testing pre-commissioning & trial run of hot air blowing unit.
2.12.2.12	Torque testing of Bolted Connections of bus duct and generator and generator transformer.
2.12.2.13	The STG will be connected to the generator transformer through cable connection. For Generator neutral connection cable shall be provided.
2.12.2.14	High voltage test of bus duct is to be carried out as per the instruction of BHEL engineer. Contractor shall arrange necessary test equipment / instrument for conducting various electrical tests at his own cost.
2.12.2.15	ISOLATED PHASE BUS DUCT
2.12.2.15.1	Generator isolated bus duct is connected to low voltage side of three phase generator transformer & generator. The bus consists of cylindrical conductor made of aluminum alloy supported on post insulators. Flexible connections and expansions joints are provided at terminal and intermediate points to alleviate stress due to expansion and to arrest vibration. All the CTs will be mounted inside the bus duct.
2.12.2.15.2	Isolated phase bus duct shall have tap off connection for potential transformer, VT, surge protection SP cubicles, unit transformers. Each phase of protection equipment and potential transformers shall be housed in metal clad cubicles.
2.12.2.15.3	A totally enclosed neutral grounding cubicle is provided to connect the Generator neutral point. The neutral grounding cubicle houses neutral grounding transformer & resistors. All the generator-isolated bus ducts are supplied with one set of Air pressurization equipment unit.
2.12.2.15.4	Bus duct enclosure /conductor is a continuous welded type conductor, enclosure, makeup pieces shunts pieces etc. have to be welded at site.

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2.12.2.15.5	The scope of for Isolated Phase Bus Duct shall include Transportation of material from stores/ storage yard, preparatory work such as erection of supporting structure, placement of sub-assemblies / equipment's alignment, edge preparation of conductor / enclosure welding of conductor / enclosure, welding of shunt pieces & make up pieces, installation - of seal of bushing& wall frame assemblies, shorting links, earthing, LA&VT cubicle, VT & SP cubicle, copper flexible's, copper rubber bellows, weldable/ bolted flexible's installation of air pressurizing unit and its associated piping work and cable etc., testing and commissioning.
2.12.2.15.6	Pre-fabricated G.I. supporting members shall be supplied in loose condition and are to be erected as per lay out drawing. Foundation pockets and embedded plate inserts shall be provided as per lay out drawing (on floor for bottom support and on bottom of concrete slabs), contractor shall weld the supports on insert plate and shall carry out grouting including supply of grout material's after complete alignment/bolting of structural members. If any modification required in supporting structure due to site conditions, the same shall be carried out without any extra cost. All welded joints shall be applied cold galvanizing zinc paint. Supply of Paints, primers etc. are in the scope of the supplier, within the quoted rates.
2.12.2.15.7	During erection of bus duct/enclosure, makeup pieces and shunts, if an modifications needed to match the alignment shall be part of work and no extra payment shall be made.
2.12.2.15.8	All bolted joints and flanges shall be tightened with torque wrench to the approved torque. Wherever there are bolted joints the same shall be cleaned and a layer of anti-oxidation paints shall be applied. Necessary paints etc. to be arranged by contractor within the quoted rates.
2.12.2.15.9	Proper sequence shall be followed during erection to avoid any mismatch and alignment problem.
2.12.2.15.10	Prior to installation of bus duct assemblies in position, various components like conductor, insulator shall be inspected and cleaned and insulation resistance to be measured and recorded. If any insulator is found damaged, the same shall be replaced.
2.12.2.15.11	Electrical test on current transformers and potential transformers shall have to be carried out prior to installation & during pre-commissioning The tests are insulation resistance measurement, winding resistance, magnetization characteristic, ratio test water ingress and air leak test on assembled bus ducts.
2.12.2.15.12	Minor civil work such as chipping, levelling of foundation, providing pockets, drilling/enlargement of holes in structure, bus bar etc. Which are incidental to the erection of bus duct shall not be treated as extra.
2.12.2.15.13	All miscellaneous items such as disconnecting links flexible's, shorting bars, hardwares,conduit for wiring, marshaling box, CTs and PTs wiring through conduit, earthing materials, bus bar fish plates etc. are part of bus duct installation. Hence separate breakup quantity is not given in BOQ.
2.12.2.15.14	Air tightness and water tightness test have to be carried out on completion of bus duct installation. In case of any leakages, contractor has to rectify and bring to the required level of air tightness/water tightness without any extra cost.

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2.12.2.15.15	High voltage test of bus duct is to be carried out as per the instruction of BHEL engineer, Contractor shall arrange necessary test equipment / instrument for conducting various electrical tests at his own cost.
2.12.2.15.16	Contractor has to carry out final painting as per standard colour code recommended by BHEL. Paints and consumables shall be in contractor (scope).
2.12.2.15.17	On welding joints, DPT test is required to be conducted.
2.12.2.15.18	Contractor shall conduct 20 % radiography and 100% NDT test on welded joints.
2.12.2.15.19	One end of the enclosure to be earthed to the station earth at shunt location where all three-phase enclosure are shorted. Wherever shunts are not provided each phase should be earthed separately.
2.12.2.15.20	In case of bolted bus ducts, phase split covers, rubber bellows clamping earth straps to be connected to maintain the electrical continuity and in turn enclosure gets earthed at one point.
2.12.2.15.21	All other equipment such as VT & SP cubicles, LA&VT cubicles, NG cubicle, air pressurization CT chambers, junction boxes, etc. to be earthed at two points to the earth grid.
2.12.2.15.22	Maintaining the equipment after commissioning till taken over by customer.
2.12.3	11 KV HT SWITCHGEAR, 415 VOLT LT SWITCHGEAR
2.12.3.1	Erection of Panels after foundation checking and carrying out minor modification wherever required, Jointing of panels, inter panel wiring, bus bar & earth bar connections, mounting of loose supplied items, testing of complete panels, HV test of main and Control bus, testing & commissioning of breakers after scheme checking including testing / calibration of all instruments and relays.
2.12.3.2	Panels shall be delivered in different shipping sections. Necessary interconnection of bus bar, inter panel wiring, etc. shall be carried out as part of panel erection.
2.12.3.2.1	The contractor shall set each section of equipment on its foundation or supporting structures. The contractor shall assemble equipment as required. Skilled craftsmen arranged by the contractor shall install all equipment with parallel, horizontal and vertical alignment.
2.12.3.3	Mechanical functional checking/ adjustment of individual breaker.
2.12.3.4	Measurement of Insulation resistance of individual breaker, complete switchgear board and combined insulation resistance of individual breaker with cable connected to drives.
2.12.3.5	Testing of Protection Relay, Thermal over relay, Power transducers, Energy/ Ammeters, Voltmeters, Power factor, frequency, tri-vector meters & metering etc. in static and dynamic condition relay.
2.12.3.6	Conducting test such as Insulation Resistance measurement, Ratio, polarity, Knee point Voltage test, Magnetization characteristic, winding resistance on CT and PT used in Bus ducts.
2.12.3.7	Checking of electrical control & protection interlock of individual breaker and integration with other system.
2.12.3.8	Operation of all illumination, space heating circuits etc.
2.12.3.9	The commissioning of Switchgear shall also involve the trial runs and commissioning of all connected equipment like motors and Service Transformer. The contractor shall have to

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	keep his people round the clock, if necessary during the trial runs and promptly take action for any repair, checks and rectification etc. Required in the equipment erected by him. (Separate rate shall be paid for commissioning of associated electrical drives as per BOM).
2.12.3.10	The contractor shall do touch up painting of switchgear panels wherever necessary. This includes supply of paint also.
2.12.3.11	BHEL shall provide vendors' supports for commissioning of proprietary type of microprocessor based instruments and protection relays which require software loading and programmer etc. However overall responsibility lies with the contractor and the contractor shall provide all support like manpower, standard T&P, Instruments etc. for calibration and commissioning of above proprietary type instruments.
2.12.3.12	Rubber mats for switchgear shall be supplied by BHEL, and these shall be laid, wherever required, by the contractor. Calibration of voltmeters, ammeters, power current & voltage transducers, TVM etc to be done before charging of system.
2.12.3.13	Provide assistance for checking the electrical operation of individual breakers from remote panels / MMI package (max DNA system).
2.12.3.14	LT Switch Boards consists of Air CKT Breakers, SFUs, relays, meters, contactors, CTs, PTs etc. with protection and metering scheme.
2.12.3.15	The contractor shall co-ordinate with cable jointer and other LT cable-laying agency for proper cable termination and also during HV testing of cable.
2.12.3.16	The charged and commissioned equipment shall be maintained by the contractor till the same is taken over by Customer.
2.12.3.17	Any items like lamps, lens, fuse/relays/instruments missed/ damaged from the custody of the contractor shall be replaced by the contractor at his cost. However, in case the damage is not due to reasons attributable to the contractor, BHEL may arrange for free replacement. The decision of BHEL Engineer in charge in this regard will be final and binding.
2.12.4	CABLE TRAYS/CABLE DUCTS
2.12.4.1	Various types of sheet metal, galvanized cable tray, i.e. perforated, ladder type, sheet metal duct, solid bottom trays, pre-fabricated structural trays etc., will be supplied in standard lengths along with accessories and hardware viz; coupler plate, tray covers and tray clamps etc.
2.12.4.2	Erection of cable tray/cable duct shall include cutting, laying, jointing, fixing tee/reducers/bends/clamps, fixing of tray covers, hardware, fabrication & welding of tray supports as per approved tray route layout etc.
2.12.4.3	Fabrication of bends/tee/ reducers from straight length of tray is within the scope of work and rate quoted shall be inclusive in unit rate (in running meter). All site welds of cable trays shall be painted with approved coat of primer (red lead/oil primer) and final coat of cold galvanizing/aluminum paint, which shall be arranged by the contractor.
2.12.4.4	In case structural cable trays, bends, tees, reducers etc., 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 instances.
2.12.4.5	Anchor fasteners of approved make or approved by BHEL engineer shall be arranged by the

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	contractor with in the quoted rate for installation works.
2.12.4.6	Cable trays/duct etc. may have to be routed underground in cable trench, overhead on structure, along the walls, floors etc.
2.12.4.7	Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.
2.12.4.8	Branch trays of 50 mm or 100 mm size trays wherever required for laying one or two cables between the field instrument and the nearest Main tray will be erected by contractor.
2.12.4.9	All Sharp edges and Burr shall be removed from cable trays before cable laying.
2.12.4.10	Cable ducts supplied for the project are of GI and FRP type. FRP cable ducts shall be laid on the main pipe rack with SS nuts and bolts. Accessories such as nuts and bolts for FRP ducts is contractor scope only.
2.12.4.11	The cable trays shall be supported in general at a span of 1.5mtrs horizontally and at a distance of 1mtr vertically.
2.12.4.12	Cable Tray covers shall be provided for the top most cable trays and vertical trays. Further wherever trays crosses hydrocarbon lines, bottom covers shall be provided.
2.12.4.13	All the cable trays being supplied for the project are of length 3000 mm.
2.12.4.14	Cable ducts supplied for the project are of GI and FRP type. FRP cable ducts shall be laid on the main pipe rack with SS nuts and bolts. Accessories such as nuts and bolts for FRP ducts is contractor scope only.
2.12.4.15	Separate colored paint strips shall be applied at every 20mtrs and each end of cable tray & branch connection and when the trays changes its direction/elevation. Also sub-branch cable trays marking not required. 3.3kv/ 11kv/33kv/66kv : red strips equally spaced at 20 metres interval, , 2 inch width each 1.1kv power cables : yellow strips equally spaced at 20 metres interval, , 2 inch width each 1.1kv control cables : blue strips equally spaced at 20 metres interval, , 2 inch width each Instrumentation cables : green strips equally spaced at 20 metres interval, , 2 inch width each
2.12.5	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 fibre)

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2.12.5.1	Cable laying includes cutting to the required length, laying in overhead cable racks / underground cable trenches, 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 printed ferrules(ferrule printing machines to be provided by contractor for printing necessary cross ferruling details) / PVC numerical / alphabetical ferrules(where printed ferrules not possible at all) machine engraved ferrules sleeve/ferrule, termination by using crimp type copper tinned/aluminum lugs, insulated/un- insulated, crimp and soldered termination, plug-in connections with insert type crimping, providing identification cable tags of PVC/aluminum at both the ends and at appropriate interval (Approximately 30meters) throughout the route length, continuity checking, insulation resistance checking. Contractor to arrange adequate numbers of his own ferrule printing machines.
2.12.5.2	Entry to the panels, JB's may be at top, side or bottom. All cable are required be supported and clamped near to the panel.
2.12.5.3	PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metal as per site requirement, clamping and dressing material such as suitable cable ties/ clamps etc. with hardware, PVC sleeves etc. Shall be supplied by contractor within the quoted rate for cable laying. Only Cable Lugs & Glands Shall Be Issued By BHEL As Free Issue item.
2.12.5.4	All care should be taken to avoid abrasion, tension, twisting, kinking and stretching of cables during installation.
2.12.5.5	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 earthed at panel end only. While terminating the shield wire in either panel or JB's, PVC sleeves are to be used to avoid two-point earthing.
2.12.5.6	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.
2.12.5.7	All cable entry openings shall be properly sealed to prevent water seepage from outside trenches/conduits into the building. The required materials for doing so shall be included by Agency in the cable laying prices.
2.12.5.8	Contractor shall carefully plan the cutting schedule of each cable drum in consultation with BHEL site engineer such that wastages are minimized. Recovery will be made in case the wastages are exceeding the wastage allowances fixed in this contract.
2.12.5.9	Directly buried cables shall be laid on and covered with sand/riddle with mud protected by brick barriers at sides and pre-cast concrete slabs on top. Location of buried cables shall be indicated clearly by cable marker, made of galvanized from interval of 30 meters and at every change of direction.
2.12.5.10	All cables shall be provided with minimum of 2mm thick aluminium sheets as cable identification tags indicating cable designation in accordance with the cable schedule. The cable tags shall be provided at the ends, every 30mtrs and when the cable changes its

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	direction/elevation. The tags shall be of aluminium with the number punched on it and securely attached to the cable by not less than two turns of 16 SWG GI wire.
2.12.5.11	All the cables shall be clamped to the cable trays/support structure with the help of clamps. All power cables shall be clamped individually and control cables shall be clamped in groups of 3 or 4 cables. Clamps for multicore cables shall be fabricated out of 25x3 mm aluminium flats. Single core power cables shall be laid in trefoil formation and suitably clamped with 25mm wide 8 SWG aluminium strips.
2.12.5.12	Cable trenches in plant shall be sand filled.
2.12.5.13	Cost of cable laying as per BOQ Cum Rate Schedule shall include the cost of Nylon / PVC ties & Aluminium strip required for dressing / clamping.
2.12.5.14	Single core cables shall be laid in Trefoil configuration. HV single core cables shall be provided with screen bonding scheme.
2.12.5.15	Cables for different voltage grades shall be laid in independent cable trays. Separate cable trays shall be provided for control cables.
2.12.5.16	Conduits shall be thoroughly cleaned before pulling in the cable.
2.12.5.17	While laying cables, existing cable tray covers and false flooring may require to be removed and re-fixed. The same has to be done at no extra cost to BHEL.
2.12.6	CABLE TERMINATION
2.12.6.1	The Cost Of Cable Laying As Per BOQ Cum Rate Schedule Shall Also Include The Cost Of Termination With Suitable Crimping Type Lugs & Ferrules .
2.12.6.2	Only Cable Lugs & Glands Shall Be Issued by BHEL as Free Issue Item. Drilling of holes in gland plates of control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL.
2.12.6.3	The contractor shall carry out insulation testing, simulation testing etc. as per the instructions of Engineer at site.
2.12.6.4	Screen of signal cables shall run in insulated sleeve (to be arranged by contractor at no extra cost) and shall be terminated as per the instructions of the BHEL Engineer.
2.12.6.5	Name plates/Tag plates with tying/fixing material for cable's both end & filed instruments@ 100 meters per run of cable as required.
2.12.6.6	Each control cable core entering panel / Junction box shall be neatly dressed and served with Nylon cord to keep it in position at the terminal block.
2.12.6.7	All cable entry points shall be sealed and made vermin and dust proof. Unused opening, if any shall be effectively closed.
2.12.6.8	The location of cable Joint if any shall be clearly indicated with cable marks with an additional inscription "Cable Joint".
2.12.6.9	Termination Of 3.3 KV, 11 KV HT Cables Only Shall Be Measured And Paid Separately As Per Quoted / Accepted Rate Of Respective Item Of BOQ CUM Rate Schedule.

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2.12.6.10	For Cables Other Than 3.3 KV, 11 KV HT Cables, The Cost Of Cable Laying As Per BOQ Cum Rate Schedule Shall Also Include The Cost Of Termination With Suitable Crimping Type Lugs Including Supply Of Ferrules (for cross / direct ferruling as per BHEL instructions). Only Cable Lugs & Glands Shall Be Issued By BHEL As Free Issue Item. Drilling of holes in gland plates of HT / LT switchgear, transformer, control panels, JBs etc as per requirement shall also be part of cabling at no extra cost to BHEL.
2.12.6.11	The contractor shall provide Tools/ equipment required for the connections and termination of cable wherever necessary.
2.12.6.12	Re-termination if required during testing/ commissioning shall be carried out without additional cost.
2.12.6.13	Scope of termination shall include supply of insulating sleeves. The sleeves shall be fire resistant and long enough to over pass conductor insulation.
2.12.6.14	Only printed ferrules should be used and contractor shall arrange necessary ferrules printer.
2.12.7	JUNCTION BOXES/PUSH BUTTON STATION
2.12.7.1	Different type of Electrical /Control Junction boxes/Push button boxes shall be supplied. The scope of installation of Junction boxes/Push button boxes shall be as follows:
2.12.7.2	Unit rate quoted for erection of junction boxes/push button boxes shall include providing necessary supports, drilling of bottom gland plates for cable glands as required, painting the tag No of JB or fixing a separate tag plate as required on junction boxes/push button boxes, minor chipping, grouting as required for mounting the JBs/PB and supply of all bolts and nuts (Fasteners) including grouting bolts as required for mounting the junction box/push button.
2.12.7.3	Fabrication and fixing of supports shall be on tonnage basis.
2.12.7.4	Contractor shall close all unused holes on the gland plates using suitable material in consultation with Site Engineer at free of cost.
2.12.7.5	All bolts and nuts (Fasteners) required for mounting the junction box shall be arranged by the contractor.
2.12.7.6	Painting of JB supports/push button station shall be in erection agency scope. Painting procedure as per main piping specification.
2.12.7.7	CONTRACTOR shall include painting and marking of all buses, individual incomers, all outgoing feeders etc. with details such as tag no., feeder rating, sending end source reference etc. for all switchboards.
2.12.7.8	It is CONTRACTOR's responsibility to identify and supply the safety equipment such as hand gloves, apron, eye shields, danger boards, first aid box.
2.12.8	SCOPE OF WORK FOR BATTERY/BATTERY CHARGERS
2.12.8.1	Lump sum rate shall be quoted for Erection and commissioning of Battery & Battery charger. No additional payment shall be made for any variation in the number of cells. The rate quoted for erection of battery will include the following works:
2.12.8.2	Checking of battery charger panel & Calibration of all indicating and measuring instruments.

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2.12.8.3	Collecting the batteries and all the accessories like cable connectors, inter cell connectors, equalizing connectors, rack insulators, fuse box, loop cables etc. from stores and assembling on the racks and fixing all loose supplied items as per drawings,
2.12.8.4	Filling the individual cells with Acid/alkali – if applicable.
2.12.8.5	Arranging suitable resistive load banks for charging and discharging during charging and discharging cycles.
2.12.8.6	Arranging manpower in shift during battery charging and discharging cycles that may be carried out round the clock as per the code of practice, and conducting other routine tests as per IS under the supervision of BHEL Engineer/CUSTOMER.
2.12.8.7	Modifications or changes if any for the loose supplied items or any minor changes in wiring.
2.12.8.8	Arranging necessary tools, T&P, Testing equipment, required for erection and commissioning of the battery Erection of battery after assembly of battery stands, inter-connection of batteries and first charging; Capacity testing using dummy load and subsequent recharging (in case of failure of capacity test, the charging Discharging cycle is to be repeated) Dummy load test of chargers includes arrangement of dummy load and temporary connection in absence of regular power supply.
2.12.8.9	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.
2.12.9	STATION LIGHTING
2.12.9.1	The illumination of various indoor and outdoor areas in the turbine generator & associated auxiliaries package shall be in the scope of main lighting package.
2.12.9.2	Normal AC lighting ,DC Lighting and Emergency Lighting
2.12.9.3	System shall include distribution boards, normal/ emergency lighting panels, lighting fixtures, junction boxes, receptacles, switch boards, lighting pole, conduits, LED Luminaires, cables and wires, earthing material etc. The system shall cover all interior and exterior lighting such as area lighting etc.
2.12.9.4	Erection of lighting panels, light poles, fittings and other suitable fixtures required for light fittings, conducting, cabling and wiring as per drawing, testing of wiring and circuit checking, energizing of system forms part of erection job. All conduits, lighting fittings / panels and accessories required for lighting work shall be supplied by BHEL free of cost. The quoted rates for light fittings shall include fabrication / erection of required supporting structures and control-gear of respective fitting. The quoted rates for lighting poles shall include all civil work including supply of cement and final painting including supply of paints as per specification etc. The quoted rate for conducting required for light fittings shall also include fixing of conduit accessories like bends, tees, 3 / 4 way JB's etc. and the laying of PVC wires in respective conduit as per circuits shown in drawing. No extra payment shall be paid for wiring in conduits and fabrication / erection of supporting structure of light fitting.

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2.12.9.5	Supply and E&C of station lighting consumable (As per Annexure-A) shall be part of the contract and supplies of these consumables are in bidder's scope.
2.12.9.6	All tools & tackles, ladders, testing equipment etc. required for erection, testing & commissioning of complete lighting system is to be arranged by the Contractors. Minor civil works Plumbing/Grouting/Foundation required to complete the lighting installation are covered under the scope of this contract and form part of the item installation cost and are not payable separately.
2.12.9.7	The erection work shall conform to latest applicable Indian standards, codes and practices, Electricity rules, fire insurance regulations and safety regulations of the locality where the equipment will be installed. All apparatus, wiring and connections shall be designed so as to minimize risk of fire or any damage which will be caused in the event of fire. Contractor to furnish the installation drawings of all equipment for purchaser's approval
2.12.9.8	The contractor shall be responsible if any parts of lighting fixtures, LDBs, LPs are lost or damaged and lamps are broken during installation. All damage and thefts shall be made good by the contractor till the installation is handed over to the customer.
2.12.9.9	The contractor shall note that for any change in the location of lighting panels, lighting fixtures, switch boxes/receptacles, no extra charges will be paid so long as the modifications are indicated to the contractor before commencement of the work on that particular equipment or circuit.
2.12.9.10	The contractor shall have a separate cleaning gang to clean all equipment under erection as well as the work area and the project site at regular intervals to the satisfaction of Engineer-in-charge. In case this is not done, the purchaser will have the right to carry out the cleaning operation and any expenditure incurred in this regard will be to the contractor account.
2.12.9.11	After installation of lighting fixtures/receptacles, panel number and circuit number shall be painted on them at a suitable place.
2.12.9.12	To distinguish emergency AC fixtures form normal AC fixtures, red painted circular mark of 1 cm dia. shall be provided on emergency fixtures.
2.12.9.13	Lighting distribution board and Lighting Panels
2.12.9.13.1	Lighting DB's consisting of lighting transformer etc, shall be mounted on floor and LP's shall be mounted on the walls/columns/steel structures at the locations indicated in the drawings.
2.12.9.13.2	Suitable Space provision for LDB mounting on floor would be made by the purchaser. The contractor will supply necessary foundation bolts and do the grouting to fix up the LDBs.
2.12.9.13.3	LPs shall be installed by fastening to studs of not less than 12 mm dia. which will be suitably grouted/welded to the wall/column by the contractor. All the required accessories including studs for the erection of the panel shall be supplied by the contractor.
2.12.9.14	Lighting control Switch Boxes & Receptacle Boxes.

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2.12.9.14.1	The locations of switch/receptacle boxes will be approximately as shown in the drawings. The exact location shall be finalized by the contractor in consultation with the engineer-in-Charge.
2.12.9.14.2	All switch/receptacle boxes in offices and control room shall be flush mounted in the wall. In other areas they shall be mounted on wall or column.
2.12.10	CONTROL PANELS (DDCMICS based /PLC panels) and CONTROL & RELAY PANELS (DCDBs, DAVR PANEL, DG Set Panel etc.)
2.12.10.1	Panels to be install are microprocessor based on Distributed Digital control, monitoring & information system (DDCMICS) control panel, Remote Input output panels (RIO) etc. supplied in suit of either one/two/three or loose shipping sections with integral base frame or loose base frame. These panels may have to be installed as stand-alone or in-group consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.
2.12.10.2	Installation of panel shall include fixing of base frame, levelling, alignment, fixing of anti-vibration pads, removal of side covers, fixing of cubical interconnection hardware, interconnection of bus bar/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, sealing of panels/ cable entries. Where the base frame is not supplied as part of panel supply, the contractor shall fabricate the base frame from structural items at site. Payment for such fabrication will be effected on measured quantity at the rate applicable for structural steel fabrication and installation. Proper sealing of all the holes and cable entries (even if the cable has been laid by others) in the panel is in the contractor's scope
2.12.10.3	Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. This shall be a part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc. Panels have to be erected at different locations and elevation in, LT & HT switchgear room, unit control room etc.
2.12.10.3.1	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.
2.12.10.3.2	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.
2.12.10.4	The contractor shall set each section of equipment on its foundation or supporting structures. The contractor shall assemble equipment as required. Skilled craftsmen arranged by the contractor shall install all equipment with parallel, horizontal and vertical alignment.
2.12.10.5	Normally the panels shall be supplied with complete Relays / Instruments and other Components mounted and wired. However, any minor modifications like dismantling of the existing Relays / Instruments / Components and mounting of new Relays /instruments / components and rewiring to suit operating conditions, will be carried out without any

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	extra cost. Similarly if any Relays/ Instruments/component supplied as loose for safety transit, same shall be mounted and wired as per site requirement at free of cost as part of scope of the job.
2.12.10.6	All T&P, Material handling equipment including cranes and Relay Testing / HV Testing / Calibration equipment / Instruments shall be arranged by contractor. Three phase current injection kit required for calibration of relays shall be arranged by the contractor. The contractor shall carry out testing and commissioning works using their own testing equipment's and Testing Engineers under the supervision of BHEL Engineer.
2.12.10.7	All the panels and JB's shall be electrically earthed to the nearest earth grid by means of GI wire/Flats as per the instructions of BHEL engineer.
2.12.10.8	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 Control & Relay Panel testing. 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, get is signed by the concerned BHEL/customer engineer and submit the same to BHEL engineer as per his instruction.
2.12.10.8.1	Integrated Electrical testing/commissioning of Generator Control and Protection Relay Panels & associated equipment, etc. shall involve various activities like relay testing/setting, simulation checks, testing of energy meters, on/off line functional checks on integrated system.
2.12.10.8.2	Relay Testing in static condition for Generator, Transformers, and associated system by secondary current injection at different current and recording the time duration.
2.12.10.8.3	Testing and checking of control and protection interlock scheme in static condition and simulation of protection device contact from internal and external devices of all electrical panels.
2.12.10.8.4	Measurement of Insulations, Winding Resistance, Polarization Index of winding of Generator & associated equipment/ system, DC resistance test & Impedance test on rotor Brushless excitation system at the time of rotor insertion as well as during pre-commissioning stage / commissioning stage/ post commissioning stage.
2.12.10.8.5	Relay setting and checking the stability of protection relays in static and dynamic condition during the OCC (Open Circuit Characteristic) & SCC (Short Circuit Characteristic).
2.12.10.9	Charged and commissioned equipment shall be maintained by the contractor till the same is taken over by Customer.
2.12.10.10	Any items like lamps, lens, fuse / relays / instruments missed from the custody if the contractor shall be replaced by the contractor at free of cost.
2.12.10.11	Contractor shall close unused opening at the panel bottom plate with suitable material in

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	consultation with Site Engineer at free of cost.
2.12.10.12	If any removal / Re-fixing of contactors / relays becomes necessary for the completion of the system, the same shall be done by the contractor at free of cost.
2.12.10.13	Scope of work shall also cover drilling of bottom gland plates for cable entry as required.
2.12.10.14	Contractor shall calibrate and commission all switchgear / panel mounted instruments, protection relays, transducers, Recorders, Indicators, energy meters etc.
2.12.10.15	Unit rate shall also include Testing, Calibration and adjustment of relays, electronic cards and instruments, transducers mounted on the panels.
2.12.10.16	If panels are supplied with monitor, printers, furniture, controller etc. or any loose items or equipment's, the erection of above shall be part of respective panel. No separate rate shall be payable for loose supplied items unless specifically given in the BOM.
2.12.10.17	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 Enclosure, Winding resistance & IR value of PMG, Main Exciter, Q axis coil, Diode wheel Checking healthiness of diodes /Fuses, Commissioning of stroboscope, Exciter Heater / Blowers Rotor earth fault brush 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.
2.12.10.18	DG Sets
2.12.10.18.1	The scope of works covers electrical and control system erection and commissioning of following auxiliaries of DG set. Battery Charger and Battery Bank, Auxiliary MCC, PLC Panel, NGR Panel, Earthing pits, Generator control & Protection panel (MRP and Syn.), Cable trays (ladder /perforated) Control cabling
2.12.10.19	Consumables like rawl plugs, screws, check nuts, nuts & bolts, saddles, saddle bars, cable (nylon) ties, washers, cable tags (strips), etc. which are not covered in the list but required for successful completion of above erection activity shall be considered in Erection agency.
2.12.10.20	Erection activities like cutting/ threading/welding etc. of conduit/pipe/ISMC/ISA shall be carried out at site as per requirement for installation of Inert Gas Extinguishing system components.
2.12.10.21	Surface preparation and base coat of primer shall be carried and final painting shall be done after completion of structural steel erection.

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2.12.11	COMPUTERS / PLC BASED EQUIPMENTS: All computer related items / equipment like CRT, monitors, printers, keyboards, pre-fabricated connecting leads etc. shall be installed in control room and control desk as per direction of BHEL Engineer. However, any assistance required for testing / commissioning have to be provided by the contractor within the quoted price. Hardware found defective during testing / commissioning and till handing over to Customer, have to be removed for repair / replacement and reinstalled within the quoted rates.
2.12.12	RIGID & FLEXIBLE CONDUITS/ Lighting wires
2.12.12.1	Cables shall normally be laid on cable trays. However, in case of shorter routes where trays are not possible, suitable GI pipe/flexible conduits shall be used.
2.12.12.2	Scope of works for flexible conduit includes drilling of the holes on the plates, fixing of the end connectors, providing suitable supports and fixing tag marks wherever specified as required by BHEL. The supply of suitable clamps, fasteners and tag plates are in contractor's scope.
2.12.12.3	Fixing end connectors shall be part of scope of flexible conduit laying.
2.12.12.4	Conduit shall run along wall, floor, ceiling, on steel structures, embedded in wall, floor, for ceiling, in accordance with relevant layout drawings. The contractor shall closely co-ordinate his work with the civil contractor. Exposed conduits shall be run in straight lines parallel to building columns, beams and walls. Unnecessary bends and crossings shall be avoided to present a neat appearance. In the office area as specified conduits shall be embedded along the entire run. It is the responsibility of the contractor to co-ordinate with the civil contractor of these buildings. Conduits supports shall be provided at an interval of 750 mm for horizontal runs and 1000 mm vertical runs.
2.12.12.5	Conduits shall be kept, wherever possible, at least 300 mm away from hot pipes, heating devices etc.
2.12.12.6	Conduits shall be securely terminated at LPs/junction boxes or lighting fixtures by proper fastening with a lock put on inside and outside. The number of conduits terminating at LP's shall not exceed the permissible number considering the glanding area of lighting panel. Conduit terminations shall be made water & vermin proof.
2.12.12.7	The entire metallic conduit system, whether embedded or exposed, shall be electrically continuous and thoroughly grounded where slip joints used, suitable bending shall be provided around the joint to ensure a continuous ground circuit.
2.12.12.8	Conduits and fittings shall be properly protected during construction period against mechanical injury. Conduit ends shall be plugged or capped to prevent entry of foreign material.
2.12.12.9	After installation, the conduits shall be thoroughly cleaned by compressed air before pulling in the wire.
2.12.12.10	Lighting wires
2.12.12.10.1	Lighting wires from lighting panels to junction boxes and junction boxes to lighting fixtures, switch boxes and receptacle boxes shall run in conduits (Rigid/flexible).
2.12.12.10.2	All wires in a conduit shall be drawn simultaneously. No subsequent drawing is permissible.

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2.12.12.10.3	Wires shall not be pulled through more than two equivalent 90 deg. bends in a single conduit run. Wherever required, suitable conduit junction boxes/pull boxes shall be provided. All types of wiring, concealed or unconcealed shall be capable of easy inspection.
2.12.12.10.4	Receptacles and lighting circuits shall be fed from different circuits. The switch controlling these circuits shall be on the live side (phase wire) of the circuits.
2.12.12.10.5	A.C. normal, A.C. emergency and D.C. emergency system wiring shall run throughout in separate conduits.
2.12.12.10.6	Wiring shall be spliced only at junction boxes. Maximum two wires shall be connected at each terminal.
2.12.12.10.7	All lighting wires shall be crimped using suitable type of solderless, crimping, tinned fork type copper lugs. Cost of the lugs shall be included in the erection price of wire.
2.12.13	SCOPE OF WORK FOR ELECTRIC ACTUATORS
2.12.13.1	All calibration instruments required for calibration of actuators shall be arranged by the contractor.
2.12.13.2	For all electrical actuators of the valves, functioning, setting and performance of limit switches/torque switches of various positions shall be checked before and after installation of the actuators. The position transmitters for inching applications shall also be calibrated.
2.12.14	FIRE PROOF SEALING/Fire retardant coating
2.12.14.1	Fire Proof Sealing. Scope includes application of fire proof sealing material for below panels, at walls, floors opening and wherever applicable.
2.12.14.2	Fire proof shall be done on cable ducts and FRP cable trays using flexible ceramic fiber blanket system (in compliance to OISD STD 164).
2.12.14.3	Fire retardant coating shall be provided and the thickness of the coating compound shall be sufficient to achieve 30 minute fire rating. The cables shall be coated with fire protection material at the strategic locations as follows: a) Fire coating shall be provided at an interval of 3 meters for a length of 1.5 meters in the straight portion of each of the cable trays above ground. At bends/ intersections and Tee joints, coating should be done 2 meters from centre line of cable tray on each side. b) All vertical cables coming out below the panels shall be coated to a full length of vertical drop from bottom of panel plus 1.5 metres horizontal run after the bend. c) Fire break shall be provided at an interval of 15 meters in cable trenches for a length of 3 meters. d) All Vertical cable runs anywhere in the area shall be coated full. The system shall be of type tested design as per international standards e.g. IEC-60332-1 & ASTM D-2863.
2.12.15	STRUCTURAL FABRICATION AND INSTALLATION (INSTRUMENT/ JUNCTION BOX FRAME/ PANEL BASE FRAME / CABLE TRAY & MISC STRUCTURES FABRICATION)
2.12.15.1	Structural steel material like MS angles, channels, beams, flats, plates etc. shall be supplied in running meter and the same shall be used for misc. fabrication if required and the same shall be used for fabrication of panel base frame, cable tray supports, Canopies for instruments/panels/ drives/ JB's/ Push Buttons etc. Instrument/Junction box frames, Impulse Pipe/Instrument Air Pipe supports and instruments etc.

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2.12.15.2	This shall include cutting to size, contouring of ends for connections if required, welding, grinding of excess weld deposits/burrs, drilling of holes for mounting of device/instrument, installation at location, levelling, alignment, providing bracings and painting etc. No gas cut holes will be permitted.
2.12.15.3	All the fabricated supports/frames for instruments, trays, pipes, electrical equipment's, etc., shall be painted after thoroughly cleaned by wire brush, scrapping or any other method as per requirement of BHEL/CUSTOMER. Paints and other associated items are in the scope of the contractor.
2.12.15.4	Frame 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. Where required, as part of work, concrete floors may have to be chipped out to reinforcement depth for anchoring the frames. Wherever grouting is required, BHEL shall arrange the grouting through their civil agency however the contractor shall coordinate with the civil agency.
2.12.15.5	In case, structural cable trays, bends, tees, reducers etc., 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 instances.
2.12.15.6	In certain packages, members of frames/rack for mounting of junction boxes/instruments may be supplied readymade. These have to be assembled prior to installation. The installation rate as quoted shall include assembly of the frames.
2.12.15.7	Gas cutting of tray/impulse pipe support and holes in frame is not permitted. only hacksaw cutting/ drilled hole shall be permitted.
2.12.15.8	Hardware for erection (Like Nuts, Bolts and Washers, etc.) where ever is required shall be in the scope of the contractor.
2.12.16	SCOPE OF ABOVE GROUND EARTHING,LIGHTENING PROTECTION & EARTH PIT
2.12.16.1	Earthing work mainly involves laying and tack welding of conductors on columns / beams at every one-meter interval and bolted connections with equipment at least at two points. Low hydrogen content electrodes shall be used for welding. All the above ground welded joints shall be coated with two coats of red oxide primer and two coats of enamel paints.
2.12.16.2	Earthing scope also covers, earthing of all cable trays, metallic frames of all current carrying equipment, supporting structures adjacent to current carrying conductors, Transformer, Bus ducts, HT/LT panels, control panels, motors, JB, push button boxes etc. as required.
2.12.16.3	Drawings of main earth grid to be provided by others would be made available to the contractor to enable them to carry out rest of the earthing system work.
2.12.16.4	Different type of earthing materials shall be supplied by BHEL and the contractor shall lay and connect the earthing materials as per site requirement.
2.12.16.5	The connection between earthing pads/ terminal to the earth grid shall be made short and direct and shall be free from kinks and splices.
2.12.16.6	Scope of works for Lightning Protection system includes installation of vertical air terminations, Horizontal conductors, vertical risers, down conductors, test links, earth

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	electrodes, supply of saddles & clamps, minor civil works etc.
2.12.16.7	Scope of work also include the formation of earth pit. Earth pits shall be treated with salt and charcoal as per IS:3043 or as per approved procedure of BHEL/CUSTOMER.
2.12.16.8	All junction boxes, receptacles, switch boxes, lighting fixtures, conduit etc. shall be earthed in compliance with the provision of I.E. rules and applicable Indian Standard amended up to date.
2.12.16.9	The earth resistance values for electrical system shall be demonstrated at site in presence of Engineer-in-charge. In case additional electrodes are required to meet the requirement, same shall be provided.
2.12.16.10	The plant earthing system will be designed as per the requirement of IEEE - 80 & IEEE-142, IS – 3043, Indian Electricity Rules and CBIP Guidelines.
2.12.16.11	At specified intervals. Separate grid shall be provided for Electronic Grounding.
2.12.16.12	The buildings will be provided with horizontal air terminations on roof top, down conductors, test links and earth connections as per IS 2309. Lightning protection conductors located on the top of the buildings/structures will be connected to the plant ground grid with galvanized mild steel down conductors. Dedicated earth riser (separate from equipment earthing) shall be provided for each down comer conductor for lightning protection through test link located one meter above ground.
2.12.16.13	Treated Earth Pits: Preparation of Treated earth pit includes Supply of all items (except the electrode rod 3 M Long /Pipe 3 M Long with funnel) including charcoal; salt, civil chamber with cover is in the scope of the contractor. The contractor shall also connect this pit to the earth grid (by other agency) at nominal distances of 5 to 10 meters by 40 mm rods, which are also in the scope of the contractor. Electronic earth pit resistance should be less than 1.0 Ohm & electrical earth pit resistance should be less than 2.0 ohm.
2.12.17	WELDING, NON-DESTRUCTIVE TESTING ETC
2.12.17.1	Installation of equipment involves good quality welding, NDE checks etc.
2.12.17.2	Welder deployed for aluminum welding shall have experienced and approved by BHEL and BHEL's Customer after due qualification process/testing.
2.12.17.3	Welding of all structural steel & aluminum shall be done only by the qualified and approved welders.
2.12.17.4	All the welders shall be tested and approved by BHEL engineer/ Customer's quality engineer before they are actually engaged on work though they may possess IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.
2.12.17.5	The welded surface shall be cleaned of slag and painted with primer paint to prevent corrosion. For this paint will be supplied by the contractor.
2.12.17.6	Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.
2.12.17.7	Certain types of coated welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the coated welding electrodes have to be carried in portable ovens.

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2.12.18	MEASUREMENTS & WASTAGE & CUTTING ALLOWANCES	
2.12.18.1	For all payment purposes, measurement shall be made on the basis of the actual execution of work in line with drawings/documents/site requirements. Physical measurements shall be made by the contractor in the presence of the Engineer. Measurement for cable, impulse pipes/tubes, GI pipe, conduits, flexible conduits, trays etc. shall be made on the basis of length actually laid.	
2.12.18.2	All the surplus, scrap and serviceable materials, out of the quantity issued to the contractor shall be returned to BHEL in good condition and as directed by the engineer.	
2.12.18.3	All materials returned to stores should carry aluminum tag indicating the size and type. Cables more than 15 meters length is termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation.	
2.12.18.4	While carrying out material reconciliation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity (ies) will be taken as the net quantity (ies) issued to the contractor. Material reconciliation shall be done and allowable scrap quantity calculated as per wastage allowance percentage specified above. Any scrap/wastage generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor.	
2.12.18.5	For all site-fabricated steel items such as supports, racks, frame, Canopy etc. physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.	
2.12.18.6	Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard Performa prescribed for this purpose by the site in charge.	
2.12.18.7	The erection contractor shall make every effort to minimize wastage during erection work. Cutting and wastage allowance shall be computed on length, weight of material actually used, measured and accepted. In any case, the wastage shall not exceed the following limits.	
	S.No.	Item
	1.	Each iron/steel section
	2.	Each size of control / shielded cable
	3.	Each size of power cables
	4.	Impulse pipe/tubes/GI pipes/copper tube
	5.	Earth Flat
	6.	Cable Tray
		% Wastage on issued Qty.
		2
		2
		1
		1
		2
		2
2.12.18.8	If the actual wastage is more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.	

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2.12.18.9	Cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. For this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length and the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Any jointing shall have to be approved by BHEL engineer. All the cut pieces/bits of cables, which are not used, shall be returned to the purchaser for accounting towards wastage. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.
2.12.19	FINAL PAINTING
2.12.19.1	All exposed metal parts of the equipment's covered within the scope of this contract after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic enamel / heat resistant/epoxy based paint. However, due to aging, the same may have got deteriorated for peeled off. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, and any other method as per requirement of BHEL. The same will be inspected and approved by the BHEL/CUSTOMER engineer before painting.
2.12.19.2	After applying the primer paints all structure / equipment / items, shall be finish painted with synthetic enamel / heat resistant/epoxy based paint or as per approved painting procedure of BHEL/CUSTOMER. In case proper finish is not obtained in two coats, the contractor shall apply additional coat (s) till proper finish is achieved. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.
2.12.19.3	Finish coat paint, No. of coat and DFT shall be as indicated in the painting specification will be issued during execution / relevant BHEL document/customer's specifications.
2.12.19.4	Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.
2.12.19.5	All the fabricated frames, racks, supports, panel base frame etc. wherever applicable shall be painted with two coats of primer and followed by two coats of paint as specified earlier herein. In case of G I Structure, The cold galvanizing paint to be applied as touch up where ever needed. This is to be done as per instruction of BHEL engineer.
2.12.19.6	Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL/CUSTOMER approved make only and painting should be as per colour scheme and quality approved / specified by BHEL/CUSTOMER. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting.
2.12.19.7	The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.
2.12.19.8	Colour Banding, Legend and Identification Marking, Direction marking etc. shall be in scope of the contractor and as per approved procedure BHEL/CUSTOMER. Letter writing shall be

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	done in Hindi / English or in both languages. The painters have to undergo test and only qualified painters will be allowed to work.
2.12.19.9	The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work. The contractor shall ensure availability of.
2.12.19.9.1	SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.
2.12.19.10	All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.
2.12.19.11	Touch-up painting of LT MCC \ Control Panels or any other equipment /devices wherever necessary.
2.12.19.12	Primer shall be compatible with the final coat paint schedule.
2.12.19.13	Full (Spray) painting of transformers, bus ducts with two coats of paint as per Specification
2.12.20	ELECTRICAL HOIST
2.12.20.1	Electrically operated hoist of capacity varying from 2 MT to 40 MT are provided for maintenance purpose in Turbine area. Mechanical erections of hoist components such as runway beams, hoist carriage, drive unit, etc. shall be done by other agency. The scope of work covered in this tender specification for erection & commissioning is installation of DSL system and associated accessories. The scope of work for the contract in this package is as under:
2.12.20.2	TEE IRON TYPE DSL SYSTEM :-It consist of tee iron guide for cable trolley and associated supporting structural members, trailing cable, cable guide trolley, dog chain, switch fuse unit, limit switch etc.
2.12.20.3	TAUT WIRE TYPE DSL SYSTEM :-It consist of end bracket, Galvanized wire rope, turn buckle/straining bolt, real insulator,/cable guide trolley ,cable, switch fuse unit, rope clamps, leather bands, dog chain, limit switch etc. DSL system shall have to be erected at higher elevation. Contractor shall take all safety measures while carrying out the work.
2.12.20.4	Installation of tee iron & other structural steel member, unit rate for fabrication & installation shall be applicable and other items unit rate shall be paid, however cable dressing, fixing of leather bands, rope clamps and any incidental work such making approaches for executing the work, scaffolding etc. shall be part of work.
2.12.20.5	Commissioning & testing of electrical hoists shall include panel wiring check, IR measurement, functional check, over load relay testing, trial run, providing assistance during load test, replacement of component if required etc. However, preparatory work for load test and arrangement of load etc. shall be done by other agency.

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2.12.20.6	It shall be the responsibility of the contractor to carry out preliminary tests like checking connections, meggering etc for LT motors commissioning, as a part of contract. These motors will generally be erected by other agencies. No separate rates are envisaged.
2.12.21	TESTING, PRE-COMMISSIONING, COMMISSIONING, AND POST-COMMISSIONING
2.12.21.1	<p>Site testing shall be required for all equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations as per the approved commissioning procedure / quality plans of BHEL/Customer. These would include, the following but not limited to :</p> <p>Electrical testing of HT/LT Motors, Testing and charging of bus ducts, Testing and Charging of HT & LT Switchgears/ control panels Checking of control loops Testing and Charging of transformers, Testing and Charging of Reactor system, Testing and charging of Battery/Battery charger system, Testing and commissioning of Electrical operated actuators Testing and charging cables in the scope Testing and commissioning of DC Motors, Testing and commissioning of field instruments Testing and commissioning of DAVR system, Testing and commissioning of Station lighting, Testing and commissioning of DG sets, Trial run of pumps/ Motors/Fans/SCC&OCC of Generators, synchronization/Auto synchronization of Generators and HT/LT Breakers, etc. as instructed by BHEL using their own consumables, labour and scaffoldings etc. Specific omission of any test which is required for the successfully commissioning of the system does not absolve the contractor of its responsibilities of performing of that test.</p>
2.12.21.2	All required tests indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests /activities may not have been listed in these specifications but contractor shall conduct the tests as per the approved commissioning procedure.
2.12.21.3	All the tests may have to be repeated till all the equipment satisfy the requirement /obligation of BHEL at various stages.

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2.12.21.4	The contractor shall perform various activities during pre-commissioning, integrated testing, post-commissioning stages of equipment covered under this tender specification. It is responsibility of contractor to arranged tools & plants, test equipment's, experienced engineers and technicians. Contractor shall earmark separate manpower for respective commissioning areas and they shall not be disturbed /diverted for other work. The contractor's commissioning group shall work as per the instruction of BHEL Engineer and they shall coordinate day-to-day activity with other agency and BHEL/ Customer. The testing activity may have to be repeated till satisfactory results are obtained and also to satisfy the requirement of Customer / statutory Authority.
2.12.21.4.1	The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and work undertaken round the clock if required. It is responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools & tackles / testing equipment's with BHEL Engineers and arrange for the same. If at any time the requisite manpower, consumables, testing equipment's etc. are not arranged then BHEL shall make alternative arrangements and necessary recoveries with overhead cost will be made from the running bills.
2.12.21.4.2	The contractor shall simultaneously start testing & commissioning activities for equipment's to match the milestone activities of the project.
2.12.21.4.3	During the commissioning activities and carrying out various tests, if any of temporarily work such mounting of test equipment's / cabling etc. are required the contractor shall carry out such work without any extra cost. The same shall be removed after completion of the activity.
2.12.21.5	It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.
2.12.21.6	Prior to commissioning and after commissioning, protocols have to be made with BHEL/ customer. The formats shall be given by BHEL and have to be printed by the contractor in adequate numbers.
2.12.21.7	Any rework/rectification/modification is required to be done because of contractor's faulty erection, which is noticed during pre-commissioning/commissioning stage, the same has to be rectified by the contractor at his cost. During commissioning, if any improvement rework / rectification /modification due to design improvement / requirement is involved, the same shall be carried out promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.
2.12.21.8	During this period though the BHEL's/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for the complete requirement of supervision, consumables, labour, T&P and IMTEs required till such time the commissioned units are taken over by the BHEL's customer.

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2.12.21.9	All testing activities shall be carried out as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. The contractor shall follow the checklist of BHEL prior to taking up testing & commissioning activities and the activities shall be carried out in accordance with the checklist. All the above shall be witnessed by BHEL engineer and the reports signed jointly
2.12.21.10	Attending the punch points post commissioning and resolve the deficiency for handing over the unit to customer .
2.12.21.11	The contractor shall co-ordinate with BHEL and other contractor's during the main plant commissioning to ensure successful commissioning of total plant.
2.12.21.12	The pre-commissioning activities of the main power plant will start with energizing of start-up power supply systems followed by trial run of various drives. Commissioning operations shall continue till trial operation of the unit. The contractor shall simultaneously start checking cables erected by him to match with the various milestone activities /commissioning programme of the project. All these works need specialised testing engineers, supervisors including electricians in each area to coordinate with BHEL Engineers and other agencies round the clock to match with commissioning schedule of unit. Contractor shall earmark separate manpower for various commissioning activities. The manpower shall not be disturbed or diverted for erection work.
2.12.21.13	The mobilization of testing team shall be planned in time and shall be undertaken round the clock. Contractor shall discuss on day to day / weekly / monthly basis the requirement of testing 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 the cost will be recovered from contractor.
2.12.21.14	Prior to commissioning and after commissioning, protocols have to be made with BHEL / Customer. The formats will be given by BHEL and have to be printed by the contractor in adequate numbers. It shall be specifically noted that above personnel of the contractor may have to work round the clock along with BHEL commissioning engineers which may involve over time payment which forms part of Contractors Scope.
2.12.21.15	Any rework / rectification / modification is required to be done because of contractor's faulty erection, which is noticed during commissioning at any stage, the same has to be rectified by the contractor at his cost. During commissioning, any improvement rework / rectification / modification due to design improvement / requirement is involved, the same shall be carried out promptly and expeditiously. Claims if any, for such works from the contractor shall be governed by clauses covered elsewhere.
2.12.21.16	All testing activities shall be carried out as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. The contractor shall follow the checklist of BHEL prior to taking up testing & commissioning activities and the activities shall be carried out in accordance with the checklist. All the above will be witnessed by BHEL engineer and the reports signed jointly.
2.12.21.17	All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications. These tests / activities may not have been listed in these specifications. Specialized test equipment, if

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	any, shall be provided by BHEL/ its client free of hire charges. However contractor has to take proper care of the equipment issued to him.
2.12.21.18	All the tests at various stages shall be repeated till all the equipment satisfy the requirement of BHEL / Customer. Any rectifications required shall have to be done / redone by the contractor at his cost.
2.12.21.19	Checking/verification of binary/analogue input and output signal from field and panel and upto recording/indicating instrument/HMI monitors.
2.12.21.20	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.
2.12.21.21	Checking the interlock, protection and alarm for various processes by simulation of field devices/process changes.
2.12.21.22	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.
2.12.21.23	Observe the proper functioning of sub-group/sub-loop control.
2.12.21.24	It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.
2.12.21.25	It shall be specifically noted that the contractor and employees of the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers/customer officials. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including engineers/supervisors.
2.12.21.26	After synchronization, the commissioning activities will continue. It shall be the responsibility of the contractor to provide manpower including necessary consumables, hand tools and supervision as part commissioning assistance till handing over of sets to customer.
2.12.22	MANPOWER TO BE DEPLOYED FOR EXCLUSIVE AUTHORITY OF BHEL SITE
2.12.22.1	<p>Following manpower is to be deployed by Contractor for exclusive use of BHEL site for facilitation of erection and commissioning purposes: -</p> <p>1. Erection & Commissioning Engineer: -</p> <p>a. Electrical Engineer – 1 no.</p> <p>These engineer shall be working exclusively under the instructions of BHEL Engineer. Electrical Engineer shall be deployed for a period of 22 months. The deployment schedule shall be finalized at site with BHEL Engineer before deployment of these manpower. This manpower is to</p>

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	<p>be provided by the contractor without any additional cost to BHEL. In case this manpower is not deployed as per requirement of BHEL Engineer, then recovery @ Rs. 30,000/- per month per engineer shall be made from the account of Contractor.</p>
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Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.0	<u>ESTABLISHMENT</u>			
3.1	<u>FOR CONSTRUCTION PURPOSE:</u>			
3.1.1	<u>Open space for office</u>	Yes		BHEL may provide free of charge limited open space for office and store as and where made available by the customer i.e. THDC.
3.1.2	<u>Open space for storage</u>	Yes		
3.1.3	<u>Construction of bidder's office, canteen and storage building including supply of materials and other services</u>		Yes	
3.1.4	<u>Bidder's all office equipment, office / store / canteen consumables</u>		Yes	
3.1.5	<u>Canteen facilities for the bidder's staff, supervisors and engineers etc.</u>		Yes	
3.1.6	<u>Firefighting equipment like buckets, extinguishers etc.</u>		Yes	
3.1.7	<u>Fencing of storage area, office, canteen etc. of the bidder</u>		Yes	
3.2	<u>FOR LIVING PURPOSES OF THE BIDDER</u>			
3.2.1	<u>Open space</u>		Yes	Bidder has to make his own arrangement at his own cost
3.2.2	<u>Living accommodation</u>		Yes	
3.3	<u>ELECTRICITY</u>			
3.3.1	<u>Electricity For construction purposes (Chargeable)</u>	Yes		Construction Power will be provided at single

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Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.3.1.1	<u>Single Point source</u>	Yes		point source on chargeable basis as and where made available by Owner, however contractor has to deploy DG Sets at no extra cost to BHEL to meet power requirement in case of delay in availability of single source or any kind of power interruptions during the course of the project.
3.3.1.2	<u>Further distribution for the work to be done which include supply of all materials, energy meter, protection devices and its execution& service</u>		Yes	
3.3.1.3	<u>Duties and deposits including statutory clearances if applicable</u>		Yes	
3.3.2	<u>Electricity for the office, stores, canteen etc. of the bidder, which include:</u>		Yes	
3.3.2.1	<u>Distribution from single point including supply of materials and service</u>		Yes	
3.3.2.2	<u>Supply, installation and connection of material of energy meter including operation and maintenance</u>		Yes	
3.3.2.3	<u>Duties and deposits including statutory clearances for the above</u>		Yes	
3.3.2.4	<u>Living facilities for office use including charges</u>		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter III: FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.3.2.5	<u>Demobilization of the facilities after completion of works</u>		Yes	
3.3.3	<u>Electricity for living accommodation of the bidder's staff, engineers, supervisors etc. on the above lines.</u>		Yes	
3.4.0	<u>WATER SUPPLY</u>			
3.4.1	<u>For construction purposes:</u>			
3.4.1.1	<u>Making the water available at single point</u>		Yes	The contractor shall arrange for construction water from underground/local sources. All borings, pipe lines, pumps, water tankers, underground storage tank, over-ground storage tank, etc, whatsoever required for taking the water from the underground source to the site of work shall be provided / erected / constructed/maintained by the contractor at his Own cost.
3.4.1.2	<u>Further distribution as per the requirement of work including supply of materials and execution</u>		Yes	
3.4.2	<u>Water supply for bidder's office, stores, canteen etc.</u>		Yes	
3.4.2.1	<u>Making the water available at single point</u>		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter III: FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.4.2.2	<u>Further distribution as per the requirement of work including supply of materials and execution</u>		Yes	
3.5.0	<u>LIGHTING</u>			
3.5.1	<u>For Material Handling work (supply of all materials)</u> 1. <u>At office storage area</u> 2. <u>At Yard or any other places where material is unloaded/stored</u>		Yes	
3.5.2	<u>For material handling work (execution of lighting work/arrangements)</u> 1. <u>At office storage area</u> 2. <u>At Yard or any other places where material is unloaded/stored</u>		Yes	
3.5.3	<u>Providing the necessary consumables like bulbs, switches, etc. during the course of construction</u>		Yes	
3.5.4	<u>Lighting for the living purposes of the bidder at the colony / quarters</u>		Yes	
3.6.0	<u>COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER</u>			
3.6.1	<u>Telephone, internet, intranet, e-mail etc.</u>		Yes	
3.7.0	<u>COMPRESSED AIR SUPPLY</u>			
3.7.1	<u>Supply of Compressor and all other equipment required for compressor and compressed air system including pipes, valves, storage systems etc.</u>		Yes	
3.7.2	<u>Installation of the above system and operation and maintenance of the same.</u>		Yes	
3.7.3	<u>Supply of the all the consumables for the above system during the contract period</u>		Yes	
3.8	<u>CONSTRUCTION FACILITIES</u>			

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter III: FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.8.0	<u>Engineering works for construction:</u>			
3.8.1	<u>Providing the construction drawings for all the works covered under this scope</u>	Yes		
3.8.2	<u>Drawings for construction methods and detailed shop drawings</u>	Yes	Yes	In consultation with BHEL. Drawings for construction methods and detailed shop drawings shall be prepared by the Contractor as specified in the BOQ.
3.8.3	<u>As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site– routing of small bore pipes</u>		Yes	In consultation with BHEL
3.8.4	<u>Shipping lists etc. for reference and planning the activities</u>	Yes		”
3.8.5	<u>Preparation of site construction schedules and other input requirements</u>		Yes	”
3.8.6	<u>Review of performance and revision of site construction schedules in order to achieve the end dates and other commitments</u>	Yes	Yes	”
3.8.7	<u>Weekly construction schedules based on Sl. No 3.8.5</u>		Yes	”
3.8.8	<u>Daily construction / work plan based on Sl. No 3.8.7</u>		Yes	”

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter III: FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

Sl.No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.8.9	<u>Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.</u>		Yes	
3.8.10	Preparation of preassembly bay		Yes	
3.9	Other important Conditions regarding facilities to be provided by BHEL / Contractor i.e. Space, Construction Power and Construction Water etc.:			
3.9.1	BHEL may provide free of charge limited open space, for office & storage shed, as and where made available by Customer (THDC). It is the responsibility of the contractor to construct sheds, fabrication yard, establish batching pant, provide all utilities and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.			
3.9.2	Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.			
3.9.3	Construction power, for construction purposes will be provided on chargeable basis at one point near erection site, from supply point AS AND WHEN IT IS MADE AVAILABLE BY THE CUSTOMER . In the initial stages, the Contractor may have to deploy the DG sets for carrying out the tender works. Further distribution of power (when received) shall be done by contractor at his cost. All wiring must comply with local regulations and will be subject to Engineer's inspection and approval before connecting supply. The THDC tariff and tax may vary from time to time. The required Energy meter for measuring the consumption shall be provided and installed by the contractor. Any dispute regarding consumption, the BHEL engineer's decision shall be final & binding to the contractor. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB etc.			
3.9.4	Provision of distribution lines of power and water from the central points to the required place with proper distribution boards observing the safety rules laid down by the authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution board, switch boards, TPN, CBS, ELCBS/ MCCBS / Copper / Brass clamps, copper conductor, change over switches, pipes, fittings etc. at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working shift / hours accordingly and deploy additional manpower if necessary so as to achieve the targets. Any duty, deposit involved in getting the Electricity shall be borne by the bidder.			
3.9.5	In case of power cuts / load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor. During interruptions in regular power supply, power cut/load shedding in any construction sites, contractor should make his own arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown /failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency			
3.9.6	Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. within finally accepted rates.			

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter III: FACILITIES IN THE SCOPE OF BHEL/CONTRACTOR

3.9.7	CONTRACTOR HAS TO ARRANGE FOR CONSTRUCTION WATER BY PROVIDING SUITABLE BORE WELL WITHIN THE QUOTED RATES. Contractor to satisfy himself that the water drawn by him is fit for construction / consumption and adequately treat such water at his cost when it is not found fit for the said purposes.
3.9.8	No claim for damages will be entertained by the Company on account of interruptions of water supply or limitation of quantity of water as aforesaid or on account of the water so taken being not fit for construction purposes or on any other account in connection with such water supply.
3.9.9	The Contractor should make arrangements for storage of sufficient quantity of water required for work.
3.9.10	The Contractor shall during the progress of the work, provide, erect and maintain at his own expenses all necessary temporary workshops, stores, consumables, offices, etc. required for the proper and efficient execution of the work. The planning, setting and erection of these buildings shall have the approval of the Engineer and the Contractor shall at all times keep them tidy and in a clean and sanitary condition to the entire satisfaction of the Engineer.
3.9.11	On completion of work or as and when required by BHEL, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the Engineer and expenses incurred shall be recovered from the contractor along with prevailing overhead. The decision of BHEL Engineer in this regard shall be final.
3.9.12	DRINKING WATER – Bidder shall provide drinking water at the work spot at their cost.
3.9.13	CONSUMABLES All consumables, like gas, electrodes, chemicals, lubricants etc. required for the scope of work, shall be arranged by the contractor at his cost unless otherwise specifically mentioned in the contract. In the event of failure of contractor to bring necessary and sufficient consumables, BHEL may arrange for the same at the risk and cost of the contractor. The entire cost towards this along with overhead shall be paid by the contractor or deducted from the contractor's bills.
3.9.14	DEWATERING The bidder shall, prior to submitting his tender for the work, visit and examine the site of works and its surroundings at his own expense, and obtain & satisfy themselves about the limit and extent of surface and subsurface water to be encountered during the performance of the work, and the requirement of drainage and pumping. Contractor shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL.
3.9.15	SITE ORGANISATION The contractor shall provide adequate staffing in the following areas in addition to the staffing requirements for execution as instructed/informed by BHEL: i. Overall planning, monitoring & control. ii. Quality control and quality assurance. iii. Materials management. iv. Safety, fire & security. v. Industrial relations and fulfillment of labour laws and other statutory obligations.
3.9.16	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter IV: T&Ps and MMEs to be deployed by Contractor

4.0	T&P DEPLOYED BY CONTRACTOR		
S.No.	EQUIPMENT	Capacity	Qty.
1.	Trailer along with pulling unit	APR	APR
2.	Hydra Crane	12T/14T/18T	APR
3.	Hydraulic jacks	APR	APR
4.	Copper tube bender and cutter sizes 6mm, 8mm, 1/2", 1/4"	APR	APR
5.	TRANSFORMER OIL PURIFICATION PLANT WITH VACUUM PUMP FOR EVACUATION TRANSFORMER ALONGWITH ACCESSORIES & HOSES. A) CAPACITY 750/1000/6000 LTR. PER HOUR	APR	APR
6.	TRANSFORMER OIL BDV TEST KIT 0-100 KV WITH 2.5MM AIR GAP.	APR	APR
7.	Welding sets with accessories and ovens for welding electrodes backing and holding	APR	APR
8.	Pipe bending machine – 2" size	APR	APR
9.	Dye sets for threading upto 2" pipe.	APR	APR
10.	Tap sets for both BSP and NPT threads upto 1" each	APR	APR
11.	Crimping tools up to all size of cables under scope of work	APR	APR
12.	Hydraulic crimping tool	APR	APR
13.	Vacuum Cleaner (Industrial)	APR	APR
14.	Grinding Machine	APR	APR
15.	Drilling Machines	APR	APR
16.	Electric Winches	APR	APR
17.	Phase sequence indicator	APR	APR
18.	Digital Multimeters 3½ digit of reputed make	APR	APR

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

19.	Digital, 6 ½, 4 1/2 digit Motwane/HIL/Fluke	APR	APR
20.	Analog multimeters	APR	APR
21.	250V/500V/1000/5000V rated Hand operated megger Mains/battery operated	APR	APR
22.	Digital Megger	APR	APR
23.	Insulation tester mains operated 2500/5000V	APR	APR
24.	Earth resistance tester	APR	APR
25.	HV TEST KIT AC, 0 –60 KV & DC, 0- 100 KV PREFERSBLY WITH DRY TYPE TRANSFORMER	APR	APR
26.	Wheatstone bridge	APR	APR
27.	Micro ohmmeter	APR	APR
28.	Tong Testers AC 5/10,25/60/300 ,Amp Range ,of reputed make	APR	APR
29.	Tong Testers DC 30/60/300 A	APR	APR
30.	Stop watch	APR	APR
31.	CAPACITANCE & TAN DELTA TEST KIT 12 KV	APR	APR
32.	Torque wrench(12-60 Nm,50-225 Nm)	APR	APR
33.	Ferrule printing machine	APR	APR
34.	Dial gauges	APR	APR
35.	Dead Weight Tester rated 400 Kg/cm ² with weights & test gauge facility	APR	APR
36.	Oil temperature bath suitable to calibrate the instruments range 0-300 deg. C with standard temp. gauges & thermostatic control	APR	APR
37.	Standard gauges 12" dial size make	APR	APR
38.	A) 0-1 kg/cm ² pressure gauge(vacuum gauge) B) 0 – 5 or 6 kg/cm ² pressure gauge C) 0 – 10 kg/cm ² – do – D) 0 – 25 kg/cm ² – do – E) 0 – 60 kg/cm ² – do – F) 0 – 100 kg/cm ² –do – G) 0 – 250 kg/cm ² – do – H) 0 – 600 kg/cm ² – do –	APR	APR

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

	I) 0.2 to 1 kg -- do --		
39.	Manometers (+/-) 1000 mm water column With hand bulb for lab and small manometers for field purpose.	APR	APR
40.	Manometer (+/-) 500mm mercury column with hand bulb for lab and small manometer for field purpose.	APR	APR
41.	Inclined manometer (+/-) 300 mm water column	APR	APR
42.	Portable air compressor with drier and regulator rated for 7 to 10 kg/cm ²	APR	APR
43.	Vacuum pump	APR	APR
44.	Standard milliamps / millivolts source of reputed make. Range 0to 50 ma and 0 to 100 mv	APR	APR
45.	DC power supply 0-50 VDC, 5 A make "Aplab" or equivalent (variable source)	APR	APR
46.	Single phase variac 250 V, 28 amp	APR	APR
47.	3 phase variac rating 15 amps	APR	APR
48.	Glass thermometer 0-120 deg. C, 0-200 deg.c and 0-600 deg.c	APR	APR
49.	PRIMARY INJECTION KIT UPTO 5000 AMPS WITH PAIR OF LEADS & CLAMPS FOR TESTING CTS	APR	APR
50.	SECONDARY INJECTION KIT WITH INTEGRAL TIMER FOR RELAY TESTING WITH CABLES LEADS & BANANA PLUGS SELECTIVE RANGE 5 AMPS & 1 AMPS RANGE (FOR RELAY TESTING)	APR	APR
51.	DC shunt 400 amp 75 mv	APR	APR
52.	Digital Tachometer non-contact type 0 to 4000 rpm	APR	APR
53.	Decade resistance box	APR	APR
54.	PPM TESTER FOR TRANSFORMER OIL	APR	APR

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter IV: T&Ps and MMEs to be deployed by Contractor

55.	DC Ammeter	APR	APR
56.	DC Voltmeter	APR	APR
57.	Voltmeter AC	APR	APR
58.	Ammeter AC	APR	APR
59.	Oil specific gravity and PPM measuring equipment	APR	APR
60.	Dew point measurement instrument	APR	APR
61.	Oscilloscope 100 MHZ	APR	APR
62.	Electric blower	APR	APR
63.	Equipment and consumables for LPI/MPI test on impulse pipes	APR	APR
64.	Three phase distribution board with complete setup for drawl & distribution of construction power	APR	APR
65.	Electric cables for drawl & distribution of construction power, heating machines	APR	APR
66.	Dewatering pump	APR	APR
67.	METERS FOR TIME MEASUREMENT OF BREAKER OPENING & CLOSING TIME	APR	APR
68.	TRANSFORMER TURNS RATIO TEST KIT	APR	APR
69.	FREQUENCY SOURCE 45 TO 55 HZ WITH 110V	APR	APR
70.	3 PHASE SHIFTER	APR	APR
71.	PHANTOM LOAD TEST KIT	APR	APR
72.	POLARITY TEST KIT	APR	APR
73.	TEMPERATURE GUN DIGITAL TYPE	APR	APR
74.	TORQUE WRENCH (12-60Nm, 50-225 Nm)	APR	APR
75.	TELETALK 2 WIRE SYSTEM/MOBILE SYSTEM	APR	APR
76.	CONTAINER FOR TRANSFORMER OIL SAMPLING	APR	APR
77.	MEASURING INSTRUMENTS LIKE MICROMETRES AND CALIPERS	APR	APR

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

78.	TIG/MIG WELDING SET	APR	APR
79.	MECHANICAL TOOL KIT FOR FITTERS	APR	APR
80.	ELECTRICIAN TOOL KIT	APR	APR
81.	FIRE EXTINGUISHERS	APR	APR
82.	SAFETY BELTS AND SAFETY HELMETS	APR	APR
83.	HYDRAULIC JACKS 250T CAPACITY/100T	APR	APR
84.	CABLE ROLLERS	APR	APR
85.	SHEARING MACHINE	APR	APR
86.	TARPOLIN FIRE PROOF	APR	APR
Other than the aforesaid, one computer, printer and other necessary peripherals will have to be maintained by the contractor in his site office.			
NOTES:			
4.1	The above list is only indicative and these T&Ps may not be required for entire contract period but contractor shall ensure the availability of the T&Ps as per work requirement and T&P Deployment schedule. T&P Deployment schedule shall be finalized at site in consultation with BHEL Engineer based on the work fronts/work requirement. BHEL decision shall be final and binding regarding the T&P deployment schedule. Contractor shall mobilize / maintain the T&P's as per the deployment schedule notified time to time by BHEL Engineer.		
4.2	APR- Contractor has to deploy T&P, MMD, IMTE as per requirement of site and as decided by BHEL Engineer.		
4.3	If any one of T&P mentioned above is not needed for proper execution of scope of work, provided contractor has not utilized BHEL free issued T&P for completing such work, no recovery from contractor shall be applicable.		
4.4	Any additional item required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.		
4.5	i.) In case deployment of T&P w.r.t requirement/schedule, is delayed or deployed for a shorter period or abnormal down time of T&P or ii) in case T&P w.r.t requirement was not deployed by the contractor as per instruction of BHEL and BHEL had to deploy either its own T&P or iii.) BHEL had to deploy the T&P from outside agency, then recovery shall be done from the contractor as under:		

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

4.5.1	In case BHEL had to deploy its own T&P, hire charges of T&P applicable for outside agencies as per extant guidelines for “Hire Charges on issue of Capital Tools & Plants” shall be recovered.
4.5.2	In case BHEL had to deploy the T&P from outside agency, actual hiring cost plus applicable overheads shall be recovered
4.6	All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to BHEL site in-charge before the start of work.
4.7	Re-testing / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MME so that work does not suffer when the particular instrument is sent for calibration. If any MMEs not found fit for use, BHEL shall have the right to stop the use of such item. It will be necessary for the contractor to deploy proper item. Any readings taken by the defective instrument will be recalled and repeat the readings taken by that instrument with a proper one. In case he fails to do so, BHEL may deploy MMEs and retake the readings at contractor’s cost.
4.8	T&P’s mentioned above shall be specifically deploy as per the respective packages. However, as per work requirement and availability of T&Ps the inter use in Material Handling and Mechanical works may be permitted as per the instruction of the BHEL Engineer.
4.9	If the work related to T & Ps mentioned above is completed then, BHEL can release that T & P during contract period / extended period if any. However, written permission shall be taken by contractor from BHEL construction Manager for releasing the T&P.
4.10	Any loss / damage to any part of BHEL T&Ps and MMEs shall be to the contractor’s account and any expenditure on these accounts by BHEL will be recovered from the contractor’s bill in case the contractor fails to make good the loss.
4.11	It shall be responsibility of the contractor to take delivery of T&Ps and MMEs from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as intimated by Engineer in project site in good working conditions after use.
4.12	This above list is only indicative and neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL engineer and required for completion of work.

The following materials/consumables are to be arranged by the contractor as part of the contractual scope.
 BHEL/NR/PROJECTS/Khurja/Electrical

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

S/N	Description
1	Welding electrodes for welding AS/CS/SS pipe and other welding from BHEL approved vendors only
2	Filler wire for argon welding
3	Argon, oxygen and acetylene gas
4	Provision for temporary scaffoldings.
5	GI “U” clamps with nuts and washers for impulse and GI pipe clamping.
6	Round aluminium tags (30mm dia x 3mm thick)
7	Teflon tape and insulation tape.
8	Hold tight / bitumen tape for GI pipe coupling.
9	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 upto 4 sqmm, PVC sleeve of different size, PVC button & tape
15	Ferrules (PVC) and suitable for ferrule printing.

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Chapter V: T&Ps and MMEs to be deployed by BHEL

5.0 LIST OF T&P BEING PROVIDED BY BHEL ON FREE OF HIRE CHARGES AND ON SHARING BASIS			
Sl. No.	Equipm ent	Qty.	Remarks
1	CRAWLER CRANE 135 MT	1 No	Free issue and on sharing basis depending on availability
	EOT Cranes at TG Hall 140 / 25 MT	1 No	On sharing basis
NOTES:			
5.1	<p>a. <u>For BHEL's cranes 75 MT & above:-</u> Day-to-day upkeep and running maintenance like filling topping up of lubricants, changing filters, etc. including repair of self-starter, batteries and dynamo of these cranes shall be excluded from the scope of the contractor.</p> <p>b. <u>For BHEL's cranes below 75 MT capacity:-</u> Day-to-day upkeep and running maintenance like filling topping up of lubricants, changing filters, etc. including repair of self-starter, batteries and dynamo of these cranes shall be responsibility of the contractor. If on checking it is found that the same is not followed, BHEL shall exercise its right to get the job/works done at the risk and cost of the contractor.</p> <p>c. <u>Common for above Sl. No. (a) & (b):-</u> In case of breakdown of crane, contractor shall provide the necessary manpower for maintenance of the BHEL owned crane to maintenance agency (deployed by BHEL), failing to do so BHEL will get the job done at the risk and cost of contractor. BHEL may also provide cranes through crane hiring agencies in which case the day-to-day upkeep and running maintenance shall also be excluded from scope of contractor. The contractor shall arrange fuel for the operation of hired & BHEL owned cranes also.</p>		
5.2	The Cranes at Sl No. 1 will be provided as per requirement and availability at the sole discretion of the BHEL Engineer.		
5.3	The contractor shall make necessary arrangement like laying of special sleeper beds, assembly & dismantling of heavy lift attachment, boom, jib etc. for movement and operation of crane.		
5.4	<p>a. <u>For BHEL's cranes 75 MT & above: -</u> The operator, helper & maintenance personal (Engineer/Technician/OEM) for BHEL's cranes 75 MT & above capacity being provided by BHEL free of cost. The contractor shall provide fuel for the operation of hired & BHEL owned cranes for its scope of work, without any extra cost.</p>		

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Chapter V: T&Ps and MMEs to be deployed by BHEL

	<p><u>b. BHEL's cranes below 75 MT capacity:-</u> The operators for BHEL's cranes 75 MT below capacity shall be provided by the contractor free of cost. These operators should possess valid license for heavy vehicle. The contractor shall provide fuel for the operation of hired & BHEL owned cranes for its scope of work, without any extra cost.</p>
5.5	Other T&P mention above contractor shall transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores.
5.6	Any other special T&P if supplied by the manufacturer and available with the customer will also be provided to the contractor free of hire charges as and when made available. Special tools and tackles are to be used only for the purpose for which these are meant and to be returned in good condition. However low height jack may not be made available and will have to be arranged for by the contractor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VI: TIME SCHEDULE

6.0	TIME SCHEDULE	
6.1	The contractor is required to commence the work within 15 days from the date of issue of letter of award (LOA) unless BHEL decides to fix any other later date. However, the actual date of start of work, to fix up the zero date of the contract, will be certified by BHEL Engineer after adequate mobilization of manpower and T&Ps(as required for finalisation of Zero date) by the contractor.	
6.2	Entire work as detailed in the tender specifications shall be completed within 22 months from the Zero date as per programme / milestones indicated by BHEL Engineer. Contractor has to mobilise adequate resources to meet BHEL"s commitments to their customer as indicated from time to time.	
6.3	<p>Entire work shall be carried out in accordance with the broad schedule for Electrical works furnished below, within the stipulated completion period.</p> <p>This schedule will undergo review on regular basis by customer and BHEL. Based on achieved progress vis-à-vis project requirement, contractor shall be provided with the revised Erection schedule by BHEL/ customer.</p> <p>The contractor will have to submit a program for E&C to meet the revised project schedule and accordingly augment his manpower/T&P at no extra cost to BHEL.</p>	
6.4	Schedule of Work For Unit#1	
6.4.1	Milestone	Schedule
6.4.2	Start of work	Zero Date
6.4.3	Charging Readiness of ST-1 (M1)	4 th Month
6.4.4	Charging and Readiness of HT Switchgear	7 th Month
6.4.5	Boiler Light up	10 th Month
6.4.6	Charging of GT	11 th Month
6.4.7	Synchronization(M2)	12 th month
6.4.8	Trial Operation	14 th Month
6.4.9	Liquidation of Pending Points	15 th Month
6.4.10	Completion of all facilities	16 th Month

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VI: TIME SCHEDULE

Note: The above schedule is for Unit#1 only. The Phase gap of Unit#2 Shall be Six Months.	
6.5	Provision of Penalty in case of slippage of Intermediate Milestones:
6.5.1	M1& M2 are the intermediate LD milestone. Milestones LD shall be applicable if the delay in achieving the milestone is solely attributable to the contractor.
6.5.2	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones
6.5.3	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.
6.5.4	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.
6.5.5	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.
6.6.6	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
6.6.7	Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.
6.6.8	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
6.6.9	* 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.
6.7	Contractor shall plan their work in such a manner so as to meet the above project schedule, in consultation with BHEL/ customer. To achieve the above schedule contractor shall work in the all the available fronts concurrently and be prepared for working in the shift operation as per the instruction of BHEL Engineer. All formalities regarding permissions/gate passes for shift working are to be applied in time in line with customer requirements.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VI: TIME SCHEDULE

6.8	Completion of facilities shall be completed in all respects only when on successful erection, trial run of individual equipment's and successful commissioning, trial operation, attending punch points, handing over of the unit's to the customer.
6.9	The work under the scope of this contract shall be deemed to have been completed in all respects only when so certified by BHEL. The decision of BHEL shall be final and binding on the contractor.
6.10	If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period, the contractor shall request for an extension of the contract and BHEL at its discretion may grant time extension for the contract as per GCC clause 2.11
6.11	Commencement of performance guarantee shall be as per clause no.2.24 (Performance Guarantee for Workmanship) of General Conditions of Contract. The commencement of guarantee period for the quality of the workmanship shall start from the date of trial operation acceptance of facilities/handing over to the customer for the respective unit.
6.12	The Contract period shall be 22 months from the start of work. Erection, Testing, Calibration and Commissioning of permanent equipment's required for completion of system shall be completed within the time schedule given above. BHEL, owing to its commitment to their customer, may ask contractor to compress the total completion schedule by up to 15%. This will result in advancement of various milestones. Contractor shall plan his activities and mobilize additional resources accordingly to the satisfaction of BHEL engineer within the quoted rates.
6.13	Material Re-conciliation The contractor shall do material re-conciliation periodically.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VII: Terms of Payment

7.0	TERMS OF PAYMENT	
7.1	The 'Engineer' will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.	
7.2	The progressive payment for erection, testing and commissioning on accepted price of contract value will be released as mentioned below in Clause 7.4 to 7.5	
7.3	Progressive Payment against monthly running bills will be made upto 85% of the value of the erected items Pro rata as per Clause no 7.4.1 to 7.4.10 of the following table.	
<u>TERMS OF PAYMENT FOR ELECTRICAL WORKS</u>		
	Activity/Work Description	% of unit rate
7.4	PRO RATA PAYMENTS (85%)	
7.4.1	Cable tray and accessories	
1	Fabrication and fixing/welding/bolting in position	60%
2	Earthing of cable trays	10%
3	Tagging of cable trays (including touch up painting & cable tray numbering on sides)	8%
4	Covering of trays where ever envisaged	7%
	Total =	85%
7.4.2	Cable laying including earthing wires	
1	Laying of cables/Wires	45%
2	Glanding and termination (except HT terminations)	15%
3	Testing and charging	10%
4	Dressing and clamping	15%
	Total =	85%
7.4.3	Junction box/Push button station (local)	
1	Erection including fixing of terminal blocks where ever applicable	75%
2	Name plate fixing where ever applicable and labelling (inside and outside)	10%
	Total =	85%
7.4.4	Misc. Structural steel including cable tray supports, Canopies	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VII: Terms of Payment

	etc, Conduits, pipes etc	
1	Fabrication/Pre assembly	45%
2	Erection, Alignment, welding/bolting and if applicable chipping/grouting/painting	40%
	Total =	85%
7.4.5	DG sets/Switch Gears/MCC/PCC/Distribution Boards/Marshalling Box/Starter Units/ Dry Transformers / Electrical Hoists/ Panels/Cubicles/Desks/UPS/ Batteries/ Chargers/VFD/ LA assy/ NGT/ NGR/ SP/Miscellaneous Equipments/ etc	
1	Placement, Alignment and coupling/interconnection where ever applicable, erection of associated accessories etc	50%
2	Precommissioning checks and tests	10%
3	Charging, Loop testing and commissioning	15%
4	System commissioning	10%
		85%
7.4.6	Earthing/Lightning protection strips, Earthing pits	
1	Fabrication, erection, alignment, welding/bolting of earthing/lightning protection strips; earth pits completion	60%
2	Testing/commissioning	25%
		85%
7.4.7	LT /HT Bus Ducts	
1	Pre assembly of Bus Ducts and accessories, erection, alignment, bolting/welding etc complete with supporting structure	50%
2	Pre commissioning checks	20%
3	Testing, Charging and Painting (as applicable)	15%
		85%
7.4.8	Oil Filled Transformers (Generator, Station, UAT, Station Service etc)	
1	Placement on foundation and alignment	25%
2	Erection of associated auxiliaries/assemblies, oil filling, etc	25%
3	Dry out including oil filtration	15%
4	Pre commissioning checks	10%
5	Testing, Charging and Painting (as applicable)	10%
		85%
7.4.9	Testing/Commissioning of Equipment (like motors, actuators, ESP trfr, misc equipments, etc) erected by other agencies	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VII: Terms of Payment

1	Local testing	40%
2	Remote testing, Loop testing, and commissioning	40%
3	System commissioning	5%
		85%
7.4.10	Other items	
1	Rubber mats/ Display Boards/Miscellaneous items/etc : on installation	85%
2	Specialised Commissioning Services - on pro rata basis.	85%
3	Civil Works - Prorata on completion of actual work.	85%
4	Termination, HT Termination, Straight through jointing etc : on pro rata basis	85%
7.5	STAGE/MILESTONE PAYMENTS (15%)	
1	Boiler Light Up	1%
2	ABO	1%
3	Steam Blowing	0%
4	Safety Valve Floating	1%
5	Oil Flushing (TG)	0%
6	Barring Gear (TG)	0%
7	Rolling and Synchronisation	2%
8	Coal Firing	0%
9	Full Load	2%
10	Trial Operation of Unit	3%
11	Painting	0%
12	Area cleaning, temporary structures cutting/removal and return of scrap	1%
13	Punch List points/pending points liquidation	1%
14	Submission of 'As Built Drawings'	1%
15	Material Reconciliation	1%
16	Completion of Contractual Obligation	1%
	Total for Stage/Milestone Payments (15%)	15%
	Note: The Terms of Payment is only for enabling release of payments through RABs and is not indicative of actual quantum or value of work	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VIII: TAXES AND DUTIES

Taxes and Duties:

8.1.1	TAXES & DUTIES
8.1.1	<p>The contractor shall pay all (save the specific exclusions as enumerated in this clause) taxes, fees, license, charges, deposits, duties, tools, royalty, commissions, other charges, etc. which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes/duties, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.</p> <p>However, provisions regarding GST on output supply (goods/service) and TDS/TCS as per Income Tax Act shall be as per following clauses.</p>
8.1.2	GST (Goods and Services Tax)
8.1.2.1	GST as applicable on output supply (goods/services) are excluded from contractor's scope; therefore, contractor's price/rates shall be exclusive of GST. Reimbursement of GST is subject to compliance of following terms and conditions. BHEL shall have the right to deny payment of GST and to recover any loss to BHEL on account of tax, interest, penalty etc. for non-compliance of any of the following condition.
8.1.2.2	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract shall be limited to direct transactions between BHEL & its Contractor. BHEL shall not consider GST on any transaction other than the direct transaction between BHEL & its Contractor.
8.1.2.3	Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. Where the GST laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL shall have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.
8.1.2.4	Contractor has to submit GST registration certificate of the concerned state. Contractor also needs to ensure that the submitted GST registration certificate should be in active status during the entire contract period.
8.1.2.5	Contractor/Vendor has to issue invoice indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder.
8.1.2.6	Vendor has to submit GST compliant invoice within seven days from the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts. Special care should be taken in case of month end transactions.
8.1.2.7	Vendor has to ensure that invoice in respect of such services which have been provided/completed on or before end of the month should not bear the date later than last working day of the month in which services are performed.
8.1.2.8	<p>Subject to other provisions of the contract, GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor: -</p> <ol style="list-style-type: none"> a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Contractor/ Vendor has submitted all the documents required for processing of bill as per contract/ purchase order/ work order.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VIII: TAXES AND DUTIES

	<p>d. In cases where e-invoicing provision is applicable, vendor/contractor is required to submit invoice in compliance with e-invoicing provisions of GST Act and Rules made thereunder.</p> <p>e. Contractor has filed all the relevant GST return (e.g. GSTR-1, GSTR-3B, etc.) pertaining to the invoice submitted and submit the proof of such return along with immediate subsequent invoice. In case of final invoice/ bill, contractor has to submit proof of such return within fifteen days from the due date of relevant return.</p> <p>f. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor.</p> <p>g. Contractor has to submit an undertaking confirming the payment of all due GST in respect of invoices pertaining to BHEL.</p>
8.1.2.9	Any financial loss arises to BHEL on account of failure or delay in submission of any document as per contract/purchase order/work order at the time of submission of Tax invoice to BHEL, shall be deducted from contractor's bill or otherwise as deemed fit.
8.1.2.10	TDS as applicable under GST law shall be deducted from contractor's bill.
8.1.2.11	Contractor shall comply with the provisions of e-way bill wherever applicable. Further wherever provisions of GST Act permits, all the e-way bills , road permits etc. required for transportation of goods needs to be arranged by the contractor.
8.1.2.12	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder.
8.1.2.13	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altere/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.
8.1.2.14	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.1.2.15	In the event of any ambiguity in GST law with respect to availability of input credit of GST charged on the invoice raised by the contractor or with respect to any other matter having impact on BHEL, BHEL's decision shall be final and binding on the contractor.
8.1.2.16	<p>Variation in Taxes & Duties:</p> <p>Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability.</p> <p>In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only.</p> <p>In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for</p>

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VIII: TAXES AND DUTIES

	reimbursement of tax or reassessment of offer.
8.1.3	<p><u>Income Tax:</u></p> <p>TDS/TCS as applicable under Income Tax Act, 1961 or rules made thereunder shall be deducted/collected from contractor's bill.</p>

8.2	<p>BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.</p>
	In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-
8.2.1	It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a licence to the Competent Authority under the BOCW Act and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of licence / permission to BHEL within a period of one month from the date of award of contract.
8.2.2	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these act and rules including that of payment / deposit of 1% cess on gross payment made for value of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
8.2.3	It shall be the responsibility of the sub-contractor to furnish the receipts /challans towards deposit of the cess together with the number, name and other details of beneficiaries (building workers) engaged by the sub-contractor during the preceding month.
8.2.4	It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.
8.2.5	The contractor shall, however ensure before deposit of any BOCW Cess, that customer is not depositing the same in order to avoid excess deposit of cess.
8.2.6	The contractor shall bear cost of BOCW cess either by way of deposit or through recovery by BHEL in case the same is deposited by the customer.
8.2.7	In case of failure in above mentioned compliances, BOCW Cess @ 1% as well as applicable penalty as specified in BOCW Act/Rules shall be deducted from the contractor.

Note:

1	The Gross amount is to be construed as cost of construction in line with the provisions of the BOCW of the BOCW Cess act and in case of compliance by customer by way of deduction at source in line with clause No 3(2) of the act an equitable adjustment to the relatable cost of construction attributable to the bidder shall be made in terms of clause no 8.2 of TCC
2	In case compliance by customer by way of deduction at source in line with clause no 3(2) is not resorted to, the compliance of BOCW Cess act shall be ensured by the bidder in line with the provisions of BOCW Cess act in terms of clause no 8.2.2 of TCC

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter VIII: TAXES AND DUTIES

3	The bidder may consider the cost of construction for levy of BOCW Cess inclusive of GST, however, due to whatsoever reason if the GST does not form the cost of construction for levy of aforesaid Cess an equitable adjustment thereof shall be made to the contract price.
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TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter IX: Important condition applicable to this Project

9.0	<u>Important milestones and their definitions which are applicable during this contract execution</u>
9.1	These are as per terms of contract between BHEL and Customer, but for the work of this contract scope, BHEL contractor shall be responsible for executing/assist in executing/compliance of the same:
9.2	Pre-commissioning activities will include but will not be limited to the following: These are general specs for pre-commissioning and contractor responsibility shall be to execute works corresponding to this contract scope.
9.2.1	Supplying safety appliances & suitable PPEs to all workers.
9.2.2	Supply & Installation of barricading tape.
9.2.3	Electrical pre-commissioning including proper earthing, pre-commissioning checks done on cable continuity checks, electrical panels, MCCs, switch gears, motors, transformers etc.
9.2.4	Contractor to coordinate and confirm compliance regarding completion of all, mechanical, Instruments and Electrical installation work.
9.3	DECLARING READY FOR COMMISSIONING
9.3.1	The unit shall be considered "Ready for Commissioning" when all the facilities have been completed along with their auxiliaries and support facilities in every respect including charging of lubes, chemicals, preparation of solution, last minute modifications, if any, as recommended by Customer. All temporary structures, scaffolding etc. used for carrying out pre-commissioning activities shall be removed, all the blinds shall be placed into position as per P&IDs
9.3.2	Once the Unit has been declared "Ready for Commissioning", the Contractor shall not carry out any erection related work including hot work without prior permission of the BHEL/Customer.
9.4	COMMISSIONING
9.4.1	Commissioning of the Unit will be carried out by Contractor once mechanical Completion is over successfully, all pre- commissioning activities are carried out and system is ready for commissioning under necessary guidance and overseeing of customer. Representative from process designer will provide necessary co-ordination during start up and related technical clarifications shall be furnished by them.
9.4.2	Contractor will provide necessary assistance during commissioning of the unit.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter IX: Important condition applicable to this Project

9.4.3	The Unit shall be considered to be commissioned successfully once all the system with instrumentation / control systems and support systems have been on uninterrupted stable operation for not less than 72 hours. Any interruption of duration up to 30 minutes during the commissioning run of 72 hrs shall be ignored. However for interruptions greater than 30 minutes, the commissioning run period shall be extended by the time equal to the interruption plus the time taken to stabilize the Unit back to the normal operating conditions. Whether the 72 hours operation has been successful or not, shall be decided by the customer based on the observations recorded during 72 hours. The countdown for 72 hours operation shall start only after Unit has been on stable operation with all controls and safety system in normal operation for a period of not less than 48 hours.
9.4.4	The Contractor shall also be required to provide on the job training to OWNER's operation personnel by associating them in all the day to day pre-commissioning, commissioning, maintenance activities and UNIT operations.
9.4.5	After successful commissioning of the process unit same shall be handed over to the customer for operation. in case of any constraint in achieving the above process parameters in the unit by the contractor, the same shall be communicated by the contractor to the BHEL/customer in writing. this will be reviewed jointly by customer to arrive at a decision on whether the constraint is on account of reasons attributable to the contractor or not. the action in either case will be according to the relevant provisions / provided elsewhere in the contract.
9.5	OTHER REQUIREMENTS
9.5.1	The Contractor shall also provide 'No Smoking' boards & Do's and Dont's, boards for other designated instructions in unit areas.
9.5.2	Contractor shall also ensure implementation of all recommendations arising out of audits viz. internal pre-commissioning audit and audit by statutory bodies as and when required.
9.5.3	Before start-up of unit, safety audit shall be conducted by Owner/PMC. All such check lists/ deficiency report generated by safety audit team shall be liquidated by the Contractor. The safety audit shall cover aspects such as floor opening, trip hazards, bump hazards, electrical safety concerns, mechanical safety concerns etc.
9.6	HOUSE KEEPING
9.6.1	Provide continuous clean-up of the construction and operational area.
9.6.2	Remove excess materials, temporary facilities and scaffolding and pick-up trash.
9.6.3	Perform washing for further clean-up as required.
9.7	FINAL INSPECTION BEFORE START OF COMMISSIONING
9.7.1	Record of liquidation of checklist point, test record etc. shall be submitted by the Contractor to OWNER/PMC. Any deficiency/ changes required in the offered system shall to be Liquidated by the Contractor.

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Chapter IX: Important condition applicable to this Project

9.7.2	It shall be the Contractor's responsibility to repair any damage to the system occurred during storage, installation, pre-commissioning and commissioning stage.
9.8	UTILITIES REQUIREMENT
	All the utilities like air, cooling water, raw water, DM water, steam, power, instrument air etc. shall be provided by client for pre-commissioning and commissioning. However, temporary piping/ fittings required to be done for drawing these utilities shall be in the scope of Contractor.
9.9	<u>Health, Safety And Environment (HSE) Management / Safety Norms to be followed during execution of work</u>
9.9.1	The Contractor shall follow OWNER's safety practices during execution of pre-commissioning / commissioning works. Contractor is required to maintain and follow all safety practices equivalent or better than those being practiced by OWNER for the complex during pre-commissioning and commissioning
9.9.2	Necessary Hot/ cold work permit shall be obtained to carryout jobs once declared mechanically completed.
9.9.3	The documents mentioned above in this head whether annexed or referred will be considered integral part of this contract.
9.9.4	Any penalties imposed on BHEL by customer, due to lapses on part of the contractor of this work scope, shall be deducted from the running bill of this contractor. These penalties shall be in addition to the penalties imposed by BHEL for such lapses
9.9.5	Guidelines for settlement of claims for compensation on accidents applicable to BHEL. (Document shall be annexed)
9.10	SPECIFIC INCLUSIONS
9.10.1	Consumables/items to be provided by BHEL free of charge
9.10.1.1	<p>Metallic Cable glands</p> <p>Steel for fabrication</p> <p>Lugs beyond 4 sq.mm size</p>
9.10.2	Consumables/items to be arranged by Bidder
9.10.2.1	<p>A) Cable ferruling numbers and character's Name plates/Tag plates with tying/fixing material for cable's at both end & field instruments Cable Markers.</p> <p>B) Station lighting system consumables(As per Annexure-A)</p>
9.10.3	SPECIFIC EXCLUSIONS
9.10.3.1	The following are specific exclusions from the scope of work/ specification:-

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter IX: Important condition applicable to this Project

9.10.3.2	Erection of dampers, valves, electrical actuators, pneumatic actuators.
9.10.3.3	Erection of HT/LT motors (except those specified herein)
9.10.3.4	Generator Erection
9.10.3.5	Attachment welding of thermocouple pads for tube metal temperature measurement and fixing of thermowells in the pipelines.
9.10.3.6	Erection of flow nozzles.
9.10.3.7	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.

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Chapter X: RATE SCHEDULE

SL NO	Item Description	UOM	Qty (Q)	FACTOR (F)	UNIT RATE P=A*F/10000000	AMOUNT T A=PXQ
1.0	ERECTION AND COMMISSIONING OF TRANSFORMERS					
1.1	120 MVA, 420 kV Station Transformer (Overall dimension & Wt.) Size LXBXH 8000 x 4000 x 4500 mm Wt.130 MT	Nos.	2	97,842.3102857	-	-
1.2	260 MVA, 21/420 kV GT 6150 x 4770 x 4870 mm, Wt. 192.5 Tons	Nos.	7	130,978.4822564	-	-
1.3	125 MVA, 420 kV Bus Reactor, 7500 x 3600 x 3700 mm, Wt- 120 Tons	Nos.	1	97,842.3102857	-	-
1.4	36/45 MVA, 21/11.5 KV UNIT TRANSFORMER WITH OIL & ACCESSORIES	Nos.	4	65,738.7856075	-	-
1.5	2500 KVA 11/0.433 KV Dry Type Transformer	Nos.	16	15,345.3431207	-	-
1.6	2000 kVA 11/0.433 KV Dry Type Transformer	Nos.	2	16,659.8753101	-	-
1.7	1600 kVA 11/0.433 KV Dry Type Transformer	Nos.	2	15,116.6320394	-	-
2.0	ERECTION AND COMMISSIONING OF HT SWITCHGEAR					
2.1	Panels– 11kV Unit Switchboard - 1UA/2UA(29)	Nos	2	31,344.5738509	-	-
2.2	Panels– 11kV Unit Switchboard - 1UB/2UB (31)	Nos	2	33,506.2685992	-	-
2.3	Panels– 11KV Station Switchboard - 1SA (23)	Nos	1	24,859.4896059	-	-

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter X: RATE SCHEDULE

2.4	Panels– 11KV Station Switchboard - 1SB (23)	Nos	1	24,859.4896059	-	-
2.5	Panels– 11KV Station Switchboard - 2SA (23)	Nos	1	24,859.4896059	-	-
2.6	Panels– 11KV Station Switchboard - 2SB (23)	Nos	1	25,070.9314606	-	-
2.7	Panels– 11KV AHP Switchboard (30)	Nos	1	32,425.4212250	-	-
2.8	Panels– 11KV CHP Switchboard (30)	Nos	1	32,425.4212250	-	-
2.9	Panels– 11KV WTP Switchboard (30)	Nos	1	32,425.4212250	-	-
2.10	Panels– 11KV FGD Switchboard (33)	Nos	2	35,667.9633476	-	-
2.11	Panels– 3.3KV AHP Aux. Switchboard (44)	Nos	1	47,557.2844634	-	-
2.12	Panels– 3.3KV CHP Aux. Switchboard (56)	Nos	1	61,042.2679040	-	-
2.13	Panels– 3.3KV FGD Aux. Switchboard (30)	Nos	3	32,425.4212250	-	-
2.14	Panels– 3.3KV WTP Aux. Switchboard (26)	Nos	1	28,102.0317284	-	-
2.15	Panels– 3.3kV Unit Aux. Switchboard-1(40)	Nos	1	43,233.8949667	-	-
2.16	Panels– 3.3kV Unit Aux. Switchboard-2 (40)	Nos	1	43,233.8949667	-	-
2.17	Panels– 11KV Standalone Transformer panel(DB1) (2)	Nos	4	2,161.6947483	-	-
2.18	Panels– 11 KV FGD Station Switchboard (33)	Nos	1	35,667.9633476	-	-
2.19	Panels– 11 KV Mis Switchboard (21)	Nos	1	26,411.6132286	-	-
3.0	ERECTION AND COMMISSIONING OF CONTROL PANEL SYSTEM					

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3.1	3.3 KV, 1100 KW VFD Transformer	Set	6	13,491.744542 2	-	-
3.2	3.3 KV, 1100 KW VFD 5000 (W) x 1500 (D) x 3000 (H) mm,	Set	6	16,668.538157 8	-	-
3.3	BTS Panel 800(W) x 2000(H) x 800(D) (max) Type-BTS Weight- 300Kg/ Panel (approx.) PACKING WT PER PANEL-400kg	Set	6	3,157.8910726	-	-
3.4	Data Concentrator 800(W) x 2300(H) x 800(D) (max) Type-DC Weight- 400Kg/ Panel (approx.) PACKING WT PER PANEL-500kg	Set	6	2,788.9937998	-	-
3.5	DAVR System	Set	2	14,609.986043 1	-	-
3.6	220V DC Charger with battery for main plant(Lead Acid Battery) 2 X 170 cells	Set	4	18,554.226961 6	-	-
4.0	ERECTION AND COMMISSIONING OF STATION LIGHTING SYSTEM					
4.1	Lighting Luminaires (complete with accessories)					
4.1.1	Luminaire Type FC06 (LED)	Nos.	995	75.9682662	-	-
4.1.2	Luminaire Type FC07 (LED)	Nos.	156	75.9682662	-	-
4.1.3	Luminaire Type FC26 (LED)	Nos.	116	77.1667238	-	-
4.1.4	Luminaire Type FC30 (LED)	Nos.	591	75.9682662	-	-
4.1.5	Luminaire Type FC32 (LED)	Nos.	68	75.9682662	-	-
4.1.6	Luminaire Type FC33 (LED)	Nos.	35	75.9682662	-	-
4.1.7	Luminaire Type FC34 (LED)	Nos.	126	75.9682662	-	-
4.1.8	Luminaire Type FC81 (LED)	Nos.	314	75.9682662	-	-
4.1.9	Luminaire Type SB11 (LED)	Nos.	60	79.5344500	-	-

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4.1.1 0	Luminaire Type SB02 (LED)	Nos.	496	79.5344500	-	-
4.1.1 1	Luminaire Type SB03 (LED)	Nos.	173	79.7342827	-	-
4.1.1 2	Luminaire Type SF63 (LED)	Nos.	1	80.5461964	-	-
4.1.1 3	Luminaire Type SF64 (LED)	Nos.	12	80.5461964	-	-
4.1.1 4	Luminaire Type SF66 (LED)	Nos.	18	82.9711205	-	-
4.1.1 5	Luminaire Type SS62 (LED)	Nos.	16	75.9658826	-	-
4.1.1 6	Luminaire Type SS63 (LED)	Nos.	19	75.9658826	-	-
4.1.1 7	Luminaire Type SW41 (LED)	Nos.	30	78.7073102	-	-
4.1.1 8	Luminaire Type SW42 (LED)	Nos.	64	78.7073102	-	-
4.1.1 9	Luminaire Type MW96 (LED)	Nos.	126	83.1980732	-	-
4.2	Switch boxes for individual control of circuits					
4.2.1	Switchboards consisting of switch boxes, switches, switch plates and fixing accessories.			-	-	-
4.2.2	Type SWB1	Nos.	239	70.4715450	-	-
4.2.3	Type SWB2	Nos.	40	71.2703372	-	-
4.2.4	Type SWB3	Nos.	27	72.6971750	-	-
4.3	Junction boxes					
4.3.1	Type JB-F	Nos.	2830	90.2564047	-	-
4.3.2	Type JB-FE	Nos.	314	90.2564047	-	-
4.4	Receptacles					
4.4.1	Type RA	Nos.	165	75.2030165	-	-
4.4.2	Type RA (Flame proof)	Nos.	1	75.9447136	-	-
4.4.3	Type RB	Nos.	190	77.0564514	-	-
4.4.4	Type RC	Nos.	26	83.9137834	-	-
4.5	Flexible electrogalvanised conduit,PVC coated(inside & outside)					

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4.5.1	20 mm dia electrogalvanised conduit,1.6 mm thick	mtrs	5701	3.0885195	-	-
4.6	Lighting Distribution Board (LDB)					
4.6.1	AC LDB Type LDB-H (12) without transformer (including cubicle suitable for 2 nos. 100 kVA transformer)	Nos.	12	622.5846097	-	-
4.6.2	100kVA transformer for housing in 1.1.1 - Normal Non encapsulated type	Nos.	16	471.9990854	-	-
4.6.3	50 kVA transformer for housing in 1.2.1	Nos.	5	622.5846097	-	-
4.6.4	DCLDB Type LDB-D (12)	Nos.	8	481.4608357	-	-
4.6.5	AC WDB Type WDB-H (12) without transformer (including cubicle suitable for 2 no. 100 kVA transformer)	Nos.	5	781.2733233	-	-
4.6.6	100kVA transformer for housing in 1.4.1 - Normal Non encapsulated type	Nos.	10	471.9990854	-	-
4.7	PANELS					
4.7.1	LIGHTING PANEL INDOOR, NORMAL SUPPLY TYPE LP-A(12)	Nos.	21	114.6370891	-	-
4.7.2	LIGHTING PANEL OUTDOOR, NORMAL SUPPLY TYPE LP-A(12)	Nos.	2	115.8064605	-	-
4.7.3	LIGHTING PANEL DECORATIVE, NORMAL SUPPLY TYPE LP-A(12)	Nos.	20	114.6370891	-	-
4.7.4	LIGHTING PANEL INDOOR, NORMAL SUPPLY TYPE LP-A(18)	Nos.	15	126.7051532	-	-
4.7.5	LIGHTING PANEL OUTDOOR, NORMAL SUPPLY TYPE LP-A(18)	Nos.	2	127.9036108	-	-
4.7.6	LIGHTING PANEL INDOOR, DC SUPPLY PANEL TYPE D(6)	Nos.	10	108.6146377	-	-
4.7.7	STREET LIGHTING PANEL TYPE-LP-S(6)	Nos.	2	151.8416156	-	-

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4.8	POLE (GALVANIZED)					
4.8.1	PSI	Nos.	5	550.7860950	-	-
4.8.2	PS2	Nos.	5	566.1075001	-	-
4.8.3	JB-S	Nos.	12	90.2564047	-	-
4.8.4	POLE-9MTR -PF2	Nos.	2	609.9818210	-	-
4.8.5	LIGHTING MAST	Nos.	7	75.3579292	-	-
4.9	PVC WIRES					
4.9.1	PVC WIRE 1CX2.5sq mm Cu.	MTR	26500	0.2676574	-	-
4.9.2	PVC WIRE 1CX4sq mm Cu.	MTR	30000	0.2676574	-	-
4.10	GI CONDUITS					
4.10.1	20MMØ GI CONDUIT	MTR	80000	3.4749973	-	-
4.10.2	25MMØ GI CONDUIT	MTR	16500	3.7293232	-	-
4.10.3	GI WIRE FOR FIXTURE EARTHING	MTR	72437	0.4020562	-	-
4.10.4	20MMØ EPOXY CONDUIT	MTR	1290	3.5131636	-	-
4.10.5	50MM GI CONDUIT	MTR	200	5.3066131	-	-
5.0	FABRICATION & ERECTION					
5.1	Structural steel Fabrication,Erection and Painting	MT	10	1,952.5481586	-	-
6.0	Screened Cables(ARMOURED) laying,dreasing & clamping					
6.1	1C - 35	Mtr	3000	1.7357882	-	-
6.2	1C - 120	Mtr	20250	2.3740415	-	-
6.3	1C - 300	Mtr	11000	4.0839175	-	-
6.4	1C - 400	Mtr	25000	4.0839175	-	-
6.5	1C - 630	Mtr	54750	4.7088852	-	-
6.6	2C - 10	Mtr	15800	1.2165585	-	-
6.7	2C-16	Mtr	37500	1.5506491	-	-
6.8	2C - 25	Mtr	30000	1.0317625	-	-

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6.9	2C - 50	Mtr	6000	1.4024138	-	-
6.10	2C - 95	Mtr	12000	1.7767681	-	-
6.11	2C - 120	Mtr	12000	2.3664303	-	-
6.12	3C - 10	Mtr	20025 0	1.4331219	-	-
6.13	3C - 25	Mtr	3550	1.8629684	-	-
6.14	3C - 50	Mtr	7500	2.3418070	-	-
6.15	3C - 95	Mtr	2250	2.7998988	-	-
6.16	3C - 150	Mtr	3750	5.6052936	-	-
6.17	3C - 240	Mtr	10500	5.4408313	-	-
6.18	3.5C - 25	Mtr	3000	2.0913486	-	-
6.19	3.5C - 50	Mtr	54000	2.6797092	-	-
6.20	3.5C - 95	Mtr	6000	3.0279200	-	-
6.21	3.5C - 185	Mtr	3000	5.0786274	-	-
6.22	3.5C - 240	Mtr	6000	5.0786274	-	-
6.23	4C - 10	Mtr	6750	1.5966645	-	-
6.24	2C-2.5	Mtr	7500	1.1520803	-	-
6.25	3C-2.5	Mtr	39000	1.3176200	-	-
6.26	4C-2.5	Mtr	24000	1.2549639	-	-
6.27	2C-6	Mtr	7000	1.5465314	-	-
6.28	3C - 1.5	Mtr	85000	1.3176200	-	-
6.29	2Cx1.5	Mtr	70000	0.9330813	-	-
6.30	5C X 1.5	Mtr	13000	1.2011799	-	-
6.31	5CX2.5	Mtr	32000	1.2011799	-	-
6.32	7C X 1.5	Mtr	13000	1.2818100	-	-
6.33	10C X 1.5	Mtr	9000	1.4655560	-	-
6.34	12C X 1.5	Mtr	16000	1.6227241	-	-

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7.0	11/11kV (UE), AL CONDUCTOR XLPE INSULATED,ARMOUR ED POWER Cables laying,dreasing & clamping					
7.1	11 KV 1C-500	Mtr	13500	17.4167686	-	-
7.2	11 KV 3C-150	Mtr	1750	17.7178123	-	-
7.3	1C-400 SQ.MM	Mtr	16500	17.4167686	-	-
8.0	3.3/3.3 KV (UE), AL CONDUCTOR XLPE INSULATED ARMoured POWER CABLES laying,dreasing & clamping					
8.1	3.3 KV 3C-150	Mtr	5000	17.7178123	-	-
9.0	ERECTION OF PRE FABRICATED CABLE TRAYS AND ACCESSORIES LIKE BEND, TEE, ELBOW , CROSS & REDUCERS ETC.					
9.1	50MM PTCT	Mtr	500	5.8766522	-	-
9.2	100MM PTCT	Mtr	501	6.1602058	-	-
9.3	150MM PTCT	Mtr	1000	7.3430127	-	-
9.4	300MM PTCT	Mtr	1000	10.8776062	-	-
9.5	600MM PTCT	Mtr	11000	13.2868008	-	-
9.6	150MM LTCT	Mtr	1000	6.8211306	-	-
9.7	300MM LTCT	Mtr	2500	9.4157525	-	-
9.8	600MM LTCT	Mtr	34000	11.0524009	-	-
10.0	Neutral Grounding resistor Erection and commissioning					
10.1	NGR 11 KV (600A, 10 SEC, 11.006 OHMS) including all support structure	Nos	8	2,735.3854193	-	-
11.0	INSTALLATION OF HOT DIP					

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	GALVANIZED STEEL FLATS					
11.1	GI Flat 65 X 8	Mtr	7000	10.3808095	-	-
11.2	GI Flat 50 X 6	Mtr	17515	7.1652091	-	-
11.3	GI Flat 25 X 3	Mtr	3333	5.5956774	-	-
11.4	GI Flat 25 X 6	Mtr	9190	5.5956774	-	-
11.5	20 MM DIA ROD	NOS	65	5.0394469	-	-
11.6	8 SWG WIRE	Mtr	2500	0.8973364	-	-
11.7	16 SWG GI WIRE	Mtr	16000 0	0.2466937	-	-
11.8	Treated Earth pit	NOS	50	876.1066979	-	-
12.0	ERECTION & COMMISSIONING OF BUS DUCTS (SPBD, IPBD AND BOI'S)					
12.1	21 KV IP BUS Duct along with LAVT, APE, HAB, NG Cubicle & including erection of all supporting structure.	Set	2	336,797.03520 41	-	-
12.2	SPBD 4000A – (Dimension 500 x 1500mm/ 600 x 1800mm) approx.- 150KG/mtr, Total 3 ph including erection of all supporting structure.	Mtr	700	292.0197824	-	-
12.3	SPBD 2500A – (Dimension 450 x 1350mm) approx.- 120KG/mtr, Total 3 ph including erection of all supporting structure.	Mtr	360	292.0197824	-	-
12.4	SPBD 2750A – (Dimension 400 x 1200mm) approx.- 100KG/mtr, Total 3 ph including erection of all supporting structure.	Mtr	160	292.0197824	-	-
12.5	NSPBD Rating: 2500A (X-section 800mmx350mm)	Mtr	200	257.6583733	-	-

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12.6	NSPBD Rating: 4000A (X-section 800mmx450mm)	Mtr	20	257.6583733	-	-
12.7	SANDWITCH BUSDUCT Rating: 2500A (X-section 800mmx350mm)	Mtr	750	257.6583733	-	-
13.0	LT MCC ERECTION & COMMISSIONING					
13.1	415V 4000 A TURBINE SERVICE PMCC# 1DA/2DA	NOS	2	21,736.147085 4	-	-
13.2	415V 2500 A EMERGENCY MCC# 1DG/2DG	NOS	2	21,949.942040 3	-	-
13.3	415V 630 A UNIT SERVICE ACDB# 1QA/2QA	NOS	2	20,514.671415 1	-	-
13.4	415V 250 A TURBINE VALVE DB# 1KA/2KA	NOS	2	40,520.203497 8	-	-
13.5	415V 4000A STATION SERVICE PMCC# 0DA/0DB	NOS	2	26,328.561993 0	-	-
13.6	220V 1250 A MAIN DCDB# 1FA/2FA	NOS	2	19,031.169408 2	-	-
13.7	415V 800A AIR WASHER MCC# 0SA/0SB	NOS	2	12,646.113133 1	-	-
13.8	415V 400A VENTILATION MCC# 1TA/2TA	NOS	2	14,660.720380 5	-	-
13.9	415V 800 A AIR CONDITIONING MCC# 0TA	NOS	1	16,322.725169 5	-	-
13.10	EMER AC FOR COMMON LOAD	NOS	1	17,037.212931 5	-	-
13.11	415V 400A CPU MCC# 0SD	NOS	1	14,950.227981 0	-	-
13.12	415V 400 A MISC SERVICE MCC# 0QA/0QB	NOS	1	19,293.266296 4	-	-
13.13	415V 2500 A SEVICE BLD PMCC# ODE	NOS	1	17,869.081471 4	-	-
14.0	DG SETS ERECTION & COMMISSIONING					

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Chapter X: RATE SCHEDULE

14.1	1500 Kva DG set, panels, battery charger, exhaust piping and with all accessories	Nos	3	39,480.8320155	-	-
15.0	TREFOIL CLAMP Erection					
15.1	630 sq mm (52mm)	Nos.	6000	20.8377898	-	-
15.2	630 sq mm (45mm)	Nos.	14000	20.8377898	-	-
15.3	400 sq mm (37mm)	Nos.	9000	20.8377898	-	-
16.0	TERMINATION & JOINTING KIT					
16.1	TERMINATION & JOINTING KITS 11KV 1C-500 AL ARMOURED CU LUG	Nos	100	401.3859818	-	-
16.2	TERMINATION & JOINTING KITS 11KV 3C-150 AL ARMOURED CU LUG	Nos	22	422.2290472	-	-
16.3	TERMINATION & JOINTING KITS 3.5 KV 3C-150 AL ARMOURED CU LUG	Nos	135	439.5758400	-	-
17.0	Testing and Commissioning of HT Motor Including Dryout & Motor CTs Testing	Nos	24	793.7602839	-	-

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Chapter XI: Unpriced Rate Schedule

UNPRICED RATE SCHEDULE

ITEM NO.	DESCRIPTION OF WORK	TOTAL VALUE IN INR (IN FIGURES AND WORDS)
1.0	<p style="text-align: center;">TOTAL PRICE FOR</p> <p style="text-align: center;">“ERECTION, TESTING, COMMISSIONING, TRIAL OPERATION AND HANDING OVER OF HT/LT ELECTRICAL SYSTEM AND ILLUMINATION WORKS FOR UNIT#1 & UNIT#2 OF 2X660 MW KHURJA SUPER THERMAL POWER PROJECT, KHURJA, U.P”</p>	<p style="font-size: 2em;">A</p>
Notes:		
a.	The rates of individual item for the entire scope of work shall be arrived as per Calculation defined in Rate Schedule.	
b.	The derived item rate will remain firm throughout the contract period.	

Notes:

- i. Bidder's quoted price above shall be complete in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.
- ii. Contractor shall fully understand description and specifications of items mentioned in BOQ.
- iii. Conditional price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.

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- iv. Quantities mentioned in BOQ Cum Rate Schedule are approximate only and liable for variation on either side depending upon site / design requirement. The tentative contract value (CV) of entire scope of work shall be calculated as per finally quoted / accepted rates & the Quantities indicated in BOQ cum Rate Schedule.
- v. Contractor's total quoted price as per BOQ Cum Rate Schedule will be taken as tentative only. The contractor undertakes to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same.
- vi. In case of any mis-match in rate and amount on price discrepancy, the same will be dealt as per clause no. 1.4 of GCC.
- vii. Taxes (GST) shall be payable extra as per relevant clauses in Technical Conditions of Contract.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter XII: Annexures

Annexures:

A	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAM PS AND M ISCELLANEOUS ITEM SPECIFICATIONS
B	OGA OF STATION TRANSFORMER
C	OGA OF GT
D	OGA OF REACTOR
E	ELECTRICAL SINGLE LINE DIAGRAM FOR AUXILAIRY POW ER DISTRIBUTION
F	ANNEXURE-A
G	NTPC SAFETY RULES