

# TENDER SPECIFICATION

**NO: BHE/PW/PUR/DHJOI-CPS/877**

PROVIDING CONSTRUCTION POWER SYSTEM ON “BOO BASIS” (BUILD OWN OPERATE) OF 11/0.433 KV POWER DISTRIBUTION NETWORK CONSISTING OF TRANSFORMERS, ASSOCIATED EQUIPMENT AND HT /LT CABLING ETC FOR CONSTRUCTION WORKS OF 2X220 TPH UTILITY BOILERS, 2X30 MW STG, 4XFr6B GTG, 4X110 TPH HRSG AND BOP PACKAGES AT OPaL DAHEJ STEAM & POWER GENERATION SYSTEM

AT

OPaL DAHEJ PETROCHEMICAL COMPLEX

DAHEJ, DIST: - BHARUCH (GUJARAT)

VOLUME – I

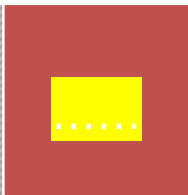
**CONSISTING OF:**

- Volume-IA : Technical Conditions of Contract,
- Volume-IB : Special conditions of Contract,
- Volume-IC : General conditions of Contract
- Volume-ID : Forms & Procedures



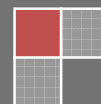
**Bharat Heavy Electricals Limited**  
(A Government of India Undertaking)  
Power Sector - Western Region  
345-Kingsway, Nagpur-440001

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# NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



Ref: BHE/PW/PUR/DHJOI-CPS/877

Date: 30/12/2010

**NOTICE INVITING TENDER (NIT)**  
**NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES  
OR  
PURCHASE TENDERS FROM THIS OFFICE ALSO**

To

Dear Sir/Madam

Sub : **NOTICE INVITING TENDER**

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

**1.0 Salient Features of NIT**

SL NO	ISSUE	DESCRIPTION
i	<b>TENDER NUMBER</b>	<b>BHE/PW/PUR/DHJOI-CPS/877</b>
ii	<b>Broad Scope of job</b>	PROVIDING CONSTRUCTION POWER SYSTEM ON "BOO BASIS" (BUILD OWN OPERATE) OF 11/0.433 KV POWER DISTRIBUTION NETWORK CONSISTING OF TRANSFORMERS, ASSOCIATED EQUIPMENT AND HT /LT CABLING ETC FOR CONSTRUCTION WORKS OF 2X220 TPH UTILITY BOILERS, 2X30 MW STG, 4XFr6B GTG, 4X110 TPH HRSG AND BOP PACKAGES AT OPaL DAHEJ STEAM & POWER GENERATION SYSTEM AT OPaL DAHEJ PETROCHEMICAL COMPLEX DAHEJ, DIST: - BHARUCH (GUJARAT)
iii	<b>DETAILS OF TENDER DOCUMENT</b>	
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> <span style="float: right;"><i>Applicable</i></span>
b	Volume-IB	<i>Special Conditions of Contract (SCC)</i> <span style="float: right;"><i>Applicable</i></span>
c	Volume-IC	<i>General Conditions of Contract (GCC)</i> <span style="float: right;"><i>Applicable</i></span>
d	Volume-ID	<i>Forms and Procedures</i> <span style="float: right;"><i>Applicable</i></span>
e	Volume-II	<i>Price Schedule (Absolute value).</i> <span style="float: right;"><i>Applicable</i></span>
iv	<b>Issue of Tender Documents</b>	<ol style="list-style-type: none"> <li>1. <b><u>Sale from BHEL PS Regional office at :Nagpur</u></b> <b>Start : 29/07/2011</b> <b>Closes: 17/08/2011 , Time :16.00 Hrs</b></li> <li>2. From BHEL website (<a href="http://www.bhel.com">www.bhel.com</a>)</li> </ol> Tender documents can however be downloaded from website till due date of submission <span style="float: right;"><i>Applicable</i></span>
v	<b>DUE DATE &amp; TIME OF OFFER SUBMISSION</b>	<b>Date : 18/08/2011 , Time :15.00Hrs IST</b> <b>Place : BHEL PSWR, Nagpur</b> Tenders being submitted through representative shall be handed over to any of the following BHEL officials after making entry/registration at the reception: <span style="float: right;"><i>Applicable</i></span>

		RK Ranade/ Sr.Manager (Purchase) Pratish Gee Varghese/ Engineer(Purchase)	
vi	OPENING OF TENDER	<b>1 hour) after the latest due date and time of Offer submission</b> Notes: (1) In case the due date of opening of tender becomes a non-working day, tenders shall be opened on next working day at the same time. (2) Bidder may depute representative to witness the opening of tender	Applicable
vii	EMD AMOUNT	<b>Rupees 2,00,000/-</b>	Applicable
viii	COST OF TENDER	<b>Rupees 2000/-</b>	Applicable
ix	LAST DATE FOR SEEKING CLARIFICATION	Date: At least 3 days before the due date of offer submission Along with soft version also, addressing to undersigned & to others as per contact address given below	Applicable
x	SCHEDULE OF Pre Bid Discussion (PBD)	Date : Not applicable.	Not applicable.
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	Not Applicable	Not Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage ( <a href="http://www.bhel.com">www.bhel.com</a> -->Tender Notifications →View Corrigendums) <b>and not in the newspapers</b> . Bidders to keep themselves updated with all such information	

- 2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed & stamped on each page, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**
- 3.0 Unless specifically stated otherwise, bidder shall remit cost of tender and courier charges if applicable, in the form of Demand Draft drawn in favour of Bharat Heavy Electricals Ltd, payable at Power Sector Regional HQ at Nagpur issuing the Tender, along with techno-commercial offer. Bidder may also choose to deposit the Tender document cost by cash at the Cash Office as stated above against sl no iv of 1, on any working day; and in such case copy of Cash receipt is to be enclosed with the Techno Commercial offer. Sale of tender Documents shall not take place on National Holidays, holidays declared by Central or State Governments and BHEL PS HQ at NAgpur, Sundays and second/ last Saturdays
- 4.0 Unless specifically stated otherwise, bidder shall deposit EMD through Demand Draft/Pay Order in favour of Bharat Heavy Electricals Ltd, payable at Nagpur. For other details and for 'One Time EMD' please refer General Conditions of Contract.
- 5.0 **Procedure for Submission of Tenders:** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:

- PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD/COST of TENDER)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)
- PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)

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

Sl no	Description	Remarks
<b>Part-I A</b>		
	<p><b>ENVELOPE – I superscribed as :</b> PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:</p> <p><b>CONTAINING THE FOLLOWING:-</b></p>	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	<p>Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above.</p> <p><b>Note:</b></p> <p>a. In case of any deviation, the same should be submitted separately for technical &amp; commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained.</p> <p>b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.</p> <p style="padding-left: 20px;">i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL</p> <p style="padding-left: 20px;">ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender</p>	
iii.	<p>Supporting documents/ annexure/ schedules/ drawing etc as required in line with Pre-Qualification criteria.</p> <p>It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph no, FAX no, etc.</p>	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : <u>Technical</u> Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	

xiii.	Any other details preferred by bidder with proper indexing.	
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<b>PART-I B</b>		
	<b>ENVELOPE – II superscribed as:</b> PART-I (EMD/COST of TENDER) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING:-</b>	
i.	1. Earnest Money Deposit (EMD) in the form as indicated in this Tender <b>OR</b> Documentary evidence for 'One Time EMD' with the Power Sector Region of BHEL floating the Tender  2. Cost of Tender ( Demand Draft or copy of Cash Receipt as the case may be)	

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

<b>OUTER COVER</b>		
	<b>ENVELOPE-IV</b> (MAIN ENVELOPE / OUTER ENVELOPE) superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:  <b>CONTAINING THE FOLLOWING:</b>	
i	<ul style="list-style-type: none"> <li>○ Envelopes I</li> <li>○ Envelopes II</li> </ul>	

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

- 7.0 No Deviation with respect to tender clauses and no additional clauses/ suggestions/ in Techno-commercial bid/ Price bid shall normally 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: (Shall be applicable for Bid Evaluation after 1<sup>st</sup> Jan 2011)**  
**Bidders capacity for executing the job under tender shall be assessed as per the following:**
- I. **Assigning Weightages (A) for Similar Jobs Under-Execution:** Weightages shall be worked out and assigned based on the average number of Similar Works under execution including works yet to be commenced by the agency, in the following manner:
- i). **Number of Similar Jobs**
    - a) No. of jobs in BHEL, PSER : Say 'J'
    - b) No. of jobs in BHEL, PSSR : Say 'K'
    - c) No. of jobs in BHEL, PSWR : Say 'L'
    - d) No. of jobs in BHEL, PSNR : Say 'M'
    - e) No. of jobs with other customers\* : Say 'N' (\*: Other than BHEL PSER, PSSR, PSWR & PSNR)
    - f) Average No. of Jobs is 'P' = (J+K+L+M+N) divided by 5
  - ii) **Weightage "A" assigned to bidders based on Average Number of jobs "P":**
    - a) If 'P' = 0-1, "A" will be equal to '3'
    - b) If 'P' = 2-3, "A" will be equal to '2'
    - c) If 'P' = 4-5, "A" will be equal to '1'
    - d) If 'P' is Above 5, "A" will be equal to '0'
- II. **Weightage "B" for Quarterly Performance Reports of Vendors:** This shall be based on the averages of the net weighted score obtained by the bidder for the jobs under execution (excluding works not commenced) for the quarter previous to the last quarter reckoned from the date of latest due date of submission, in all four Regions i.e BHEL PSER, PSSR, PSWR & PSNR, in the following manner.
- i). **Ratings by Power Sector Region:**
    - a) PS ER's Rating 'Rer' =  $(X_1 + X_2 + \dots + X_n)$  divided by n
    - b) PS WR's Rating 'Rwr' =  $(X_1 + X_2 + \dots + X_n)$  divided by n
    - c) PS SR's Rating 'Rsr' =  $(X_1 + X_2 + \dots + X_n)$  divided by n
    - d) PS NR's Rating 'Rnr' =  $(X_1 + X_2 + \dots + X_n)$  divided by n
    - e) **Over all Power Sector Region Rating 'R<sub>BHEL</sub>' = (Rer+ Rwr+ Rsr+ Rnr) divided by 4**

(where "X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>,...X<sub>n</sub>" is the net weighted score obtained by the bidder as per the "Evaluation of Contractor Performance (Quarterly)" against the various contracts 'n' under execution in the respective Region).
  - ii) **Weightage "B" assigned to bidders based on Overall Power Sector Rating (R<sub>BHEL</sub>):**
    - a) If R<sub>BHEL</sub> is 80% and above, "B" will be equal to '6'
    - b) If R<sub>BHEL</sub> is > 70% < 80%, "B" will be equal to '5'
    - c) If R<sub>BHEL</sub> is > 60% < 70%, "B" will be equal to '4'
    - d) If R<sub>BHEL</sub> is < 60%, "B" will be equal to '0'

.....  
III. **Evaluation of Bidders capacity to execute the job under tender:** shall be based on the sum of scores obtained in 'A' and 'B', as below:

- a) 6 or above : Considered 'Qualified' for the job under tender
- b) Less than 6: Considered 'NOT Qualified' for the job under tender

IV. **Explanatory note:**

- a) Similar work means Boiler or Turbine or Civil or Electrical or CI, etc irrespective of rating of Plant
  - b) Quarter shall be as per the quarter defined in the "Evaluation of Contractor performance (Quarterly)". For contracts where annexed Quarterly Evaluation performance was not part of the contract, 'Quarterly Performance Reports' previous to the last quarter reckoned from the date of latest due date of submission, given by the respective project site against the contract will be the basis for evaluation.
  - c) Vendors who are not executing any jobs presently in the Region and first timers to the Region, may be considered subject to satisfying all other tender conditions
  - d) 'Under execution' shall mean works in progress upto Boiler Steam Blowing (for Boiler and Auxilliaries) or Synchronisation (for all other jobs including Civil) shall be considered.
- 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 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. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of above.
- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), **if applicable**, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. **The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (xi) of 1 above.**

- 16.0 The Bidder has to satisfy the Pre Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of pre-qualification evaluation/ techno-commercial bids, approval/ acceptance of customer (as applicable), etc. and date of opening of price bids shall be intimated to only such bidders.
- 17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorised representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.
- 18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) or specified otherwise in SCC of tender.
- 19.0 BHEL reserves the right to decide the successful bidder on the basis of Reverse Auction process. In such case all qualified bidders will be intimated regarding procedure/ modality for Reverse Auction process prior to Reverse Auction and price will be decided as per the rules for Reverse Auction. .
- However, if reverse auction process is unsuccessful as defined in the RA rules/procedures, or for whatsoever reason, then the sealed 'PRICE BIDS' will be opened for deciding the successful bidder. BHEL's decision in this regard will be final and binding on bidder.
- 20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
- 21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.
- 22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
- 23.0 In case Consortium Bidding is allowed as per Pre Qualifying Requirement, then Prime Bidder and Consortium Partner shall enter into Consortium Agreement. Validity period of Consortium Agreement shall be 6 months after which the same can be re validated.
- 'Stand alone' bidder cannot become a **prime bidder' or a 'consortium bidder' in a consortium bidding**. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non compliance, consortium bids of such Prime bidders will be rejected. .
- 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 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:
- Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
  - Notice Inviting Tender (NIT)
  - Price Bid
  - Technical Conditions of Contract (TCC)—Volume-1A
  - Special Conditions of Contract (SCC) —Volume-1B

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- f. General Conditions of Contract (GCC)—Volume-1C  
g. Forms and Procedures —Volume-1D

for BHARAT HEAVY ELECTRICALS LTD

AGM (PUR)

**Enclosure**

01. Annexure-1: Pre Qualifying criteria.  
02. Annexure-2: Check List .  
03. Other Tender documents as per this NIT.

**ANNEXURE - 1**

**PRE QUALIFYING CRITERIA**

JOB	PROVIDING CONSTRUCTION POWER SYSTEM ON "BOO BASIS" (BUILD OWN OPERATE) OF 11/0.433 KV POWER DISTRIBUTION NETWORK CONSISTING OF TRANSFORMERS, ASSOCIATED EQUIPMENT AND HT /LT CABLING ETC FOR CONSTRUCTION WORKS OF 2X220 TPH UTILITY BOILERS, 2X30 MW STG, 4XFr6B GTG, 4X110 TPH HRSG AND BOP PACKAGES AT OPaL DAHEJ STEAM & POWER GENERATION SYSTEM AT OPaL DAHEJ PETROCHEMICAL COMPLEX DAHEJ, DIST: - BHARUCH (GUJARAT)		
TENDER NO	<b>BHE/PW/PUR/DHJOI-CPS/877</b>		
L NO	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	
		Name and Description of qualifying criteria	Page no of supporting document
A	Submission of Integrity Pact duly signed	NOT APPLICABLE	
B	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT	<b><u>Shall be applicable for Bid Evaluation after 1<sup>st</sup> Jan 2011</u></b>	
C	<p><b><u>TECHNICAL:</u></b> Bidder must fulfill the Qualifying Requirements as under in order to be considered as technically qualified for this Tendering process</p> <p><b>C.1)</b> Bidder must have, in last seven years as on 30/06/2011, executed:</p> <p><b>C.1.1)</b> Supply, Erection and Commissioning of HV Power transmission / distribution of 11 KV or higher voltage rating and LT substation of 415 volt rating or higher rating.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>C.1.2)</b> Erection and Commissioning of Electrical systems consisting of HV transformers of Primary voltage 11 KV or higher, switchgears and cables</p> <p style="text-align: center;"><b>OR</b></p> <p><b>C.1.3)</b> Providing Construction Power supply system of 11KV or higher rated power distribution network consisting of Transformers, Associated equipments, HT/LT cabling etc on 'Build, Own, Operate' basis or 'Lease basis'</p> <p style="text-align: center;"><b>OR</b></p> <p><b>C.2)</b> Bidder should have been Techno Commercially Qualified for Providing Construction power on 'Build, Own &amp; Operate' basis of 11 KV or higher rated power distribution network by any of the Power Sector Region/Unit/division of BHEL, in the last 3(Three) years as on 30/11/2010</p> <p style="text-align: center;"><b>OR</b></p> <p><b>C.3)</b> Bidder should be empanelled with BHEL-PSWR for</p>		

	E-CP-2 or E-CP-3 category  <b>AND</b>  <b>C.4)</b> Bidder must possess a valid electrical contractor license as on the date of offer submission		
D 1	<b><u>Financial TURNOVER</u></b> Bidders must have achieved an average annual financial turnover (Audited) of <b>33.00 Lakhs</b> or more over last three Financial Years (FY) i.e 2007-08, 2008-2009, 2009-2010		
2	<b>NETWORTH</b> Net worth of bidder based on Audited Accounts of 2009-2010 (should be higher than 50% of paid up capital in case of companies.		
3	<b>PROFIT</b> Bidder must have earned cash profit in any one of the three Financial Years as applicable in the last three years defined in 'D1 above based on latest Audited Accounts.		
E	Approval of Customer Note: Names of bidders who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval. Price bid of only those bidders shall be opened who are approved by customer.	<b>NOT APPLICABLE</b>	
F	Consortium criteria	<b>NOT APPLICABLE</b>	
	<b>Explanatory Notes for QR 'A'</b> 1. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as given above along with all annexures		

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

**CHECK LIST**

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

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Fax No:	
4	EMD DETAILS	DD No:                      Date : Bank :                      Amount: <u>Please tick ( √ ) whichever applicable:-</u> ONE TIME EMD / ONLY FOR THIS TENDER	
		APPLICABILITY	BIDDER REPLY
5	Whether the format for compliance with <b>PRE QUALIFICATION CRITERIA</b> (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
6	Whether Audited profit and Loss Account for the last three years submitted	Applicable	YES/NO
7	Whether Copy of PAN Card submitted	Applicable	YES/NO
8	Whether all pages of the Tender documents including annexures, appendices etc are read understood and signed	Applicable	YES/NO
9	Integrity Pact	Not Applicable	Not Applicable
10	Declaration by Authorised Signatory	Applicable	YES/NO
11	Whether No Deviation Certificate submitted	Applicable	YES/NO
12	Whether Declaration confirming knowledge about Site Conditions submitted	Applicable	YES/NO
13	Whether Declaration for relation in BHEL submitted	Applicable	YES/NO
14	Whether Non Disclosure Certificate submitted	Applicable	YES/NO
15	Whether Bank Account Details for E-Payment submitted	Applicable	YES/NO
16	Capacity Evaluation of Bidder for current Tender	<b>Shall be applicable for Bid Evaluation after 1<sup>st</sup> Jan 2011</b>	YES/NO
17	Tie Ups/Consortium Agreement are submitted as per format	Not Applicable	Not Applicable
18	Whether Power of Attorney for Submission of Tender/Signing Contract Agreement submitted	Applicable	YES/NO
19	Whether Analysis of Unit rates submitted	Applicable	YES/NO

NOTE : STRIKE OFF 'YES' OR 'NO', AS APPLICABLE

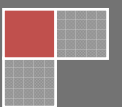
DATE :

**AUTHORISED SIGNATORY**  
(With Name, Designation and Company seal)



# TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS  
LIMITED



SI No	DESCRIPTION	Chapter	No. OF PAGES
<b>Volume-IA</b>	<b>Part-I: Contract specific details</b>		
1	Project Information	Chapter-I	02
2	Scope of Works	Chapter-II	02
3	Facilities in the scope of Contractor/BHEL (Scope Matrix)	Chapter-III	09
4	T&Ps and MMEs to be deployed by Contractor	Chapter-IV	03
5	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V	01
6	Time Schedule	Chapter-VI	02
7	Terms of Payment	Chapter-VII	02
8	Taxes and other Duties	Chapter-VIII	03
9	Standards Applicable for 11/0.433KV construction Power	Chapter-IX	01
10	Annexures	Chapter-X	
A	Drawings		02
B	BOQ		02
<b>Volume-IA</b>	<b>Part-II : Technical Specifications</b>		
1	General	Chapter-I	01
2	Detailed Technical Requirements	Chapter-II	13

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter - I : Project Information

1.0	<b>Project Information</b>
1.1	<p><b>INTROUCTION</b></p> <p><b>ONGC Petro Additions Limited (OPaL)</b> is setting up a Petrochemical Complex at Dahej in the state of Gujarat, India. The complex consist of dual feed Ethylene Cracker of 1100 KTPA capacity.</p> <p>The scope of the present project is to set up a Steam and Power generation system to primarily meet the process steam requirement and incidentally generate power to partly meet the power requirement for the Petrochemical Complex. The project shall consist of 2X220 TPH Utility Boilers, 2X30 MW STG, 4XFr6B GTG, 4X110 TPH HRSG along with associated auxiliary systems and accessories.</p> <p>BHEL has been awarded the EPC package comprising of System Design, Detailed Engineering, Manufacturing, Procurement, Civil Works, Supply, Fabrication, Inspection, Transportation, Storage, Installation, Insurance, Testing, Mechanical Completion, Pre-commissioning, Commissioning and performance Guarantee test runs of the complete system. The project is to be completed within 30 months from zero date (15/04/2011).</p> <p><b>Site information</b></p> <p>a) Location : Dahej SEZ near Village Ambhetha at Dahej, District-Bharuch, Gujarat</p> <p>b) Longitude : 21°40'47"N to 21°41'48"N</p> <p>c) Latitude : 72°35'24"E to 72°36'44"E</p> <p>d) Nearest Railway Station : Bharuch – 45 km</p> <p>e) Nearest Town : Bharuch - 45 Km, Vadodara - 140 Km</p> <p>f) Nearest Port : Dahej - 10 Km</p> <p>g) Nearest Air Port : Vadodara - 140 km</p> <p>h) Access Road : Bharuch-Dahej State Highway - SH6 - 1.2 Km</p> <p>i) Height above mean sea level : Mean Sea Level (MSL) = 5.1M w.r.t. Chart datum Finished Grade Level (FGL)=6.6M/ 7.1M/ 7.6M above MSL</p>
1.2	<p><b><u>CLIMATIC CONDITIONS</u></b></p> <p><b>1. <u>Seismic data</u></b></p> <p>a. Zone : III</p> <p><b>2. <u>Air Temperature</u></b></p>

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter - I : Project Information

	a. Air Temperature Max/Min	: 40° C / 13° C
	b. Design dry bulb Temp Max/Min	: 42° C / 29° C
	<b>3. Relative Humidity</b>	: 90%@ 42 °C
	<b>4. Rainfall</b>	
	Annual Rainfall	: 1000 mm
	<b>5. Wind velocity/ direction</b>	
	a. March- October	: 44 km/h/ South west
	b. November- February	: 15KM/Hr/ North west/North/ North East
	<b>6. Climatic Conditions</b>	: Tropical

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

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### 2.1 SCOPE OF WORK

The intent of this specification is to provide the services of “**Construction Power Package**” on BOO basis (Build, Own, and Operate). The scope of work includes Engineering, Procurement, Installation, Erection, Commissioning, and Operation & Maintenance. The brief scope of work shall be defined as under.

### 2.2 SCOPE OF WORK UNDER “BOO”

2.2.1 Construction power from supplier (M/s Torrent Power) will be supplied at one single point at 11KV, 3 phase, 2000 KVA with suitable circuit breaker and metering arrangement at the incomer end.

2.2.2 The scope of work covered under this tender specification includes liaisoning with the supplier under the instruction of BHEL to obtain construction power supply (which will be at single point at 11 KV, 3 phase, 2000 KVA) and to carry out detail engineering to step down the construction power from 11 KV to 415 V, 4 wire with multiple output distribution board with metering arrangement at 11 KV side for each transformers, preparation of detailed diagram (based on single line diagram), getting the approval from concerned state statutory authority, procurement of equipments, installation, commissioning, operation and maintenance of construction power distribution network on BOO basis. (Built, Own, Operate) to deliver the construction power supply at 415/ 433 V, 3 phase, 4 wire system with earthing and protection as per relevant IS specifications, metering arrangements, power factor improvement arrangement etc in all aspects.

The requirement envisaged under the technical specification is through 2 nos of transformers each of capacity 11 KV/ 0.433 KV, 1000 KVA with all related items like incomer circuit breaker, metering arrangement at 11 KV side, connecting power cables, protection, outgoing ACDB, cables, cable trays etc.

Bidder shall ensure suitability of protections available in the 11 KV feeder and any further hook up required for relay, OTI/ WTI protection bidder shall make necessary cabling arrangement between 1000 KVA transformers and 11 KV line. Bidder shall carry out testing and commissioning of 11 KV Breaker including protection relays & metering circuit of Torrent Energy Limited.

The scope shall also include related civil works like making of cable trench/ cable pit etc, foundations for transformers (11/0.433KV- 2 Nos) and ACDB, Switchgear and Metering room, Control Room and all other associated civil works. The detailed layout drawing and engineering design shall be as per enclosed single line diagram (refer Sketch No PMX/DHJOI-CPS/877/CP/001) and the arrangements/ systems provided shall be as per requirements of BHEL/ Opal (customer)/ Torrent Energy Limited, which shall be as per final approval of Gujarat State statutory authority like electrical inspector, factory inspector, labour officer etc whosoever concerned.

2.2.3 Contractor shall dismantle the equipments installed like Transformers, Circuit Breaker, AC Distribution Panels etc at the end of contract period at his own cost. Bidder shall also dismantle all the civil works done by him for the substations and leave the area levelled and absolutely clear of any kind of garbage/debris/scrap.

2.2.4 Bidder shall visit site and prepare lay out plan in consultation of BHEL/ Torrent Energy Limited.

2.2.5 Design/ detail engineering of equipment/ devices which includes 11/ 0.433 KV step down power transformers, HT side circuit breakers, sizing of HT/ LT cables (underground and above ground), number of runs of HT and LT cables per phase for rated power, VCB panels (1 incoming and 2

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter – II : Scope of Work

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- outgoing), 415V AC Distribution boards, power cables (above ground and below ground), earthing and protection including lightning arrestor as designed by state statutory authority, civil foundations for transformers/ ACDB and other associated civil work.
- 2.2.6 Bidder shall design the system, supply the equipments with complete installations and obtain approval from Torrent Energy Limited / Electrical Inspectorate, Gujarat Govt for technical data sheet of all equipments such as transformer, ACDB and cables and lay out of the of power distribution network which includes 11/ 0.433 KV transformer and further LT distribution to withstand the fault current as per the latest relevant IS standards.
- 2.2.7 Providing materials, equipments, devices, protection & metering arrangements etc as per requirement.
- 2.2.8 Erection & Commissioning, operation and maintenance of the entire system including providing necessary consumables & spare parts and associated works as per scope of work defined in the Sketch No PMX/DHJOI-CPS/877/CP/001 to provide uninterrupted power. Bidder shall immediately replace/ repair the faulty items on urgent basis for uninterrupted power supply.
- 2.2.9 All the equipments/ items/ materials provided shall be new and fresh purchase reputed brand/ make & source.
- 2.2.10 Bidder shall take his own insurance for his entire installations, manpower etc deployed at his own expenses throughout the contract period and extended period (as applicable) including third party insurance.
- 2.2.11 Bidder shall obtain approval of entire installation and clearance for operation of system from appropriate statutory authority.
- 2.2.12 At the end of the contract period including extended period (if any), bidder shall dismantle the total installation, clear the premises of all debris, scrap etc.
- 2.2.13 In case due to unavoidable reason, which is not attributable to bidder, the shifting and relocation of cables, equipments etc, contractor shall carry out the work on immediate basis as per the instruction of BHEL (bidder shall provide manpower with T&P on urgent basis as per the scope of work and BHEL will provide cables etc).

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

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Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	<b>PART I</b> <b>ESTABLISHMENT</b>			
3.1.1	<b>FOR CONSTRUCTION PURPOSE:</b>			
A	Open space for office (as per availability)	Yes		Only small open space as per availability & at available location will be provided by customer/ BHEL free of charge. <b>As such there is limitation / shortage of open space inside the project premise and looking to this aspect contractor will plan his small portable type (Porta Cabin) office cum T&amp;P storage arrangement at site. After the completion of work, contractor shall dismantle his structures/ installations and handover the vacant land to customer/BHEL.</b>
B	Open space for storage (as per availability)	Yes		Only small open space as per availability & at available location will be provided by customer/ BHEL free of charge.
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)  
Chapter – III : Facilities in the scope of contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	<b>PART I</b>			
D	Bidder's all office equipments, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
F	Fire fighting equipments like buckets, extinguishers etc		Yes	
G	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	<b>FOR LIVING PURPOSES OF THE BIDDER</b>			
a	Open space for labour colony (as per availability)		Yes	Electricity, Water etc for Labour colony is also in the scope of Contractor
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	<b>ELECTRICITY</b>			
3.2.1	<b>Electricity for construction purposes 3 Phase of Voltage 415/440 V</b>			

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

Sl.No	Description <b>PART I</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
a	Single point source		Yes	Bidders shall have to arrange DG set for erection / installation / construction works of Construction Power arrangements / equipments under these tender specifications. BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	<b>Electricity for the office, stores, canteen etc of the bidder</b>			

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

Sl.No	Description <b>PART I</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
a	Single point source		Yes	Bidders shall have to arrange DG set for erection / installation / construction works of Construction Power arrangements / equipments under these tender specifications. BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	<b>Electricity for living accommodation of the bidder's staff, engineers, supervisors etc</b>		Yes	Bidder to make his own arrangement
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)  
Chapter – III : Facilities in the scope of contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	<b>WATER SUPPLY</b>			
3.3.1	<b>For construction purposes</b>		<b>Yes</b>	
a	Making the water available at single point		Yes	For construction purpose, water shall be arranged by the contractor.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	<b><u>Water supply for bidder's office, stores, canteen etc</u></b>			Bidder to make his own arrangement
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	<b><u>Water supply for Living Purpose</u></b>		<b>Yes</b>	Bidder to make his own arrangement
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	

BHEL-PSWR

TECHNICAL CONDITIONS OF CONTRACT (TCC)  
Chapter – III : Facilities in the scope of contractor/BHEL

Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.4.0	<b>LIGHTING</b>			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	<b>COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER</b>			
a	Telephone, fax, internet, intranet, e-mail etc		Yes	
3.6.0	<b>COMPRESSED AIR wherever required for the work</b>		Yes	

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

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Sl.No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	<b>PART I</b>			
3.7.0	<b>Demobilization of all the above facilities</b>		<b>YES</b>	
3.8.0	<b>TRANSPORTATION</b>			
a	For site personnel of the bidder		Yes	
B	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

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Sl.No	Description <b>PART II</b> <b>3.9.0 ERECTION FACILITIES</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.9.1	Engineering works for construction:			
a	Providing the erection/constructions drawings for all the equipments covered under this scope		Yes	BHEL will only provide general layout arrangement. Further preparation of single line diagram, duly approved by Gujarat state statutory authority, will be the responsibility of the bidder.
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL/Torrent Energy Limited
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	
d	Shipping lists etc for reference and planning the activities			<b>NA</b>
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III : Facilities in the scope of contractor/BHEL**

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Sl.No	Description <b>PART II</b> <b>3.9.0 ERECTION FACILITIES</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on Sl No. e		Yes	In consultation with BHEL
h	Daily erection / work plan based on Sl No. g		Yes	In consultation with BHEL
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of pre assembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself			<b>NA</b>
L	Arranging the materials required for preassembly		Yes	

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

### Tentative List of Major T&P & MMD which may be required to deploy by the Contractor

#### A. T&P FOR ELECTRICAL WORKS

SL. NO.	DESCRIPTION	QUANTITY
01	TRANSFORMER OIL PURIFICATION PLANT WITH VACUUM PUMP FOR EVACUATION TRANSFORMER ALONGWITH ACCESSORIES & HOSES. A) CAPACITY 750/1000 LTR. PER HOUR	As per requirement
02	PPM TESTER FOR TRANSFORMER OIL	As per requirement
03	METERS FOR TIME MEASUREMENT OF BREAKER OPENING & CLOSING TIME	As per requirement
04	3 PHASE VARIAC 15 Amps	As per requirement
05	SINGLE PHASE VARIAC 28 AMPS	As per requirement
06	HV TEST KIT AC, 0 –50 KV &DC, 0- 100 KV PREFERSBLY WITH DRY TYPE TRANSFORMER	As per requirement
07	TRANSFORMER OIL BDV TEST KIT 0-100 KV WITH 2.5MM AIR GAP.	As per requirement
08	PORTABLE AIR COMPRESSOR WITH DRIER AND REGULATOR MAKE "TOSHNIWAL"/"KHOSLA" RATED FOR 7/10 KG/CM2	As per requirement
09	SOLDERING IRON "SOLDRON" MAKE 25 WATT	As per requirement
10	MULTIMETRES	As per requirement
11	DIGITAL "MOTWANE" MAKE 3.1/2 DIGIT OR HIL MAKE  ANALOG MOTWANE MAKE  DIGITAL 4.1/2 DIGIT Accuracy +/- 1% (HIL/MOTWANE/ Fluke make)	As per requirement
12	STANDARD MILLI AMPS/MILLIVOLTS SOURCE MAKE RANGE 0 TO 60 mA AND 0 TO 100 mV	As per requirement
13	INSULATION TESTER MOTORISED OPERATED / ELECTRONIC WITH SELECTIVE RANGE OF 1000 / 2500/ 5000 VOLT. Range 0.5 Mega ohms to 10000 Mega ohms	As per requirement
14	INSULATION TESTER MAINS OPERATED/ ELECTRONIC 500 volt & 1000 Volts Range 0.5 Mega ohms to 1000 Mega ohms	As per requirement
15	VARIABLE DC POWER SUPPLY 0 TO 250 V DC, 10 A MAKE "APLAB" OR RQUIVALENT(VARIABLE SOURCE)	As per requirement
16	PHASE SEQUENCE INDICATOR	As per requirement
17	DIGITAL TONGUE TESTER A/C 5/10, 25/60/300 AMP RANGE AC KEW SNAP MAKE	As per requirement
18	DIGITAL TONGUE TESTER D/C 30/60/300 AMS	As per requirement

BHEL-PSWR

Tender Specification No: BHE/PW/PUR/DHJOI-CPS/877

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

SL. NO.	DESCRIPTION	QUANTITY
19	DIGITAL TONGUE TESTER 0-1 / 5 AMPS AC	As per requirement
20	STOP WATCH	As per requirement
21	CONTAINER FOR TRANSFORMER OIL SAMPLING	As per requirement
22	MICRO OHM METER/DUCTER ( mV volt Drop Test Kit ) 0-200 A DC , 0-2000 Micro ohms with suitable calibrated cable leas for current injection & mv drop	As per requirement
23	CAPACITANCE METER HAVING RANGE 20 pf –100MFD +/- 1%	As per requirement
24	DECADE RESISTANCE BOX	As per requirement
25	TELETALK 2 WIRE SYSTEM	As per requirement
26	TORQUE WRENCH (12-60Nm, 50-225 Nm)	As per requirement
27	WATTMETER AC/DC 0-125-250V, 0-5-10A	As per requirement
28	TACHOMETER (NON CONTACT TYPE)	As per requirement
29	CAPACITANCE & TAN DELTA TEST KIT 12 KV	As per requirement
30	OIL SPECIFIC GRAVITY AND PPM MEASURING INSTRUMENT	As per requirement
31	RHEOSTAT	As per requirement
32	POLARITY TEST KIT	As per requirement
33	NON – CONTACT TYPE DIGITAL THERMOMETER	As per requirement
34	RELAY TESTING KIT	As per requirement
35	TWO WAY INTERCOM SET WITH 50 to 100 MTRS CABLES FOR CHECKING THE CABLES CONTINUTITY	As per requirement
36	PROTECTIVE EARTH ROD SUITABLE FOR 220 / 400 KV SYSTEM HAVING LEAKAGE CURRENT METER, 70 SQMM CABLE & CLAMPS ANY REPUTED MAKE	As per requirement
37	OTHER PROTECTIVE DEVICES	As per requirement

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

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**B. T&Ps FOR MECHANICAL WORKS**

SN	DESCRIPTION	QUANTITY
	II. HANDLING EQUIPMENT	
1	TURN BUCKLES	As per requirement
2	D'SHACKLES	As per requirement
3	STEEL WIRE ROPES	As per requirement
4	MANILA ROPES	As per requirement
5	CRANES / TRUCKS	As per requirement
6	CABLE ROLLERS	As per requirement
7	SHEARING MACHINE	As per requirement
8	DYNAMOMETERS	As per requirement
9	HYDRAULIC CRIMPING TOOL FOR CONDUCTOR / SHIELD WIRE	As per requirement
10	TORQUE WRENCH OF DIFFERENT RANGES	As per requirement

**NOTE:**

**THE LIST OF INSTRUMENTS / EQUIPMENTS TO BE BROUGHT BY THE CONTRACTOR AS SHOWN ABOVE IS ONLY INDICATIVE. ANY OTHER INSTRUMENTS / EQUIPMENTS REQUIRED FOR THE EXECUTION OF THE WORK IS TO BE NECESSARILY ARRANGED BY THE CONTRACTOR.**

THE TESTING/ CALIBRATION INSTRUMENTS WHICH ARE USED TO BE DULY CALIBRATED IN THE INTERVAL PRESCRIBED BY BHEL ENGINEERS FROM THE REPUTED AGENCIES DECIDED BY BHEL AND TEST CERTIFICATE TO BE FURNISHED.

## TECHNICAL CONDITIONS OF CONTRACT (TCC)

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

**No T&P shall be provided by BHEL**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter – VI: Time Schedule

### 6.0 TIME SCHEDULE, QUANTITY VARIATION, PRICE VARIATION ETC.

#### 6.1 TIME SCHEDULE

The contractor shall mobilise his resources so that the entire work shall be completed to meet the following schedule.

SN	Description of Activity	Completion PERIOD
01	Completion of Finalisation of Scheme, Engineering, Design and BOQ for entire 11/0.433KV, 2000KVA Construction Power arrangements/ equipments and preparation of installation drawings with the approval of authorities as per tender specifications etc.	Within Ten days of award of work by Fax L.O.I.
02	Arranging of all required materials including Transformer, Cables, Breakers, ACDBs and associated items/materials including protections & metering materials	Within 1 months of award of work by Fax L.O.I.
03	Completion of Installation, Erection, Testing, Commissioning and putting / charging of system including arranging the Operation, Maintenance and Up keeping services of entire system	Within 2 months of award of work by Fax L.O.I.
04	Providing the services of Operation, Maintenance and upkeep of the entire construction power distribution system	24 Months from date of successful commissioning and charging of system
05	Withdrawal, dismantling and clearing of site for clear possession by Client	Within 30 days after clearance by BHEL for withdrawal & dismantling of system

6.1.2 BHEL may grant extension of time schedule in case the reasons are beyond the control of the contractor. Contractor shall provide necessary documentary evidence to prove the reasons for delay not in his control as required by BHEL.

#### 6.2 Contract Period, and Overrun compensation

The total contract period shall be **27 months** from date of Fax LOI.

**No overrun charges** are applicable for the scope of work covered under this contract.

#### 6.3 EXTENSION OF HIRING PERIOD

BHEL may extend the hiring period for the services to be provided on BOO basis as specified in this tender specifications depending upon the requirement reviewed from time to time. The extension of hiring period if applicable shall be in two tranches as given below:

- ❖ 1<sup>st</sup> Extension of six months at the end of contract period
- ❖ Subsequent (2<sup>nd</sup>) extension of six months after expiry of contract period + 1<sup>st</sup> extension.
- ❖ Subsequent (3<sup>rd</sup>) extension of six months after expiry of contract period + 1<sup>st</sup> + 2<sup>nd</sup> extension.

Payments for the extended hiring periods shall be as defined in Chapter VII

#### 6.7 PRICE VARIATION

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter – VI: Time Schedule

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The contract price shall remain firm throughout the contract period and extended period. PVC as provided in General Conditions of Contract is therefore **NOT applicable**.

However the monthly payment for the 1<sup>st</sup> extension period of six months, subsequent (i.e. 2<sup>nd</sup>) extension period of six months and another subsequent (i.e. 3<sup>rd</sup>) extension period of six months will be paid as per the clause 7.1 B of chapter VII of TCC.

### 6.8 Review and Monitoring

The detailed plan and progress of supply and installation of the system shall be made by the contractor and approved by BHEL. This shall be reviewed regularly and contractor shall take necessary action based up on the review and as per instruction of BHEL.

### 6.9 Definition of Work Completion:

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

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VII: Terms of Payment

### 7.1 SCHEDULE OF PAYMENTS

#### A. ACITIVITY BASED PAYMENT:

S no	ACTIVITY	% Progressive Payment
1	On supply and receipt of entire system equipments, materials at site with submission of all relevant documents like purchase bills, test report/ test certificates, guarantee certificates, LR copies, entry bills etc and same shall be varied at on receipt of these materials at site.	8 % of contract value
2	On successful installation and commissioning of entire system	7% of contract value
3	Monthly hire charges for providing services on BOO basis	85% of contract value divided by 24
	<b>TOTAL</b>	<b>100.00%</b>

**Note:** For above progressive works, contractor will be paid 95% of above % distribution. Remaining 5% will be released after completion of de-mobilisation.

#### B. MONTHLY HIRING CHARGES for PROVIDING SERVICES DURING THE EXTENDED HIRING PERIOD (IF ANY) APPLICABLE.

For the extended periods, BHEL shall pay monthly charges at the following rates:

1. For 1<sup>st</sup> Extension period of Six Months: 12% x Accepted monthly hire charges {12% of 85% of Contract Value divided by 24}.
2. For 2<sup>nd</sup> Extension period of Six Months: 10% x Accepted monthly hire charges {10% of 85% of Contract Value divided by 24}.
3. For 3<sup>rd</sup> Extension period of Six Months: 09% x Accepted monthly hire charges {09% of 85% of Contract Value divided by 24}.

#### C. PRO RATA PAYMENT

In case hiring services are provided for part of calendar month, during the normal contract period and the extended periods, pro- rata payment of monthly hiring charges for the utilised numbers of days shall be made by BHEL.

Pro-rata rate shall be calculated as under:

BHEL-PSWR

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VII: Terms of Payment

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❖ Pro-rata daily rate = accepted monthly hire charges divided by 30

7.2 Mode of Payment and measurement of work completed

**Refer General Conditions of Contract**

7.3 **Extra Charges for Modification and Rectification:**

**There shall not any extra charges on any account.**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VIII: Taxes and Other Duties

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### 8.0 TAXES, DUTIES, LEVIES

#### 8.1.1

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

**However, provisions regarding Service Tax and Value Added Tax (VAT) on output services and goods shall be as per following clauses.**

#### 8.1.2 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on Services are excluded from contractor's scope; therefore contractor's price/rates shall be **exclusive** of Service Tax and Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate (presently 10.3 %) on the admitted bill value.

**Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by him or a person authorized by him in respect of taxable service provided, and shall contain the following, namely,**

- I. The name, address and the registration number of the contractor,
- II. The name and address of the party receiving taxable service,
- III. Description, classification and value of taxable service provided and,
- IV. The service tax payable thereon.

**All the Four conditions shall be fulfilled in the invoice before release of service tax payment.**

**Wherever, more than one route/option are available for discharge of service tax liability under a particular service, (e.g. "works contract Service"), contractor shall obtain prior written consent from BHEL site before billing the amount towards Service Tax.**

#### 8.1.3 VAT (Sales Tax /WCT)

As regards Value Added Tax (VAT) on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) applicable as per local laws, the price quoted by the contractor shall be **exclusive** of the same. Where such taxes are required to be paid by the contractor, this will be reimbursed on production of proof of payment made to the authorities by the Contractor. In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. The contractor has to take all necessary steps to **minimize tax on input goods** by purchasing the materials from any registered dealer of the concerned state only. In case contractor opts for composition, it will be with the prior express consent of BHEL. Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VIII: Taxes and Other Duties

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

### 8.1.4 Modalities of Tax Incidence on BHEL

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

### 8.1.5 New Taxes/Levies

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

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

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

### 8.1.6 Submission of Periodical Reports

Contractor shall submit periodical reports in respect of following aspects of operation:

- 1) Consumption of welding electrodes and gases
- 2) Consumption of construction power
- 3) Manpower reports
- 4) Daily and Monthly Progress reports
- 5) Field calibration reports

BHEL at site will inform formats for these reports.

**8.1.7** It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. Necessary coordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours

**8.2 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998.**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VIII: Taxes and Other Duties

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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:-

- i. 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.
- ii. 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 the extant of work involving building or construction workers engaged by the contractor within a period of one month from the receipt of payment.
- iii. 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.
- iv. 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.

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter-IX : LIST OF STANDARD APPLICABLE FOR 11/0.433**  
**KV CONSTRUCTION POWER**

Sl.No	IS No. and Amendment	IEC PUB	Description
01	585/1962 Amd 1,2,3	38/1967	AC transmission line
02	1818/1972 Amd.1 to 6	129/1961	Ac current Isolators & earth switch
03	2607/1967	129/1986	AB isolator upto 1000 volts
04	2099/1986 Amd. 1to 4	137/1962	HV porcelain bushing
05	3347/1965 & 67		-----Do----- for transformer
06	4257/1967		-----Do-----clamping arrangement for transformer bushing
07	2516/1985		Ac Circuit breaker < 1000 volts
08	398/1976	209	ACSR conductor
09	2121/1962 Part 1 to 5		Fittings for ACSR conductor & over head line accessories
10	3835/1966		Aluminiumised steel core wire for AL conductor
11	2147/1972	144/1963	LT SWGR enclosure
12	4237/1967		LT SWGR <1000 volts
13	3427/1069		SWGR >1000 volts
14	6262/1971		Di-electric for Ins.oil
15	6209/1971		Distribution pillar <1000 volts
16	3043/1966		Earthing
17	5792/1970		HT fuses
18	4770/1968		Rubber gloves
19	335/1983		Ins. Oil for transformer & SWGR
20	731/1971		Porcelain Insulators for O/H lines.>1000 volts
21	1445/1977		Porcelain Insulators for O/H lines.<1000 volts
22	2486/1963 part 1 to 4		Insulator fitting for O/H lines >1000 volts
23	2544/1963		Porcelain post insulators 3.3 KV and above.
24	3188/1980		Disc Insulator/string insulators for O/H line
25	5613/1970 Part 1 to 4		Installation & maintenance of O/H lines
26	5216/1982 Part 1 & 2		Safety procedure in electrical works
27	375/1963		SWGR
28	3072/1965		SWGR Installation & Maintenance
29	4067/1967		Normal duty AB switch up to 1000 volts
30	1886/1967		Installation & Maintenance of Transformers
31	2026/1962 Part 1 to 4		Power transformers
32	3639/1966		Fitting & accessories of power transformer.
33	3043		Earthing.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-X : (A) LIST OF DRAWINGS FOR TENDERING PURPOSE

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SN	Description	Drawing No
01	General layout arrangement	PMX/DHJOI-CPS/877/CP/001

**NOTE: -The above listed drawings are suggestive for tendering purpose and not to be considered as final. Actual layout and arrangements shall depend on job requirement.**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-X : (A) LIST OF DRAWINGS FOR TENDERING PURPOSE

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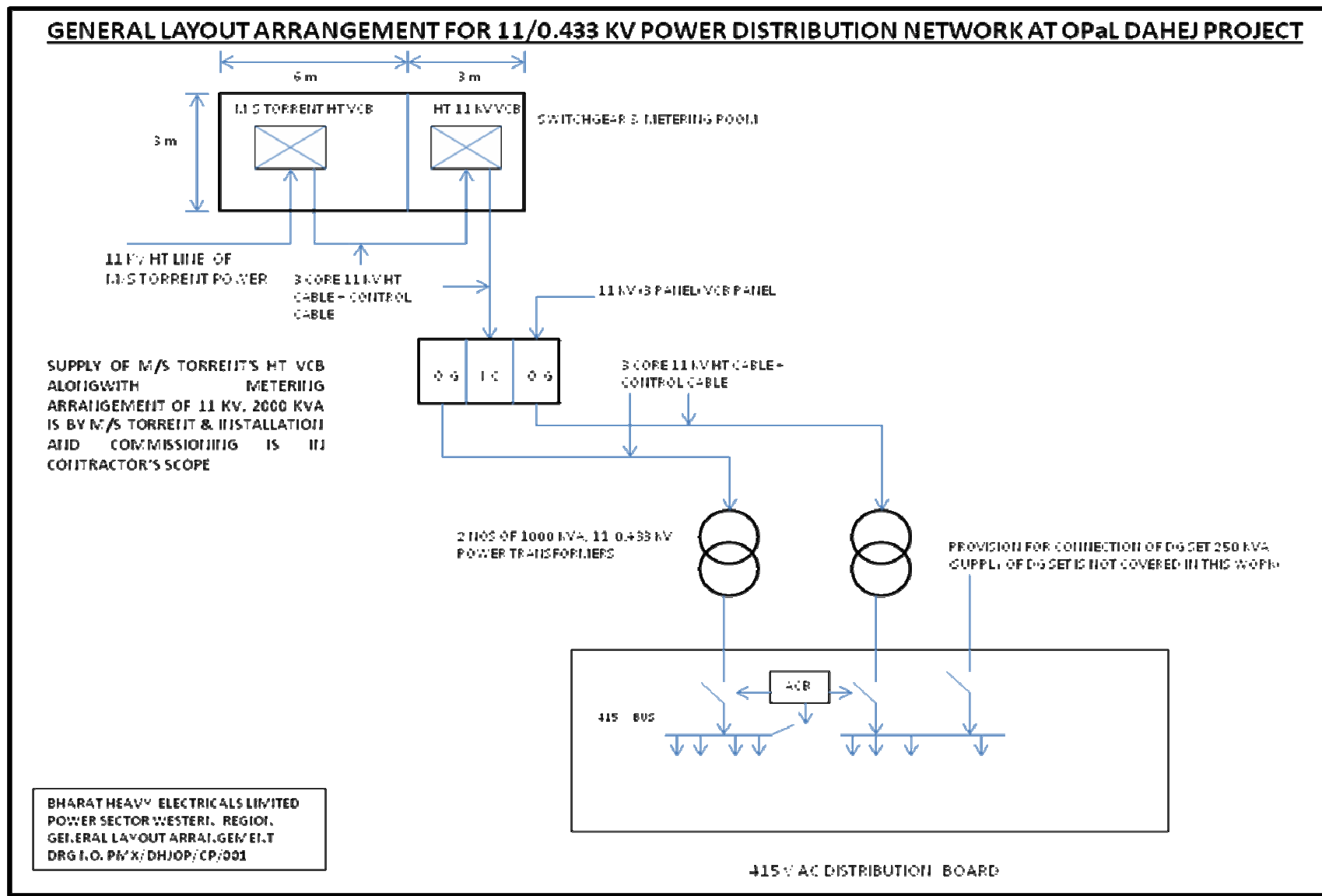
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BHEL-PSWR

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-X : (A) LIST OF DRAWINGS FOR TENDERING PURPOSE

PMX/DHJOP/CP/001



BHEL-PSWR

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-X : (B) BILL OF QUANTITIES

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### **BRIEF DESCRIPTION OF WORK IN BIDDER'S SCOPE COVERED UNDER "BOO" (Build, Own & Operate Basis)**

1. M/s Torrent Power shall provide construction power of 2000 KVA at 11 KV alongwith a vacuum circuit breaker and energy meter.
2. Bidders shall arrange following items at his own cost under "BOO" scope:
  - a. 11 KV vacuum circuit breaker indoor type capable of handling 2000 KVA of power supply.
  - b. Construction of a switchgear and metering room of dimensions 3m(H) x 9m(W) x 4m(D) to accommodate M/s Torrents as well as bidders 11 KV breaker.
  - c. HT 11 KV XLPE & control cable from M/s Torrents circuit breaker to bidder's circuit breaker.
  - d. HT 11 KV XLPE & control cable from bidder's circuit breaker to 2 nos of 1000 KVA transformers, tentative route length is approximately 550 meters.
  - e. 2 nos of 1000 KVA power transformer 11/0.433 KV, Dyn11, ONAN cooled with OFF-LOAD Switch (off circuit tap changer) designed for +/- 5% in steps of 2.5%, winding temperature, oil temperature & Buchholz protection, ammeter with selector switch. 2 neutrals-one for solid earthing & other one for 415 V distribution board – 3 phase, 4 wire.
  - f. 3 Nos of 11 KV vacuum circuit breaker panel (one I/C, 2 O/G).
  - g. LT power cable between transformers and their respective 415 V ACDB's
  - h. 2 nos of 415 V LT power distribution board 3 phase, 4 wire system. It should have provision for the following:
    - i. Air circuit breaker fixed/ draw out type on incomer, rating should be selected in consideration of 11/ 0.433 KV transformer. It should have provision for over current and earth fault with adjustable range.
    - ii. It should have provision for measurement of current & voltage, energy meter on LT incomer.
    - iii. Outgoing feeders on LT side should mould case circuit breaker of different rating with short circuit/ over current/ earth fault protection. 100 Amps- 2 Nos, 200 Amps – 8 Nos, 300 Amps – 2 Nos, 400 Amps – 8 Nos.
  - h. 415 V ACDB system shall be designed for 415 V, 1600 A, 50 Hz, 50 KA, 3 phase, 4 wire system with variation in voltage +/- 10%, frequency +/- 5, Combined voltage – 10%
  - i. 415 V ACDB should be planned for outside location and DB shall be suitable for outdoor duty with suitable canopy.
  - j. Secondary connection from transformer shall be by Bus Duct arrangements as per approval of customer & their consultant in consultation with BHEL engineer at site.
  - k. 11 KV cable shall be XLPE insulated, armoured and aluminium cables.
  - l. The interlock between 11KV feeder breaker of M/s Torrent and 415 V LT ACB (of contractor) shall be as per the requirement of M/s Torrent.
  - m. 11 KV system designed & offered should match the requirement of 11 KV short circuit level of 40KA for 3 seconds.
  - n. All outdoor sub-station shall be with earthing layout, lighting layout requirements as per statutory rules & regulation requirements.
  - o. Power factor improvement capacitors shall be provided at 415 V level so that PF shall be maintained at 0.95 at all times.
  - p. Safety appliances and fire fighting equipments shall be provided as per statutory requirement.
  - q. System shall be equipped with energy metering and measuring arrangements at LT side.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-X : (B) BILL OF QUANTITIES

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3. As an additional information, the switchgear and metering room is at about 550 meters HT cable route length from installation location of power transformer and LT cable distance between power transformers to ACDB's/ Bus duct shall be as per actual layout arrangements at site. The actual length requirements of HT & LT cables shall be as per requirements of actual layout arrangements at site as approved by customer. Contractor shall visit the site, discuss with M/s Torrent, BHEL engineer incharge and customer at site and ascertain the same for designing the layout, installation and offering for lease. Routing of HT & LT cables shall include underground routing. Routing through cable trays and overhead structure with all arrangements and works required is under vendor' scope.
4. There shall be the provision of bus coupler and breaker arrangements in construction power arrangements of contractor for connection of 250 KVA DG set sources for emergency supply.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-I General

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#### **GENERAL REQUIREMENTS – COMMON TO ALL WORK**

##### 1.1

The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the Contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

##### 1.2

The terminal points decided by BHEL shall be final and binding on the Contractor for deciding the scope of work and effecting payment for the work done.

##### 1.3

The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The Contractor and his personnel shall cooperate with personnel of BHEL, BHEL'S Customer, Customer's consultants and other Contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

##### 1.4

The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The Contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The Contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

##### 1.5

Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

##### 1.6

All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory/ local authorities are to be arranged by the Contractor at his cost in time to ensure smooth progress of work.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-II: Detailed Technical Requirement

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#### 2.0 TECHNICAL FEATURES OF THE CONSTRUCTION POWER DISTRIBUTION NETWORK

2.1 BHEL intends to avail the services of complete power distribution network on hire basis which includes 11 KV XLPE cabling from 11KV Vacuum Circuit Breaker & 2 Nos of 11/0.433 KV step-down transformers of rating 1000 KVA, 11/0.433 KV.

2.2 From 11KV breaker, cabling connection shall be made to breaker panel and from breaker panel it will be connected to 2 Nos of 11/0.433KV, 1000KVA step down transformer and then to 415 Volt ACDB with metering & protection arrangements. The LT connection between the Construction Power Transformer, Incomer Feeders, and AC Distribution Boards shall be Cables / Bus-bars connections as per recommendations of BHEL/client/ consultant of client.

HT & LT Cabling work shall include the laying of under ground cable, routing of cable through as per actual site cable routing layout requirement. Vendor shall arrange all required arrangements / materials and works for under ground cabling, routing as scope of work for offering the systems on Hire basis.

2.3 Bidder shall provide complete 11/0.433 KV, Dyn11, 2000 KVA, ONAN cooled step down transformer substation along with associated LT distribution boards with their respective civil foundations, Control Room, Metering & Protection equipments / systems, earthing and HT/LT power cabling with supporting arrangements etc. on monthly hire charges basis including operation and maintenance. All the equipments and components required for entire systems, installation, erection, commissioning and operation & maintenance shall be in bidder's scope.

2.4 ***Bidder shall source the required equipments and accessories of reputed make and the equipments/components shall conform to BIS specification. Bidder shall ensure technical requirement of 11/0.433KV, 1000KVA power transformers, 11KV Vacuum Circuit Breaker, 11KV Breaker panel, Capacitor Panel for Power Factor improvement and 415 Volt AC Distribution Boards as per detail given in the tender specification vide clause no. 2.7 Bidder shall also ensure trouble-free operation and specified availability of equipment/system for use at site, failing which LD/Penalty as stipulated elsewhere in this Tender Specification shall be levied.***

2.5 **The contract period, duration of Hiring period, price variation, extension of hiring period etc shall be as indicated in Chapter-VI. Terms of payment shall be as indicated in Chapter-VII.**

2.6 The installation shall be conforming to the statutory requirement and as per as applicable Indian Standard Specifications. The services shall also include Operation & Maintenance of the equipments / arrangements provided by bidder with all consumables, spares and upkeep and break down maintenance of the Substations.

#### 2.4 OTHER TECHNICAL REQUIREMENT FOR HIRING OF 11/0.433KV- 2NOS TRANSFORMER SUB STATION, DISTRIBUTION BOARDS & ASSOCIATED EQUIPMENTS

2.4.1 All the Civil works including providing the required materials for civil works, as required for substations and associated equipments given on lease shall be arrangement/made by the contractor under this scope of work.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-II: Detailed Technical Requirement

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- 2.4.2 The substation area shall be fenced as per Indian electricity rules & regulation and shall have provision of lockable door. Fencing shall be of chain link wire mesh on mild steel angle iron posts to a height of not less than 2500 mm. The 11/0.433 sub-station area shall be graded and sloped to prevent any water stagnation of rainwater. Surface shall be covered with ballast of 15 to 20 mm size.
- 2.4.3 Earthing of all the sub-station equipments shall be carried out as per is: 3043. Earthing system shall consist of number of earth electrodes of 40 mm dia. galvanised steel pipe, buried in earth pit.
- 2.4.4 Transformer sub-station shall have minimum two-earth electrodes/ pit for natural earthing, two electrodes for body earthing and two electrodes for lighting arrestor earthing.
- 2.4.5 All non-current carrying metal parts shall be connected to earth system at two points, each of 100 % rating. Metallic supports, fencing, etc. shall be connected to earth system.
- 2.4.6 Bidder shall submit the substation layout drawing and install the substation in accordance with IE Rule and other statutory requirements. It is the responsibility of contractor to get the installation certified by appropriate statutory authority. All the expenses towards the statutory approval shall be borne by bidder.
- 2.4.7 Bidder shall have to visit site as pre requirements, discuss with client & client's consultant and BHEL site In-charge and finalise the scheme, arrangements & layout for Construction Power at site.
- 2.4.8 Bidder shall maintain adequate inventory of spares and consumables at site for regular, preventive and break down maintenance and day-to-day upkeep of the substations.
- 2.4.9 Bidder shall have to provide adequate fire protection arrangements such as Fire extinguishers & Sand Buckets as per relevant standard specification and Industrial/factory Safety rules & regulations and requirement of customer.
- 2.4.10 In case of non-availability of construction power equipment for use due to breakdown/ failure attributable to the contractor, he shall restore it within the shortest possible time. BHEL will allow a maximum of 24 hours time in one calendar month per substation for preventive cum breakdown maintenance. Preventive maintenance shall be scheduled with prior consent of BHEL site in charge. No recoveries will be made from the agreed monthly hire charges for such purpose up to the duration of 24 hours per month per substation.
- 2.4.11 In case the breakdown/ non-availability duration extends beyond 24 hours in a calendar month, recoveries shall be made at the rate of 1½ times the pro-rata hourly rate. Pro-rata hourly rate will be calculated as under.

**PRO-RATA HOURLY RATE = AGREED MONTHLY HIRE CHARGES PER SUBSTATION  
DIVIDED BY 720**

- 2.4.12 However recoveries shall not be made in case reason is not attributable to contractor for non availability of power in the event of power failure from source.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-II: Detailed Technical Requirement

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- 2.4.13 During the contract period including the extended period if any, the ownership of entire system shall lie with the bidder.
- 2.4.14 Contractor shall dismantle and take back the equipment at the end of contract period at his own cost. Bidder shall also dismantle the civil works done by him for the substations and leave the area level and absolutely clear of any kind of garbage/debris/scrap.
- 2.4.15 Bidder shall arrange entry permits as per prevailing sale tax law in the state of Gujarat and tax liability shall be borne by the Bidder.
- 2.4.16 Bidder shall arrange at insurance cover at his own cost for his materials, substation installation, manpower deputed for operation & maintenance.
- 2.4.17 The monthly hiring charges shall be inclusive of the detail scope of work as above, entry tax, service tax and all other applicable taxes.
- 2.4.18 The contractor shall operate and maintain the substations round the clock 24 Hours in two/three-shift operation as per the instruction of BHEL Engineer In-charge. Contractor shall deploy adequate electricians and helpers in each shift for uninterrupted operation & Construction Supply. Electrician should have valid license for handling 11KV HT installation. In addition to shift operation, the contractor shall deploy a supervisor for over all co-ordination purpose.
- 2.4.19 Various parameters of the system e.g. Recording of loads on individual substations, transformers oil temperature and oil level in transformers, healthiness of the system on day to day basis.
- 2.4.20 During this period, various reports have to be generated and records maintained as per the requirements of BHEL. The engineer will specify the formats for these at site.
- 2.4.21 Sub-contractors of customer and BHEL will draw power from LT distribution boards at various locations. Contractor shall co-ordinate and assists them in terminating the cables, issue of permit for work and other work related to drawl of construction power by these agencies.
- 2.4.22 Contractor shall intimate BHEL engineer immediately on notice any thing adverse and critical in the system, which requires immediate attention.
- 2.4.23 All work, including preventive and breakdown maintenance period, in the system shall be taken up only after obtaining necessary permit/ clearance from BHEL engineer.
- 2.4.24 Bidder shall procure and arrange the inspection themselves for other items from BIS approved source / make.
- 2.4.25 If Bidder is failed to provide the services as per tender specification, BHEL will take suitable action at contractor's risk and cost.
- 2.4.26 The terminal points as decided by BHEL shall be final and binding on the contractor.
- 2.4.27 Erection of the total system shall be done in stages. 2 nos. of 11/0.433KV Transformer & other accessories shall be erected & commissioned depending on the Electrical Supply connection approval from Gujarat state statutory authority. Erection & commissioned shall be done for entire system with the temporary supply from site. The connection with M/s Torrent Power shall be made after duly approval by statutory authorities.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-II: Detailed Technical Requirement

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#### **2.4.29 OPERATION AND MAINTENANCE OF CONSTRUCTION POWER DISTRIBUTION SYSTEM**

Contractor shall operate and maintain the installations regularly. Contractor shall attend the break down and replace the defective items, equipments, components including cables etc. promptly. Failing which BHEL will get the same done at the risk and cost of the contractor.

Contractor shall take special care for selection, laying/installation of cables to provide satisfactory & un-interrupted Construction Power supply. For any failure of Cables, contractor shall promptly replace / rectify the faulty / defective cables.

Operation, Maintenance and Upkeep of the entire system including requisite manpower, T&Ps, consumables, spares from the day of installation & commissioning of system till completion of contract period including extended period shall form part of scope of work.

The hiring period of complete system in integrated operational condition shall commence from date of successful commissioning & charging of system for regular operation. The decision of BHEL Engineer In-charge at site to accept the date of successful commissioning shall be final and binding on Contractor.

#### **2.4.30 TIME SCHEDULE**

Bidder shall plan his activities such that the installation & commissioning of 11/0.433 KV, 1000KVA transformers substation and associated equipments shall be completed as per schedule given in Chapter-VI.

#### **2.4.31 DEMOBILIZATION OF INSTALLATION**

Bidder shall dismantle entire installation and remove all materials, scrap and debris from the project premises. The land shall be levelled and consolidated as a part of the work while handing over back to BHEL/Client. Bidder shall take back all the material at his cost.

BHEL will serve one month's advance notice for withdrawal of the construction power distribution system.

#### **2.5 TECHNICAL REQUIREMENT 11/0.433 KV, 1000KVA- 2 Nos DISTRIBUTION NET WORK & TRANSFORMER SUB-STATION**

2.5.1 The information herein is not intended to list the complete technical requirement. It is only for general information. However, contractors have to visit the site, discuss with M/s Torrent Power and BHEL site in-charge, and make their own study / assessment of work & requirement prior to

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Part II: Technical Specifications

### Chapter-II: Detailed Technical Requirement

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submission of offer. Omissions from mention of any/all equipment, material, services etc; herein shall not relieve the contractor from providing all such equipment, materials, services etc within the quoted rates.

- 23.5.2 Bidder shall make necessary arrangement for receipt, handling at stores and work site, transport to work site, erection, fabrication, civil work, testing and commission of entire system.

#### **2.5.3 APPLICABLE STANDARDS FOR INSTALLATION:**

The installation shall be done conforming to Indian Electricity Rule/Act with all the safety provision. Experienced persons shall be deployed for installation, commissioning and maintenance purpose. Contractor shall deploy only licensed electrician for the installation and commissioning work.

- 2.5.4 Bidder shall design and carry out preparation of layout, sub-station drawing etc. taking into account the statutory requirements and clearances etc as per latest Indian Electricity Acts and Rules including amendments thereof.
- 2.5.5 All incidental civil works e.g. grouting of poles/stays/ posts, foundations, civil foundation work, Canopy/covering, including necessary earthwork like excavation and backfilling, provision of all requisite materials like cement, sand & grit, reinforcement steel, T&P, shuttering etc. are in scope of contractor.
- 2.5.6 Contractor shall obtain approval from appropriate statutory authority for the installations, at all stages including the renewal etc as per requirement. Contractor shall bear all the statutory fees/levies/ charges in connection with the approval of installations.
- 2.5.7 The work covered under this specification is of high voltage 11/0.433 KV system, requiring the best quality of workmanship, engineering and construction management. The contractor shall execute the entire work according to most modern and proven techniques and codes. The omission of specific reference to any method and/or equipment or materials necessary for the proper and efficient services in connection with this work shall not relieve the contractor of the responsibility of providing such services, facilities etc.
- 2.5.8 The contractor should ensure timely completion of work. Parallel and simultaneous working in multiple fronts will be required to meet the schedule. The contractor must deploy adequate quantity of tools, & testing instruments along with manpower. He must also have on his rolls adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. Contractor shall deploy the manpower as instructed to match the work requirement.
- 2.5.9 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site including the space constraints. 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.
- 2.5.10 All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.

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- 2.5.11 Contractor shall be holding valid (at least up to Due Date of Tender Submission) 'A' class license as electrical contractor, copy of which should be furnished along with the offer. If the license is of state other than Gujarat, then he will have to obtain electrical license/permission from appropriate authority as may be applicable after award of the work.
- 2.5.12 If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost.
- 2.5.13 Bidder shall maintain adequate inventory of spares and consumables at site for regular, preventive and break down maintenance and day-to-day upkeep of the substations.
- 2.5.14 In case of non-availability of any substation due to breakdown/failure attributable to the contractor, it shall be restored by him within the shortest possible time.
- 2.5.15 During the contract period including the extended period if any, the ownership of substations shall lie with the bidder.
- 2.5.16 Bidder shall arrange entry permits as per prevailing sale tax law in the state of Gujarat and tax liability shall be borne by the Bidder.
- 2.5.17 Bidder shall arrange at insurance cover at own cost for his material, substation installation, manpower deputed for operation & maintenance including the third party liabilities.
- 2.5.18 The contractor shall operate and maintain the substations round the clock 24 hours in three-shift operation as per the instruction of BHEL Engineer In-charge. Contractor shall deploy one electricians and one helpers (total 6 nos) in each shift for uninterrupted operation. Electrician should have valid license for handling 11KV HT installation. In addition to shift operation, the contractor shall deploy a supervisor- 1 no for over all co-ordination purpose.
- 2.5.19 Various parameters of the system e.g. Recording of loads on individual substations, transformers oil temperature and oil level in transformers, healthiness of the system on day to day basis.
- 2.5.20 During this period, various reports have to be generated and records maintained as per the requirements of BHEL. The engineer will specify the formats for these at site.
- 2.5.21 Contractor shall intimate BHEL engineer immediately on notice any thing adverse and critical in the system, which requires immediate attention.
- 2.5.22 All work, including in preventive and breakdown maintenance period, in the system shall be taken up only after obtaining necessary permit/ clearance from BHEL engineer.
- 2.5.23 Miscellaneous items and works not specifically described herein but required for transmission line and substations shall be provided as per relevant IS and REC Specifications & Construction Standards and shall constitute part of contract.
- 2.5.24 On completion of the works, the contractor shall clear away and remove from the site all his equipments, surplus materials, rubble/ debris and temporary works of every kind and leave the whole of the site and works clean to the satisfaction of BHEL.

## **2.6 GENERAL GUIDE LINES FOR EXECUTION OF WORK**

### **2.6.1 11KV HT & 415 VOLTS LT CABLING REQUIREMENT**

The cable installation including necessary joints shall be carried out in accordance with the specification IS 1255-1967

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Cable route shall be decided prior to cable laying work is under taken. While shortest possible route should be referred, cable runs shall generally follow fixed development such as road, foot paths etc; with proper off set so that future maintenance, identification etc. are rendered easy.

While selecting cable route, corrosive soils, surrounding sewage effluent etc. shall be avoided, where this not feasible, special precaution as decided by Engineer-In-Charge, particularly for HV cable, shall be taken.

Power and communication cable shall be as far as possible cross at right angles. Where power cables are laid in proximity to communication cables to horizontal and vertical clearance shall not normally less than 60 cm.

During the preliminary stages of cable laying, consideration should be given to proper location of the joint position so that when cable is laid the joints are made in most suitable places. As far as possible water logged location, carriageways, pavements, proximity to telephone cables, gas to water mains, inaccessible places, ducts, pipe racks etc, shall be avoided for joint position.

#### 2.6.2 CABLE LAYING DIRECT IN GROUND

The method shall be adopted where the cable route is through open country, along road / lanes etc, and where no frequent excavations are encountered and re-excavation is possible without affecting the other work.

**Width of Trenches:** -The minimum width of trench for laying single cable shall be 35 cms. Where more than one cable are to be laid in the same trench in horizontal formation, width of trench shall be increased such that the inter axial spacing between the cables, for 415 volts shall be 20 cms, and for 11 shall be 35 cms; to be maintained.

**Depth of Trenches:** - Where cables are laid in single formation, the total depth of trench shall not be less than 75 cms for cable up to 1.1 KV grade and shall not less than 120 cms for cable above 1.1 KV grade. When ever more than one tires formation of cable is unavoidable and vertical formation is adopted, the depth of trench shall be increased by 30 cms for each additional tire to be formed.

**Excavation of Trenches:** - The trenches shall be excavated in reasonably straight lines. Wherever there is change in direction, the minimum safe bending radius for all type of PVC cables shall be 12 times the overall diameter of the cable. A larger radius shall be adopted at joints and termination; it shall not be less than 15 times of its overall diameter.

Adequate precaution shall be taken while excavation of trenches to avoid damages to existing cables, pipes or such installation in the proposed route during excavation. Where-ever bricks, tiles or protective covers or bare cables are encountered, further excavation shall not be carried out without the approval of Engineer –In-Charge.

Where there is any danger of trench collapsing /endangering adjacent structures, the side should be well shored up with timbering and or sheeting as excavation process. This should be followed back filling wherever necessary.

The bottom of the trench shall be level and free from stone, brickbats etc. The trench shall be provided with a layer of clean and dry sand cushion of not less than 8 cms in depth.

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#### 2.6.3 Laying of cables in Trenches:-

Continuity and insulation measurement test shall be performed for cable core before and after laying in the trenches, if any abnormality is observed, the same shall be brought in notice of Engineer- in -Charge. End of the cables shall be sealed with suitable moisture seal tape in case of PVC cables and XLPE cables shall be sealed with end seal caps.

Cable laid in trenches in single tier formation shall have covering of clean dry sand of not less than 17 cms above the base cushion of sand before the protective cover is laid.

In case of vertical multi tier formation after the first cable has been laid, a sand cushion of 30 cms shall be provided over the initial bed before the second tier is laid. If additional tiers are formed, each of the subsequent tiers also shall have sand cushion of 30 cms as stated above. The top most cable shall have final sand covering not less than 17 cms before protective cover is laid.

**Protective Covering:** - Unless otherwise specified, the cable be protected by B class/ second class brick of not less than 20cms x 10 cms x 10cms (nominal size) as per CPWD building specification or protective cover placed on the top of the sand and both sides of cable (bricks shall be laid breadth wise for cable top protection / height wise for cable side protection) for full length of cables to the satisfaction of EIC. Where more than one cable is laid in the same trench, this protective covering shall cover all the cables and projects at least 5 cms over the sides of the end cables. A layer of bricks shall be laid in between two cables when more than one cable is laid in same trench.

**Back filling:** -The trenches shall be than back filled with excavated earth free from stones or other sharp edged debris and shall be rammed and watered, if necessary, in successive layer not exceeding 30 cms, unless otherwise specified. A crown of earth not less than 50 cms in the centre and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of earth however should not exceed 10 cms so as not to be hazard to vehicular traffic. The temporary reinstatements of road ways should be inspected at regular intervals, particularly during wet weather and any settlement should be made good by further filling as may be required.

Where road berms or lawns have been cut or kerbed stones are displaced, the same shall be repaired and made good except/ turning / asphaltting.

**Route Marker:** -Route marker shall be provided along straight runs of cables and at change in direction locations as approved by EIC and in general at intervals not exceeding 100 meter in straight run.

Route marker shall be made out of 100 mm x 100 mm x 5 mm GI/ Aluminium plate bolted or welded on 35 x35 x6 mm MS angle iron of 600 mm long. Such route marker shall be mounted and grouted parallel to and 0.5 meter away from the side of trench.

The word "Cable" and voltage grading, size of cable shall be inscribed on the marker.

**Three Core XLPE Cable:** - Three core cables for three-phase circuit shall normally laid on close trefoil formation and shall be bounded at interval of 1 meter. The relative position of the three cables shall be changed at each joint, complete transposition being effected in every three consecutive cable lengths. The joints shall be marked in an approved manner to indicate the

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circuit and phases. The arrangement for laying a number of parallel cables shall be detailed of IS 1255-1967.

**Cable laying in pipe:** In location such as road crossing, entry to building, on poles, in paved area etc. cable shall be laid in pipe.

Stone ware pipe, GI /CI or spun reinforcement pipe shall be used for such purpose. The size of the pipe shall be not less than 10 cms dia for single core cable and not less than 15 cms for more than one cable in a pipe. This pipe shall be laid directly in the ground without any special bed except for SW pipes which shall be laid over 10 cms thick cement concrete 1:5:10 bed. No sand cushion or tiles shall be used in such situation, unless otherwise specified. The top surface of pipe shall be at minimum depth of 1 meter from ground level when laid under road, pavements etc.

Loops in Cable: - Approximately 3 meter of surplus cable shall be left at each end of cable and on each side of under ground joint. Surplus cable may be left in form of loop.

#### 2.6.4 CODES & STANDARDS

All the equipment and system installation shall be confirming to relevant Indian standards, Indian electricity Rules/Acts etc. Suggestive List of such standards is furnished in Appendix-III.

#### 2.6.5 TESTING AND COMMISSIONING

Prior to commissioning and energizing of system, following tests shall be carried out:

- 1) Insulation Resistance measurement.
- 2) High Voltage test on HT cables.
- 3) Earth Resistance Test
- 4) Mechanical Checks of Overhead lines and all associated components.
- 5) Any other check/test necessary to ensure desired quality of installation as per Codes and FQP and safe operation of the system.

#### 2.6.6 Miscellaneous items and works

Miscellaneous items and works not specifically described herein but required for completion of system and substations shall be provided as per relevant IS and REC Specifications & Construction Standards and shall constitute part of scope of contract.

#### 2.7. BRIEF TECHNICAL DETAILS POWER DISTRIBUTION TRANSFORMER, SUB STATION & 415 VOLT AC DISTRIBUTION BORAD.

##### 2.7.1 DISTRIBUTION TRANSFORMER

The distribution transformer shall be oil immersed, natural air cooled, 3 phases, 50 HZ, out door type, conforming to IS 2026. 2 nos. of 11KV/415V.500KVA, Vector group, Dyn11, Neutral solidly earth. The transformer will have 2 neutrals (One for solid earthing and the other one for 415 V Distribution Board 3 phase, 4 wires.

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The transformer shall be capable of being loaded in accordance with IS 6600 upto 150%. There shall be no limitation imposed by bushing, tap changer etc. The transformer shall be capable of being operated without danger on any tapping at rated KVA with voltage variation of +10% corresponding the voltage of the tapping. The transformer and all accessories shall be capable of withstanding for two seconds any external short circuit at bushing terminals without any damage. The maximum flux density in any part of the core and yoke at nominal voltage and frequency shall be such that the flux density on any tap position with 10% voltage variation from voltage corresponding to the tap shall not exceed 1.9 wb/m<sup>2</sup>.

Cores shall be constructed from high grade, cold rolled, non-aging grain oriented silicon steel lamination. The insulation structure for the core to bolt and core to clamp plate shall be capable of withstanding shocks during transport, installation, and service.

Winding shall be of fully insulated electrolytic grade copper winding and connection shall be adequate braced to withstand shocks during transportation and short circuit condition.

The tank shall be conventional type, fabricated from commercial grade low carbon steel. All bolted joints shall be fitted with oil tight gaskets. It shall be designed to with stand mechanical shocks and short circuit forces. All accessories such as pressure relief valve, air vent plugs, filling & drain valve, lifting lugs, thermometer pockets, conservator tank, air breather, radiators etc to be provided.

The transformer shall be provided with 3-phase hand operated off circuit tap change switch. The mechanism shall be complete with tap position indicator, direction of operation, warning plate & mechanical stop to prevent over cranking. Suitable pad lock arrangement shall be provided in any working position.

Transformer HT bushing shall be solid porcelain type confirming to IS 2099 & 8603. It should be suitable for ACSR conductor.

Suitable cable box shall be provided on HV / LV side. In addition to neutral terminal, an addition provision shall be provided on the tank for earthing of LV winding neutral.

General Technical Particulars are as under.

1.	Rated Out put	1000 KVA, 3ph, 11/0.433 KV, ONAN cooled
2.	Voltage Ratio	11/0.433 KV
3.	Type	Two winding (Electrolytic grade copper)
4.	Temp. Rise Winding	55 Deg C
5.	Temp. Rise Top Oil	50 DegC
6.	Impedance at 75 Deg C & permissible tolerance	As per IS 2026
7.	Fault level of system	As per IS 2026
8.	Vector group	Dyn11
9.	Winding Connection/ Nominal System Voltage(KV)	As per IS 2026
10	One minute power frequency withstand voltage (KV) rms	As per IS 2026

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11	Lighting impulse withstand voltage (KV) peak	As per IS 2026
12	Insulation Neutral	As per IS 2026
13	Tap Changer	Off circuit tap change switch on HV winding with range of +/- 5% in steps of 2.5 %
14	Phase Bushing Rated voltage (kV) Rated Current (Amp) Minimum Creepage distance (mm) Basic impulse level (kV)peak	As per IS 2026 As per IS 2026
15	Neutral Bushing Rated Voltage (kV) Rated Current (Amps)	As per IS 2026
16	HT & LT Termination	Suitable Cable Box to be provided on HT /LT side. Suitable size cable type XLEP may be selected as per to meet the load / system fault level.
17	Variations to be considered	Voltage-+/-10% Frequency-+/-5% Combined variations-10%
18	Short Circuit level to be considered	40KA for 3 seconds
19	Protections to be incorporated	1. Composite Numerical transformer protection relay including Over current, Earth fault and Under Voltage, Winding temperature, Oil temperature and Buch holtz protection.

#### 2.7.2 LT DISTRIBUTION OUTDOOR KIOSK (Suitable Covered shed is required)

Distribution boards shall be suitable for 415 volts, 3-phase, 4-wire 50 Hz system. The board shall be designed for continuous operation at maximum ambient temperature of 50 deg C and maximum relative humidity of 100 %.

Distribution boards shall be free standing out door type, totally enclosed. Dust and vermin proof, CRCA sheet construction. Frame shall be fabricated out of 2 mm thick sheet steel and thickness of sheet steel enclosure shall not be less than 1.6 mm. Gland plate shall be removable type made of 3 mm thick sheet.

Distribution board shall be single front, fully compartmentalised, having uniform height of not more than 2100 mm. Operating handles shall not more than 1800 mm height. Board shall be provided with outer enclosure so that access to individual compartment, bus bar and cable alley shall be available only after the out door is opened.

It shall be provided with pad lock arrangement with hinged door, sloped canopy to prevent ingress of rain water, base frame mounting, Caution notice, earth bolts, lifting hooks, energy meter, phase indication lamps, voltmeter & ammeter with selector switch etc.

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All the cable entry shall be bottom only. All the doors and cut out shall be gasketed with neoprene/ synthetic rubber to give minimum protection of IP 55. Cable termination shall be suitable for terminating specified number of armoured aluminium cables as per the number of out going feeder asked for.

The board shall be provided with live, neutral earth bus bars. Individual out going feeders shall be tapped from vertical section bus bars. Vertical cables alley shall be provided covering entire height. Earth bus shall be of 50 x 8 mm GI strip/ welded framework of the panel at bottom through the length.

A minimum clearance in air of 25 mm shall be provided between phases and between phase and earth for horizontal & vertical run of bus bars, bus link connection to ACB & MCCBs. Bus bar shall be bare and supported with insulators of high strength moulded compound or equivalent. The bus bar and supports shall be designed for short circuit capacity of minimum 20 kA rms for 1 sec. Maximum temperature rise while carrying rated current shall not exceeded 40 deg. C above ambient of 50 deg. C.

Internal wiring shall be carried out with 1.1 KV grade PVC insulated flexible connection, stud type power terminal shall be provided.

The board shall be coated with two coats of primer after proper degreasing, picking, rinsing, phosphating and acid treatment. Two coats of synthetic enamel finish paint of shade 631 as per IS 5 shall be applied on panel exterior. Panel interior shall be painted with glossy white.

#### FEEDERS PARTICULARS FOR EACH FEEDER (2 Nos)

DESCRIPTION	QUANTITY	TECHNICAL DETAILS
Incomer Make – L&T or GE Power or Controls & Switchgears or Siemens	1No.	1600 Amps, 415 volts, TPN, Air Circuit Breaker, AC 3 pole with over current release, 3 Nos built in CTs, Earth fault release
Outgoing MCCB Make – L&T or GE Power or C&S or Siemens	1 No.	100 Amps, TPN, Moulded Case Circuit Breakers. Built-in over-current & short-circuit protection
	3 Nos.	200 Amps, TPN, Moulded Case Circuit Breakers.
	1 No.	300 Amps, TPN, Moulded Case Circuit Breakers.
	4 Nos.	400 Amps, TPN, Moulded Case Circuit Breakers.
Metering		Ammeter & voltmeter 96x96 mm flush mounted, CTR, Selector switch Energy meter 3-phase, four- wire at power measurement at incoming power. Phase indication lamp

#### 2.7.2.1 VACCUM AIR CIRCUIT BREAKER at 11 KV side

Circuit breakers shall be air break, three pole, horizontal, non-draw out type suitable for manual operation. Manual operating mechanism shall be spring charging stored energy type.

It shall have spring charging handle and push button for closing the breaker mechanically after the spring has been fully charged. . However closing by spring charging handle, after the spring is fully charged, shall also be acceptable. It shall be interlocked such that it shall not close unless the spring is fully charged. The closing action of the circuit breaker shall charge the spring, thus

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making it ready for tripping. Push button shall be provided on front of the panel to trip the breaker manually.

The circuit breaker shall be provided with short circuit release, over current & earth fault release. The tripping characteristic of breaker to provide satisfactory discrimination.

Rating	1600 Amps
Short Circuit Making Current	50 kA
Short time breaking capacity at rated voltage	20 kA
Short time with stand rating	20 kA rms for 1 sec.

#### MOULDED CASE CIRCUIT BREAKERS.

It shall be 3 pole, quick make, and quick break type with short circuit & over current release, manual closing / opening, automatic tripping under fault condition. Magnetic & thermal release shall be adjustable one.

Short time breaking capacity 20 kA at 0.25 PF at rated voltage.

Short time with stand rating 20 kA rms for 1 sec.

#### 2.7.3 11 KV GRADE HT XLPE SINGLE /MULTI CORE CABLE

11 KV (UE) grade power cable with stranded Aluminium Conductor, conductor screen, XLPE Insulation, insulation screen, Colour coded for phase identification extruded ST-2 PVC inner sheath, GI wire / strip armoured, FRLS outer sheath of ST-2 PVC-FRLS, conforming IS: 7098 Part -II (latest)

2.7.4 11 KV Breaker panel with one incoming and two outgoing panel shall be provided to take 11KV supply to 2 nos of 11/0.433KV, 1000 KVA transformers.

#### 2.7.5 LT POWER CABLE 1.1 KV GRADE

Power cable with stranded aluminium conductor (AYFY), PVC insulated, colour coded for phase identification, extruded PVC inner sheath, Copper armoured (YWY), FRLS outer sheath of PVC FRLS conforming to IS 1554(latest)

2.7.6 Capacitor panel for Power Factor improvement  
375 KVAR APFCR Panel shall be used for power factor improvement

2.7.7 11/0.433 KV transformers shall be of Voltamp or equivalent make, LTPCC and Distribution panel shall be supplied by CPRI approved fabricator

2.7.8 The make of supplies of various components /Parts /assemblies/Components shall be of reputed or renowned company and like transformer 11/0.433 KV Capacitor panel having switchgears of C&S/L&T or equivalent and Capacitor of Heavy Duty MPP of Epcos/Siemens make, APFCR relay of Trinity make

2.8

Contractor shall make own arrangement, for receipt, store, verification, safe custody, watch & ward and transportation of material from store to site, for the equipment is his scope.

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If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost.

#### 2.9 **Inspection and Acceptance of Components/Equipment:**

Contractor shall provide all the components as per specifications indicated herein. BHEL will carry out suitable stage inspection and final inspection before accepting the materials.