

**BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
SUBCONTRACTS MANAGEMENT
PLOT NO. 25, SECTOR 16A, NOIDA,
DISTT. – GAUTAM BUDDHA NAGAR (U.P.) - 201301**



TENDER DOCUMENTS

FOR

ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

CUSTOMER

M/s PUNJAB STATE POWER CORPORATION LTD. (PSPCL)

TENDER SPEC. NO.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26
DATE 17-01-2026

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
SUBCONTRACTS MANAGEMENT

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PLOT NO. 25, SECTOR 16A, NOIDA,
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REF No. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Date : 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

Dear Sir,

1 Sealed tender are invited for the following :

NAME OF WORK	TIME OF COMPLETION	EARNEST MONEY DEPOSIT	TENDER SUBMISSION DATE AND TIME	TENDER OPENING DATE & TIME
ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.	15 months from the date of LOI	Rs. 2,00,000/- As per Annexure to conditions of contract for ETC Works	02-02-2026 11.00 hrs.	02-02-2026 16.00 hrs.

2 Bidder has to submit offer directly through E-PROCUREMENT MODE. Bidder may visit <https://eprocurebhel.co.in>

Procedure for Submission of Tenders through e-tendering:

The tender is also floated online through our E-Procurement Site <https://eprocurebhel.co.in> . The bidder may respond by submitting their offer online in our e-Procurement platform at <https://eprocurebhel.co.in>

Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online EXCEPT EMD (which shall be submitted in physical form (as described in NIT cl. No.1) above as mentioned below:

a) Technical Bid (Un priced Tender)

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

- i) Earnest money Deposit (EMD) furnished in accordance with NIT Clause 4.0
- ii) Technical Bid (without indicating any prices).

- b) **Price Bid:**
- i) Prices are to be quoted in the attached Price Bid format online on e-tender portal.
 - ii) The price should be quoted for the accounting unit indicated in the e-tender document.
 - iii) Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
 - iv) A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
 - v) A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.
- c) Uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.
- d) Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

3 Tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described in Annexure to conditions of contract for ETC Works, which shall be part of the Technical Bid.

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

TO,
Ashok Kumar Meena
AGM (TBSM)
BHARAT HEAVY ELECTRICALS LIMITED,
TRANSMISSION BUSINESS GROUP,
4th Floor, BHEL SADAN, Plot no.: - 25, Sector- 16A, Noida,
Distt. – Gautam Buddha Nagar, UP-201301
TELEPHONE: 0120-2218640, 9831038136
E-mail: akmeena@bhel.in

- 4 Bidders may please note that no other mode of bid submission shall be considered for evaluation apart from Clause no. 02 to 03 mentioned above.
- 5 The prospective bidders who have downloaded the tender documents from our website are requested to send their acknowledgement and willingness to participate in the tender to the undersigned, through fax or email.
- 6 Offers should be strictly in accordance with the Tender Specifications and General Instructions to Tenderer enclosed herewith.
- 7 **BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders as per RA Guidelines.**
- Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their price bid along with applicable loading, if any, shall be considered for ranking.”**
- 8 The contractor shall give his explicit confirmation without any deviations to the HSE (Health, Safety and Environment) requirements as per enclosed specification No. TBSM/HSE/NIT-01, Rev-02 Date 31.01.2024. Contactors are also required to furnish details as per Annexure (HSE) to NIT along with their offer. Offers received without compliance & data about HSE requirements are liable to be rejected.
- 9 All documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder.
- 10 Clarifications, if any, can be obtained from the undersigned but such requests should be submitted well before the due date for submission of tenders. Due date for submission and opening of tenders will not be extended on such grounds.

- 11 Please note that wherever there is a contradiction between the **Annexure to conditions of contract for ETC Works and General Conditions of Contract for ETC Works (Document No. TB-ETC-GCC, Rev-02)** , the **Annexure to conditions of contract for ETC Works** clauses shall be governing and binding on the contractor."
- 12 Drawings & FQP enclosed with the NIT (if provided) are for tender purpose only. Drawings & FQP may get change during execution stage and work to be carried as per latest RFC drawings & Field Quality Plan (FQP).
- 13 Construction/ RFC drawing/ Fronts shall be furnished progressively as per project requirement and no claim towards idling charges/ project overheads etc. borne by the contractor on account of non-availability of drawings/ fronts shall be entertained.
- 14 Completion period of the work has been envisaged under best possible conditions. Any changes/ deviation during execution shall be dealt as per relevant clauses mentioned in general/ special conditions of contract for ETC works.
- 15 "In case this tender is awarded to first time contractor*, then the bidder shall be eligible to qualify for the next tender of similar work# of BHEL, TBG; only after successful executing of 50% (fifty percent) of this work prior to the date of next tender (in which bidder desires to quote) and on satisfactory performance feedback by BHEL site Incharge."

* First time contractor: The bidders who have not successfully executed more than 50% (fifty percent) of awarded similar work by BHEL (TBG/ ISG/Power Sector/Any BHEL Unit) in last 5 years from date of NIT.

The bidders who have taken any order from BHEL under 1st time category, and desires to further participate in BHEL tenders, needs to submit a certificate/ undertaking mentioning the reason of not executing 50% of awarded work, hence the criteria under 1st time bidder shall not be applicable to them. The certificate/ undertaking shall be duly certified by Site In charge of BHEL

Similar work: Similar to nature of work of the tender under consideration.

- 16 Before submission of offer, the tenderer is advised to inspect the work & the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, sourcing of material and labour, means of transport and access to site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge on any of these conditions/ resources.
- 17 The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.
- 18 Integrity commitment, performance of the contract and punitive action thereof:
- 18.1. Commitment by BHEL:
BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.
- 18.2. Commitment by Bidder/ Supplier/ Contractor:
- i) The bidder/ supplier/ contractor commits to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
- ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
- iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.
- If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www.bhel.com and/or under applicable legal provisions".
- 19 Also, offer of the bidders who are suspended (under hold/ delist) for business dealings by BHEL, TBG shall not be considered. Please note that lifting/ restoration of suspension (Ban/ Hold/ De-list) of business dealing is not automatic after expiry of specified suspension period. Hence, vendor shall be considered as suspended for business till suspension is lifted by BHEL in writing on specific request of the vendor as per extant guidelines.

- 20 BHEL Fraud Prevention Policy, "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."
- 21 Offers will be scrutinized based on the qualifying requirements and only those who are technically and financially capable to execute the Job and who fulfil the Pre-Qualifying Requirements (PQR) are eligible to quote against the above NIT. However, final acceptance of the bidder/ offer shall be subject to acceptance of our customer.
- 22 The evaluation currency for this tender shall be INR.
- 23 The Submission of EMD is compulsory for subject tender. In case requisite Amount of EMD not submitted by the bidder before tender opening or along with offer, the offer shall not be considered for evaluation and the offer shall be rejected.
- 24 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

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

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

- 25 Technical Bid will be opened in the office of undersigned. If required, technical discussions will be held with only those bidders who have taken any deviations. The price bids will be opened subsequently, after Technical Bids of all the bidders have been evaluated and frozen. Bidders should quote their most competitive rates as there will not be any price negotiation. However, if felt necessary by BHEL, price negotiation will be held with lowest bidder (L-1) only. IT WOULD BE PREFERRED THAT YOUR OFFER IS WITHOUT ANY DEVIATION w.r.t. TENDER SPECIFICATIONS AND THE SAME MAY BE CLEARLY MENTIONED ON THE COVERING LETTER ACCOMPANYING THE TECHNICAL BID. Offers with deviations are likely to be rejected.
- 26 In case any adverse information is received concerning performance, capability or conduct of the bidder after issue of tender enquiry, BHEL reserves the right to reject the offer at any stage as deemed fit.
- 27 **Any Bidder falling under MSE category shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.**

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

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

28 Integrity Pact (IP)

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

Sr. No.	IEM	E-mail
1	Dr. Sarat Kumar Acharya, Ex-CMD, NLC	iem1@bhel.in
2	Shri R. Mukundan, IRPS (Retd.)	iem2@bhel.in
3	Shri Madan Lal Meena, IAS (Retd.)	iem3@bhel.in

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

Note: -

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below":

Details of contact person (s): -

Name	Ashok Kumar Meena	Ajay Kumar Chowdhary
Designation/ Department	AGM/TBSM	GM/TBMM&SM
Address	4th Floor, TBG, BHEL Sadan, Film City, Sector-16A, Noida, UP-201301	5th Floor, TBG, BHEL Sadan, Film City, Sector-16A, Noida, UP-201301
Phone	0120 2218640	0120 2218789
E-mail	akmeena@bhel.in	akchowdhary@bhel.in
Fax		

- 29 Any materials (if required) for ETC works have to be procured from Customer approved sources only. It will be the bidder's responsibility to get the approval of materials and vendors for materials.
- 30 The purchase preference for central P.S.U.s shall be given as per the prevailing Government policy.
- 31 Work schedule and the deployment of manpower and T&P resources committed by the contractor in their offer, to match the scheduled completion, shall be submitted by contractor and mutually agreed with site In-charge immediately after the award of work. Further, the contractor shall mobilise at site within two weeks of award of work.
- 32 In case an offer is not being submitted by the prospective bidders against this tender, they may send their "regret" letter to this office, for information.
- 33 Details of qualifying work(s) executed by the bidder will be forwarded to the principal employer for verification of the work with respect to completion, commencement & completion date and value of the work executed. Performance feedback of the bidder will also be sought from the principal employer.
- 34 The bidder representative may be called for discussion with the committee. His originals may be verified by the committee. In addition to above their organisation chart and detail list of manpower, tools & plants and technical capability will be discussed and ascertained by the committee.
- 35 **Conflict of Interest among bidders/Agents: -**
"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:
- they have controlling partner (s) in common; or
 - they receive or have received any direct or indirect subsidy/ financial stake from any of them; or
 - they have the same legal representative/agent for purposes of this bid; or
 - they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
 - Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; or
 - In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent/dealer. There can be only one bid from the following:
 - The principal manufacturer directly or through one Indian agent on his behalf; and
 - Indian/foreign agent on behalf of only one principal; or
 - A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; or
 - In case of it holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "

36 GRIEVANCE REDRESSAL MECHANISM:

To promote transparency and ensure fair treatment of all bidders, a structured Grievance Redressal Mechanism is in place to address any concerns or issues arising during the tendering process or in subsequent business dealings with the company.

Suppliers/Contractors are requested to follow the below escalation process for grievance resolution:

1. **First Level:** Any grievance should initially be addressed to the designated Dealing Officer, whose contact details are as follows:

(i) **During tendering Stage –**

Ashok Kumar Meena
AGM/TBSM, TBG, BHEL
Email – akmeena@bhel.in
Phone – 0120-2218640

(ii) **After execution of work –**

Sunil Kumar
AGM (Sector Head-TBNS), BHEL
Email – sunil.kumar@bhel.in
Phone – 9761724520

2. **Second Level:** If the issue remains unresolved, it may be escalated by lodging a formal grievance through the **SUVIDHA Portal: <https://suvidha.bhel.in/suvidha/>**. Responses will be provided in accordance with the defined escalation matrix.”

Thanking you,

Yours faithfully,
For and on behalf of BHEL,

(Ashok Kumar Meena)
AGM /TBSM

PROJECT INFORMATION

REF No. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE :

17-01-2026

1	CUSTOMER:	M/s PUNJAB STATE POWER CORPORATION LTD. (PSPCL)
2	PROJECT LOCATION AND DETAILS:	ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.
3	SITE ADDRESS:	Village Harur, Shahpurkandi , Distt- Pathankot, Pin- 145024, Punjab
4	CONTACT PERSON AT SITE :	Sh. Mukesh Kumar Sr. Engineer Phone No. : 9812611261
5	CONTACT PERSON: FOR CONTRACTUAL ISSUES	Ashok Kumar Meena AGM (TBSM) SUBCONTRACTS MANAGEMENT, TRANSMISSION BUSINESS GROUP, 4th Floor, BHEL SADAN, Plot No. 25, Sector-16A, Noida, Distt. Gautam Buddha Nagar, UP-201301 PHONE: 0120-221-8640/ 9831038136 E-mail: akmeena@bhel.in
6	CONTACT PERSON: FOR ENGINEERING ISSUES	Jintu Gogoi Manager (TBEM-Electrical) TRANSMISSION BUSINESS GROUP, 5th Floor, BHEL SADAN, Plot No. 25, Sector-16A, Noida, Distt. Gautam Buddha Nagar, UP-201301 PHONE: 0120- 221-8915, 8499948587 E-mail: jintugogoi@bhel.in@bhel.in
7	CONTACT PERSON: FOR CONTRACT EXECUTION ISSUES	Sunil Kumar AGM & Sector Head/TBNS TRANSMISSION BUSINESS GROUP, Plot No. 25, Sector-16A, Noida, Distt. Gautambudh Nagar, UP-201301 PHONE: 9761724520 PHONE: 0120- 221-8795 E-mail: sunil.kumar@bhel.in

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER

REF:

DATE:

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. – Gautam Buddha Nagar, UP-201301

Dear Sir,

Sub: Submission of Offer against following tender specification No. :

TENDER REF NO. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

I/We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Transmission Business Group (TBG) in accordance with the terms and conditions thereof. I/We have carefully perused the following listed documents connected with the above work and agree to abide by the same.

1. Amendments/Clarifications/Corrigenda/Errata/etc., issued in respect of the Tender documents by BHEL
2. Notice Inviting Tender (NIT)
3. Price Bid
4. Technical Specifications
5. Special Conditions of Contract
6. General Conditions of Contract
7. Forms and Procedures

Should our Offer be accepted by BHEL for Award, I/we further agree to furnish 'Security Deposit' for the work as provided for in the Tender Conditions within the stipulated time as may be indicated by BHEL. I/We further agree to execute all the works referred to in the said Tender documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

I/We have deposited/depositing herewith the requisite Earnest Money Deposit (EMD) as per details furnished in the Check List.

Place :

Date :

Signature of the Authorized Signatory

Name:

Designation:

TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD

ANNEXURE – X

DECLARATION BY BIDDER

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

It is certified that General Instructions and Information for tenderer have been read/ complied/ agreed to and each page of tender offer has been initialled and stamped.

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

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

(Signature of Tenderer)

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

ANNEXURE – Y

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

Subject: Declaration confirming knowledge about Site conditions

I/We, _____ hereby declare and confirm that we have visited the Project Site with reference to above BHEL Tender Specifications and acquired full knowledge and information about the Site conditions including Wage structure, Industrial Climate, the Law & Order and other conditions prevalent at and around the Site. Also, we have acquired information about availability of manpower, construction material, water, electricity etc.

We further confirm that the above information is true and correct and we shall not raise any claim of any nature due to lack of knowledge of Site conditions.

I/We, hereby offer to carry out work as detailed in above mentioned Tender Specification, in accordance with Terms & Conditions thereof.

Site Visited Official Name & Contact Details:

(Signature of Tenderer)

Date :

Place :

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

ANNEXURE – Z

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING,SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

Subject: Authorization of representative who will participate in the Online Reverse Auction Process:

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

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

LIST OF KEY-STAFF TO BE POSTED AT SITE AFTER RECEIPT OF LOI

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

Subject: LIST OF KEY-STAFF TO BE POSTED AT EACH SITE AFTER RECEIPT OF LOI

Dear Sir,

With reference to above, this is to confirm that we shall depute the following main staff (Minimum) for above referred work at project site permanently till completion of work..

SHAPURKANDI PH-I SITE					
		Site Incharge	Supervisor-1	Supervisor-2	Safety Officer
1	Name				
2	Qualification				
3	Experience (in years)				
4	Age				

We assure that above are the minimum staff we shall depute at site. In case of further requirement, we shall depute additional staff as per work requirement and as per instruction of BHEL site incharge.

Thanking you,

(Signature of Tenderer)

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

NO DEVIATION CERTIFICATE

REF:

DATE:

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

TENDER REF NO.

TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Dated

17-01-2026

Subject: NO DEVIATION CERTIFICATE

Dear Sir,

With reference to above, this is to confirm that as per tender conditions, we have visited subject site before submission of our offer and noted the job content & site conditions etc.

We also confirm that we have not changed / modified the tender documents as appeared in the website and in case of observance at any stage, it shall be treated as null and void. We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT and we hereby convey our unqualified acceptance to all terms and conditions as stipulated in the tender and NIT. In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer strictly in accordance with tender instructions

Thanking you,

(Signature of Tenderer)

Date :

Place :

Name and Designation of Authorised person (s)

Signing the tender on behalf of the tenderer

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

Declaration for relation in BHEL

REF:

DATE:

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

Sub: Declaration for relation in BHEL

TENDER REF NO. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Dated 17-01-2026

I/We hereby submit the following information pertaining to relation/relatives of Proprietor/ Partner(s)/Director(s) employed in BHEL

Tick (✓) any one as applicable:

1. The Proprietor, Partner(s), Director(s) of our Company/Firm DO NOT have any relation or relatives employed in BHEL
OR

2. The Proprietor, Partner(s), or Director(s) of our Company / Firm HAVE relation / relatives employed in BHEL and their particulars are as below:

a)

b)

Signature of the Authorized Signatory

Note:

- 1) Attach separate sheet, if necessary.
- 2) If BHEL Management comes to know at a later date that the information furnished by the Bidder is false, BHEL reserves the right to take suitable against the Bidder/ Contractor.

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

DECLARATION REGARDING INSOLVENCY / LIQUIDATION / BANKRUPTCY PROCEEDINGS

REF:

DATE:

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

Sub: Declaration Regarding Insolvency / Liquidation / Bankruptcy Proceedings

Reference Documents :

(a) NIT/Tender NO.

TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Dated

17-01-2026

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

Thanking you,

Date :

(Signature of Tenderer)

Place :

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

**DECLARATION BY AUTHORISED SIGNATORY OF BIDDER REGARDING
AUTHENTICITY OF SUBMITTED DOCUMENTS**

REF:

DATE:

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

Sub: Declaration by Authorized Signatory regarding Authenticity of submitted documents.

Reference Documents :

(a) NIT/Tender NO. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26 Dated 17-01-2026
(b) All other pertinent issues till date

I/We, hereby certify that all the documents submitted by us in support of possession of "Qualifying Requirements" are true copies of the original and are fully compliant required for qualifying / applying in the bid and shall produce the original of same as and when required by Bharat Heavy Electricals Limited.

I / We hereby further confirm that no tampering is done with documents submitted in support of our qualification as bidder. I / We understand that at any stage (during bidding process or while executing the awarded works) if it is found that fake / false / forged bid qualifying /supporting documents / certificates were submitted, it would lead to summarily rejection of our bid / termination of contract. BHEL shall be at liberty to initiate other appropriate actions as per the terms of the Bid / Contract and other extant policies of Bharat Heavy Electricals Limited.

Thanking you,

Date :

(Signature of Tenderer)

Place :

Name and Designation of Authorised person (s)
Signing the tender on behalf of the tenderer

Annexure-MII

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

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

DATE: 17-01-2026

NIT TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

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

Reference Documents :

(a) NIT/Tender NO. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Dated 17-01-2026

(b) All other pertinent issues till date

We here by certify that the items/works/services/ offered by (specify the name of the organization here) has a local content of _____ % and this meets the local content requirement for – Class 1 Local supplier/ Class II local supplier** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

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

1 _____ 2 _____
3 _____ 4 _____

Thanking you,
Yours faithfully,

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

** - Strike out whichever is not applicable.

Note:

Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted.

In case the bidders quoted value is excess of 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers/contractors other than companies).

In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

(TO BE FILLED BY TENDERER OVER THEIR LETTERHEAD)

DECLARATION REGARDING NO CONFLICT OF INTEREST

REF: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26 DATE: 17-01-2026

NIT TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

To,
AGM/TBSM
Transmission Business Group,
Bharat Heavy Electricals Limited,
4th Floor, BHEL SADAN,
Plot No. 25, Sector-16A, Noida,
Distt. - Gautam Buddha Nagar, UP-201301

Dear Sir,

Subject: DECLARATION REGARDING NO CONFLICT OF INTEREST

Reference Documents :

NIT / TENDER NO. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26 Dated 17-01-2026

We, M/s. _____ a company/Firm incorporated under the laws of the country having its registered office at _____, hereby declare and confirm the following in connection with the tender No.

We confirm that no conflict of interest exists in our participation in this tender.

None of our personnel, agents, or subcontractors have any personal, financial, or business relationship with BHEL's employees or officials involved in this tender process that could constitute a conflict of interest.

None of our directors, employees, agents, or allied firms have been involved in need assessment, procurement planning, or evaluation of this tender.

If we are acting as an agent/distributor, we confirm that we do not represent more than one manufacturer in this tender and that the OEM is not bidding separately.

We are not participating in more than one bid in this tender. *

*Participating in any capacity by a bidder (including the participation of a Bidder as a partner/JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a sub-contractor in more than one bid if he is not bidding independently in his own name or as a member of a JV.

We understand that false declarations may result in disqualification or legal action."

Thanking you,
Yours faithfully,

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

Note:

1) Attach separate sheet, if necessary.

INDEMNITY BOND

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

This Indemnity Bond executed by <_____ name of company> having their Registered Office at <_____> in favour of M/s Bharat Heavy Electricals Limited, a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort, Asiad, New Delhi - 110049 through its unit - TBG, 5th Floor, BHEL Sadan, Plot No. 25, Sector-16A, Noida-201301 (UP). (Hereinafter referred to as the Company)

And whereas the Company has entered into a Contract with M/s _____, the executants of this Deed (hereinafter referred to as the Contractor) as its contractor in respect of the work of ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

AND WHEREAS under the provisions of GCC further stipulates that the Contractor shall indemnify the Company against all claims of whatever nature arising during the course of execution of Contract including defects liability period of <_____ Months > i.e till <_____>

Now this deed witness that in case the Company is made liable by any Authority including Court to pay any claim or compensation etc. in respect of all labourers or other matters at any stage under or relating to the Contract with the Contractor, the Contractor hereby covenants and agrees with the Company that they shall indemnify and reimburse the Company to the extent of such payments and for any fee, including litigation charges, lawyers' fees, etc, penalty or damages claimed against the Company by reason of the Contractor falling to comply with Central/States Laws, Rules etc, or his failure to comply with Contract (including all expenses and charges incurred by the Company).

The Contractor further indemnifies the Company for the amount which the Company may be liable to pay by way of penalty for not making deductions from the Bills of the Contractor towards such amount and depositing the same in the Government Treasury.

The Contractor further agree that the Company shall be entitled to withhold and adjust the Security Deposit and/or withhold and adjust payment of Bills of Contractor pertaining to this Contract against any payment which the Company has made or is required to make for which the Contractor is liable under the Contract and that such amount can be withheld, adjusted by the Company till satisfactory and final settlement of all pending matters and the Contractor hereby gives his consent for the same.

The Contractor further agrees that the terms of indemnity shall survive the termination or completion of this contract.

The contractor further agrees that the liability of the contractor shall be extended on actual basis notwithstanding the limitations of liability clause, in respect of :

1. breach of terms of contract by the contractor
2. breach of laws by the contractor
3. breach of Intellectual property rights by the contractor
4. breach of confidentiality by the contractor

Nothing contained in this deed, shall be construed as absolving or limiting the liability of the Contractor under said Contract between the Company and the Contractor. That this Indemnity Bond is irrevocable and the condition of the bond is that the Contractor shall duly and punctually comply with the terms and the conditions of this deed and contractual provisions to the satisfaction of the Company.

In witness where of M/s _____ these presents on the day, month and year first, above written at _____ by the hand of its signatory Mr. _____.

Signed for and on behalf of M/s _____

Witness

1 _____

2 _____

PROFORMA OF BANK GUARANTEE (in lieu of SECURITY DEPOSIT)

(On non-Judicial paper of appropriate value)

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at BHEL House, Siri Fort, New Delhi-110049 through its Unit at BHEL, Transmission Business Group, Noida (name of the Unit) having agreed to exempt _____ (Name of the Vendor / Contractor / Supplier) with its registered office at _____¹ (hereinafter called the said "Contractor" which term includes supplier), from demand under the terms and conditions of the Contract reference No. _____ dated _____² valued at Rs. _____³ (Rupees) (hereinafter called the said Contract), of Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs. _____⁴ (Rupees.....only),

We _____ (indicate the name and address of the Bank) having its Head Office at _____ (address of the head Office) (hereinafter referred to as the Bank), at the request of _____ [Contractor(s)], being the Guarantor under this Guarantee, do hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer, an amount not exceeding Rs. _____ without any demur, immediately on demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand

Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal or Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied & the Employer certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) or acceptance of the final bill or discharge of this guarantee by the Employer, whichever is earlier. This guarantee shall initially remain in force up to and including _____⁵ and shall be extended from time to time for such period as may be desired by the Employer. Unless a demand or claim under this guarantee is made on us in writing on or before the _____⁶, (3 months more than the present date of validity of Bank Guarantee) we shall be discharged from all the liability under this guarantee thereafter.

We, _____ (indicate the name of the Bank) further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

We,..... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁴
- b) This Guarantee shall be valid up to⁵
- c) Unless the Bank is served a written claim or demand on or before⁶ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

Date _____ Day of _____

for _____ (indicate the name of the Bank) _____

(Signature of Authorised signatory)

¹ ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER .

² DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

³ CONTRACT VALUE

⁴ BG AMOUNT IN FIGURES AND WORDS

⁵ VALIDITY DATE (At least 3 months more than completion period)

⁶ DATE OF EXPIRY OF CLAIM PERIOD (At least 3 months more than the present date of validity of BG)

Notes:

1 The expiry of claim period shall be at least 3 months more than the validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.

2 The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.

3 **In Case of Bank Guarantees submitted by Foreign Vendors:**

a From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)

From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.

PROFORMA OF BANK GUARANTEE (in lieu of EARNEST MONEY if permissible in NIT)

(On non-Judicial paper of appropriate value)

Bank Guarantee No. _____
Date _____

To,
M/s Bharat Heavy Electricals Limited
Transmission Business Group (TBG)
4th Floor, BHEL SADAN, Plot No. 25, Sector-16A, Noida,
Distt. – Gautam Buddha Nagar, UP-201301

Dear Sirs,

In accordance with the terms and conditions of Invitation for Bids/Notice Inviting Tender No.....¹ (Tend Conditions), M/s having its registered office at² (hereinafter referred to as the 'Tenderer'), is submitting its bid for the work of³ invited by M/s Bharat Heavy Electricals Limited through its Unit at BHEL, Transmission Business Group, 6th Floor, BHEL SADAN, Plot No. 25, Sector-16A, Noida, U.P.-201301.

The Tender Conditions provide that the Tenderer shall pay a sum of Rs as Earnest Money Deposit in the form therein mentioned. The form of payment of Earnest Money Deposit includes Bank Guarantee executed by a Scheduled Bank.

In lieu of the stipulations contained in the aforesaid Tender Conditions that an irrevocable and unconditional Bank Guarantee against Earnest Money Deposit for an amount of Rs.....⁴ is required to be submitted by the Tenderer as a condition precedent for participation in the said Tender and the Tenderer having approached us for giving the said Guarantee,

We, the.....[Name & address of the Bank] having our Registered Office at.....(hereinafter referred to as the Bank) being the Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of Rs.⁴ (in words Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

We Bank further agree that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Tender or to extend the time of submission of from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Tenderer and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Tenderer or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Tenderer or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

This Guarantee shall be irrevocable and shall remain in force upto and including.....⁵ and shall be extended from time to time for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the⁶ we shall be discharged from all liabilities under this Guarantee.

We, Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁴
- b) This Guarantee shall be valid up to⁵
- c) Unless the Bank is served a written claim or demand on or before⁶ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

(Signature of Authorised signatory)

Date _____
Place of Issue _____

¹Details of the Invitation to Bid/Notice Inviting Tender

²Name and Address of the Tenderer

³Details of the Work

⁴BG Amount in words and Figures

⁵Validity Date (At least six months from date of tender opening)

⁶Date of Expiry of Claim Period (At least 3 months more than the present date of validity of BG)

Note:

- 1 The Bank Guarantee should be valid for at least six months from date of tender opening. The expiry of claim period shall be at least 3 months more than the validity date. It may be ensured that the same is in line with the agreement/ contract entered with the Vendor.
- 2 The BG should be on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.

3 **In Case of Bank Guarantees submitted by Foreign Vendors:**

a From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)

From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 will required to be followed.

The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). The BG Format provided to them should clearly specify the same.

Pre-Qualifying Requirements

REF No. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26

Date :

17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

Tenders (Under two-part bid system) are invited from competent contractors for subject works. Only those who are technically and financially capable to execute the Job and who fulfil the Pre-Qualifying Requirements [PQR] given under are eligible to quote against the above NIT. Tenderers should submit their offer as per the procedure specified in tender documents. The PQR of contractor for tender submission shall be as under:

Sl. No.	Criteria	Description
A	Turn Over	<p>Bidders should have a minimum average annual turnover (Annual Gross Revenue from operations/ Gross operating income as incorporated in the profit & loss account excluding Other Income) of</p> <p style="text-align: center;">Rs.72,51,746/- for last three financial years (2022-23, 2023-24 & 2024-25)</p> <p>and should submit audited balance sheet and Profit & Loss Account Sheet of these years.</p> <p>The audited financial statements must be signed by the owner and the auditor. Auditors seal, Name, Membership No., Firm Registration No. & firm name (if applicable), UDIN and the capacity in which he is signing (Proprietor/Partner), must be mentioned on the Profit & Loss A/c and Balance Sheet.</p> <p>In case of proprietorship and partnership firms where Audited Profit & Loss A/c and Balance Sheet is not mandatory as per extant rules, CA certificate certifying turnover and profit for the required financial years must be submitted. CA certificate must be on his letter head mentioning his/her name, Membership No., Firm Registration No. & firm name (if applicable), UDIN, capacity in which he is signing (Proprietor/Partner), date and place of signing.</p>
B	Profit & Networth	<p>Bidder should have earned profit in at least one financial year during the period of last three Financial Years as per Sl. No. A above</p> <p style="text-align: center;">and</p> <p>Net worth of the Bidder based on the latest Audited Accounts as furnished for 'A' above should be positive. Net worth = Paid up share capital + Reserves. (Net worth is required to be evaluated in case of companies)</p>
C	Similar Work	<p>Bidder should have successfully completed :</p> <p style="text-align: center;">“Electrical installation works of 132kV or above voltage rating switchyard (AIS/GIS) and allied works ”</p> <p>during last seven years ending on 31.12.2025 and should be either of the following:</p> <p style="text-align: center;">(i) One similar job costing (except service tax/GST) not less than Rs. <u>1,93,37,989</u> OR</p> <p style="text-align: center;">(ii) Two similar jobs costing (except service tax/GST) each not less than Rs. <u>1,20,86,243</u> OR</p> <p style="text-align: center;">(iii) Three similar jobs costing (except service tax/GST) each not less than Rs. <u>96,68,994</u></p>

NOTES:

- 1 The Bidder shall submit the Contract Agreement/Work Order/LOI along with BOQ and Performance/completion/execution certificate issued by customer/contractor along with technical bid in support of qualification.
- 2 In order to technically qualify in this tender, bidder should meet all criteria i.e. A, B & C mentioned above.

- 3 If the job is completed in the last seven years period, as specified above, even if it has been started earlier, the same will also be considered meeting the qualifying requirements.
- 4 Consortium/ JV bidding is not allowed.
- 5 In case an Erection agency is already deployed at the same site the overall MAAT & Similar work value shall be evaluated for the both works i.e. requirement of already awarded work + requirement for this tender-work already executed for awarded work.
- 6 BHEL reserves the right to:
 - (a) Accept or reject any bid received at its discretion without assigning any reasons whatsoever.
 - (b) Postpone the above-mentioned date, split and distribute the work among more than one bidder without assigning any reason whatsoever.
 - (c) May ask for further qualification during techno commercial scrutiny of bids received.
 - (d) May ask for further proofs including TDS certificates/ Form 26AS/ Final bill/ payment detail for the said job for cross- verification.
- 7 BHEL shall not be responsible for any delay, loss, damage for bids/documents sent by post.
- 8 BHEL shall not be liable for any expenses incurred by bidder in preparation of bid irrespective of whether it is accepted or not.
- 9 Quotations received from bidders who do not fulfil the PQR shall be summarily rejected without any further evaluation and information to bidders.
- 10 Canvassing i.e. soliciting favour, seeking advantage etc. in any form is strictly prohibited and any bidder found to have engaged in canvassing shall be liable to have his bid rejected summarily
- 11 If the bidder deliberately gives any wrong information in his tender to create in circumstances for the acceptance to his bid, BHEL reserves the right to reject such application.
- 12 Bidder's selection is subject to approval of BHEL's customer for this work. The approval/acceptance of bidders from Customer is mandatory requirement for subject tender.
- 13 All corrigenda, addenda, amendments and clarifications to this Tender will be hosted in web page, www.bhel.com and <https://eprocurebhel.co.in> and not in the newspaper. Bidders shall keep themselves updated with all such amendments.

FORMAT FOR E-PAYMENT

To,
 AGM/FINANCE
 Transmission Business Group,
 Bharat Heavy Electricals Limited,
 5th Floor, BHEL SADAN,
 Plot No. 25, Sector-16A, Noida,
 Distt. - Gautam Buddh Nagar, UP-201301

Dear Sir,

Sub: e-Payment vide RTGS/NEFT

I / We hereby request and authorise you to effect E-Payment vide any of the two modes to my bank account as per the details given below:

Vendor Name	
Title / Name of account in the bank	
Account Type (Saving / Current)	
Bank account number	
Name and address of the bank	

Bank / Branch contact person's Name	
Bank / Branch Telephone Number with STD Code	
Bank Branch MICR Code (Please enclose a copy of a cheque. This Cheque should not be a payable at par cheque.)	
Bank Branch RTGS IFSC Code	
Bank Branch NEFT IFSC Code	

Vendor email address	
Name of authorised signatory of Vendor	
Vendor's Contact persons name	

I/We confirm that information provided above is correct & any consequences due to any mistake in above will be borne by us.

Thanking you,

Name and Designation of Authorised person (s)

We confirm that we are enabled for receiving RTGS/NEFT credits and we further confirm that the account number of _____, the signature of the authorised signatory and the MICR and IFSC codes of our branch mentioned above are correct.

Bank's Verification
 (Manager's / Officer's Signature under bank stamp)

Note : Please attach cancelled original Cheque leaf

INTEGRITY PACT**Between**

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

and

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

Preamble

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

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

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

Section 1- Commitments of the Principal

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

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

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



- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

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

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

Section 4 - Compensation for Damages

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



Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

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

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

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

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

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.



- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.



Section 10 - Other Provisions

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



 For & On behalf of the Principal
 (Office Seal)

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

Place _____
 Date _____

Witness: _____
 (Name & Address) _____

Witness: _____
 (Name & Address) _____

HSE CONDITIONS

at a **GLANCE** (for bidders)



Health Safety and Environment Management



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

	Transmission Business Group HSE Department, HQ, Noida	Doc No. TBG/HSE/NIT-01 Rev No. : 02 Date: 31.01.24
	HSE Conditions at a Glance for Bidders	Page- 1 of 18



Transmission Business Group, Noida

DOCUMENT CONTROL			
Document number:	TBG/HSE/NIT-01		
Issue number:	00	Issue date:	08.01.2020
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Revision number:	02	Revision date :	31.01.2024
	Prepared by	Approved and Issued for use by	
Name	Arvind Kumar Pandey	RS Pathwar	
Designation	Sr. Engineer	Dy. General Manager	
Signature	-sd-	-sd-	
Date	31.01.2024	31.01.2024	
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Issued by :	Name	Designation	Signature

BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS GROUP



Transmission Business Group

HSE Department, HQ, Noida

Doc No. TBG/HSE/NIT-01

Rev No. : 02

Date: 31.01.24

HSE Conditions at a Glance for Bidders

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BHEL TBG through its long experience and policy, has developed a culture to consider wellbeing of the society, protection of environment and occupational health and safety of its workers first. TBG has also a culture of transparency in all its business activities. In line to this culture, this NIT annexure is prepared as a peeping window in to the TBG HSE requirements which need to be 100% complied by the successful bidders while executing the contract. Interested bidders should go through these HSE conditions:

1. BHEL HSE Policy



In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

June 5, 2018

Atul Sobti
Chairman & Managing Director

Creating  of tomorrow

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2. Legal Compliances:

- a. **Statutory Provisions:** All the sub-contractors are to comply with client specific rules and procedures, the National legislations and codes, in particular the following or their revised versions:

Srl. No	Acts/Rules Name	Srl. No	Acts/Rules Name
1	The Factories Act 1948, Amendment Act 1947	11	Contractor labour Act, 1970 (Regulation and abolition)
2	The Environment Act 1986	12	Provident fund Act, 1952
3	Workmen's Compensation Act, 1923	13	Payment of gratuity Act, 1972
4	Building and Other Construction Workers (Regulation of employment and condition of service) Act, 1996	14	Indian Explosives Act and the explosives Rules 2008
5	Buildings and Other Construction Workers Welfare Act, 1996	15	The Gas Cylinder Rules, 2016, Static and Mobile Pressure Vessels (Unfired) Rules 2016
6	Payment of wages Act, 2017 Equal remuneration Act,	16	The Indian Electricity Act 2003 and Indian Electricity Rules 2005
7	Minimum wages Act.1948	17	The Atomic Energy Act, 2015
8	Employers liability Act, 1938	18	The atomic energy (Radiation Protection) Rules. 2004
9	Industrial dispute Act, 1947	19	National Fire Protection Association (NFPA),
10	maternity benefit amendment act 2017	20	National Building Code of India 2016 etc.

b. **Indian Standard (IS) Codes related to HSE**

All the sub-contractors are to comply with client specific rules and procedures, the National legislations and codes in particular the following or their revised versions:

Srl	IS Code	Applies on
1	IS: 4081 -1986	Safety code for Blasting and Related Drilling operations
2	IS: 3764 -1992	Safety code for excavation work



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3	IS: 5121 -1969	Safety code for piling and other deep foundations
4	IS: 2750 -1964	Specification for steel scaffoldings
5	IS: 3696 (Part-I)-1987	Safety code for scaffolds and Ladders: Part- I Scaffolds
6	IS: 3696 (Part-II) -1991	Safety code for scaffolds and Ladders: Part –II Ladders
7	IS: 4082 -1977	Recommendations on stacking and storage of construction materials at site (First revision)
8	IS: 4130-1976	Safety code for demolition of building (First revision)
9	IS: 4912-1978	Safety requirements for floor and wall openings, railings and toe boards (First revision)
10	IS: 5916- 1970	Safety code for constructions involving use of hot bituminous materials
11	IS: 7205 -1974	Safety code for erection of structural steel work
12	IS: 7969 -1975	Safety code for handling and storage of building materials
13	IS: 8989 -1978	Safety code for erection of concrete framed structures
14	IS: 7293 -1974	Safety code for working with construction machinery
15	IS: 2212 -1991	Pipe lines –Identification –Colour code
16	IS: 5216 -1982	Recommendations on safety procedures & practices in Electrical works (Part -I &II)
17	IS: 875 -1964	Code of practice for structural safety of buildings and loading standards
18	IS: 10386 -1983	General aspects Part-1 -1983, Part-2 -1982, Part-6 -1983, Part-10 -1983- Amenities, Protective clothing and equipment, construction, storage, handling, detection and Safety measures for gases, chemicals and flammable liquids
19	IS: 10500-2012	Drinking water (Specification)
20	IS: 10291 -1982	Code of dress in civil engineering works
21	IS: 2925-1984	Safety helmets
22	IS: 1179-1967	Welding helmets
23	IS: 7524 -1979 (Part-I)	Safety goggles
24	IS: 9167 -1979	Ear muff /Ear plugs
25	IS: 6994 -1973 (Part-I)	Canvas hand gloves, Cotton hand gloves, Chrome leather gloves
26	IS: 4770 -1991	Rubber hand gloves tested for 15,000 volts
27	IS: 3521 -1999	Full body safety harness
28	IS: 11057 -1984	Specification for Industrial safety nets

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29	IS: 13415 -1992	Protective Barriers in & around buildings (Code of safety)
30	IS: 13416 -1992	Preventive measures against Hazards at work places-Recommendations part-I Falling materials hazards Prevention part-I
31	IS: 13416 -1992	Preventive measures against Hazards at work places-Recommendations part-II Fall Prevention
32	IS: 15298 -2011 (Part 1&2)	Personal Protective Equipment -Safety shoes
33	IS: 12254 -1993	Poly vinyl chloride (PVC) industrial boots
34	IS: 5557:2004	Industrial and Protective Rubber knee and Ankle boots
35	IS: 2878 -2004	Co2 Type fire extinguisher
36	IS: 2171 -1999	Dry chemical powder fire extinguisher
37	IS: 13849 – 1993	Fire extinguisher for ABC fires
38	IS: 10204-2001	Mechanical Foam type extinguisher (Foam used shall conform to IS: 4989 -1974 and Co2 cartridge shall conform to IS: 4947 -1985)
39	IS: 3786 -1983	Methods for computation of Frequency rate and Severity rates for Industrial injuries and classification of Industrial accidents (First revision)

c. The Sub-contractors need to

- Attend HSE familiarization program at TBG-HQ with his site management team. This will be a half day long awareness session on HSE requirements and compliances which the agency is supposed to fulfil during contract execution at site. The session shall be taken by TBG HSE department on intimation by TBSM. **(Rev-01)**
- Request for issuance of Form-V in their name from customer on behalf of BHEL
- Get the Labour license registration from concerned Labour office.
- Get the BOCW Registration done along with the labour license.
- Get their labourers registered under BOCW for benefits provided by the office.
- Maintain Seven registers of labours as per BOCW requirement.
- Ensure payment of wages to labours not less than the current minimum wages applicable in the premises.
- Ensure PF deduction of labourers and submission of proof to BHEL office (Wage sheet, ECR & Challan copies) duly signed.
- Submit Labour Payment Certificate by 10th of Every month.
- File timely returns, get renewals done and submit a copy to BHEL office.

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- Get Workmen's Compensation policy before the start of work, covering all the labourers and staff,
 - Policy should clearly mention the project name and location,
 - should be as per labour class and wage.
 - Should cover all the height workers with clear mention of Max. height.
 - Policy should be submitted to BHEL office and renewal before expiry.
- Issue employment card to every worker.

3. Labour Welfare and Medical Facilities

a. Labour Welfare

1. Declaration of normal working hours and weekly off day, Payment day & intervals
2. Paid rest days & holidays.
3. Payment of overtime @ twice the normal wage rate.
4. No labour shall be allowed overtime >12 hrs/week, limited to 48 hrs/month.
5. Rest and lunch area.
6. Separate Male/Female Toilets and Lavatories, clearly marked in local Language and provided with signage.
7. Cold and clean drinking water facility suitable to strength and near workplace
8. Creche for children of female workers as per BOCW requirements
9. Arranging labour accommodation in hygienic environment with the facilities of Water (Drinking, Sanitation), washing and bathing area, toilets in sufficient nos., clean and safe camps and surrounding, access road, well illuminated camp and roads, mode of contact, transport facility, first aid centre, 24x7 Security etc.
10. Cooking and eating place to be maintained in hygienic condition
11. General awareness of health and hygiene.

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b. Medical facilities and Health centres

- Availability of first aid box at every work location and agency office, with contents as per BOCW requirement.
- Emergency vehicle (four-wheeler) at work place
- Availability of stretchers in emergency vehicle and in office.
- Trained first aider
- Medical check-up for all the supervisors and workers including cooks, at the time of induction and annually thereafter.
- Tetanus Vaccination for all in every six months.
- Identification and tie-up with nearby reputed hospital(s) and display of their contact number in Emergency contact list.

4. House Keeping & Storage

Housekeeping is a continuous process and is the part of work. Agencies shall maintain safe and presentable housekeeping all the time in their respective areas, common work locations and passage areas. Roads, passages, staircases, entrance/exit gates shall always be maintained obstruction free. No material shall be left or stacked at the roof edges. Agency shall make arrangements to remove scraps on regular basis and dispose them at a space provided by customer, clearly fenced and marked by the sub-contractor as **“SCRAP YARD”**. Suitable arrangement like dedicated housekeeping team and tractor/hydra should be identified for this work.

Construction materials like shuttering materials, staging materials, cables, re-bars, cements bags, earthing flats and rods, FF pipes, surplus soil etc should be stored/stacked properly such that it should neither pose threat to safety of man nor should obstruct the free movement of man and machineries.

Every sub-contractor should have separate and well-maintained storage area for his own materials, T&Ps, PPEs and BHEL issued materials. Consumables like diesel, cotton, grease, oil, paint, admixtures and other fire potential materials should be stored separately with suitable firefighting facility.

Fire capacity of store area to be assessed and accordingly fire extinguishers shall be planned suiting the class and capacity of fire. Sand heaps may also be stacked in open store yards suitably to use in case of fires.

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5. Site Safety

a. Induction and others safety trainings

Every sub-contractor shall make arrangement to provide induction training as per BHEL and/or customer requirement on a pre-approved and fixed module to all its new inductees irrespective of class or grade of appointment/hire. He shall also arrange the required facilities for induction training such as board, marker, dummy, posters/banners with all the mandatory PPEs.

Sub-contractor shall also arrange for periodic trainings on fire-fighting, first aid, CPR, importance and use of PPEs, electrical safety, hot work safety, Height work safety, confined space, deep excavations and barricading, concreting work safety etc.

b. Appointment of Safety Officer/Supervisor

Every sub-contractor shall appoint full time **safety officer(s)** as per **Schedule VIII of BOCW Act-1996**. The safety officer so appointed, shall not be assigned any duty/work other than assisting in fulfilment of legal and contractual obligations at site. He shall perform his duties in line to meet the requirements of TBG HSE MANAGEMENT SYSTEMS, such as ensuring daily TBT, conducting induction and other HSE training and awareness programs, organising HSE campaigns, health check-ups, periodic mock drills, reporting & record keeping and other such compliances as per **HSE Plan for Site Operation (TBG/HSEP-14)** on regular basis. **(Rev-01), (Rev-02)**

c. Safety organisation, Safety committees and meetings

Safety officer shall report directly to the head of the projects of the sub-contractor management. There shall be some appointed or nominated **safety stewards** from each sub-group like shuttering, bar-bending, concreting, brick work, material handling, structure erection, cable laying, pipe work, maintenance, batching plant, housekeeping, etc.

A **safety committee** shall be formed including members from different agencies, BHEL and customer covering at-least 50% participation from workers. Safety committee shall meet on weekly basis or as may be decided by customer, outcomes shall be complied as committed.

d. Personal Protective Equipment.

Unless mentioned otherwise, there will be three mandatory PPEs- Safety shoes, Safety Helmet and Reflective jackets conforming to relevant IS codes as mentioned above. Every person entering in the project premises shall use above mandatory PPEs.

There will be other PPEs too, based on the work requirement like: Twin lanyard full body harness, fall arresters and life lines for height workers, Face shield for welders and grinders, Induction helmets and Electrical resistant shoes with FRP/PVC toe for electricians and commissioning engineers, Gum boots for concrete workers and manual excavators, Goggle for gas cutters and grinders, Aprons for welders, shoulder pads for material handlers, Hand gloves – Leather for binders/welders/grinders, certified Rubber gloves for electricians, PVC for concrete/cement

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handlers, cotton-housekeeping team/brick coolies/erectors, cable laying men and other material handlers. Dust mask for cement handlers.

e. Material Handling

BHEL as a policy discourages continuous manual handling. Material handling contributes a major portion in the project and hence proper means (mechanical/ electrical powered) should be deployed appropriately for this work. Cranes/Faranas/hydras should not be used for material transportation for long distances(>100m), if such movement is un-avoidable, it must be accompanied by a trained signal man. Long materials should be guided by tagline. Roads for material movement should be free from obstructions. Lifting appliances must be in good condition and must have test/inspection certificates.

Lifting tackles like- D-shackles, chains, ropes, slings, belts shall be periodically inspected and shall have valid test certificate and/or third-party inspection certificates.

Painted/galvanized structures/materials to be lifted by adequate capacity nylon belts only.

If a machine undergoes a major maintenance, fresh TPI shall be required before use.

Hydraulic/pneumatic machines shall be free from leakages. Daily checklist to be filled and witnessed by the concerned supervisor before start of the work.

f. Vehicle/Machinery Documents and other safety requirements

- **Crawler mounted boom cranes/Tyre mounted telescopic cranes/tower cranes**
 1. Valid third-party inspection certificate.
 2. Valid Insurance policy
 3. Registration Certificate (if applicable)
 4. Valid Pollution under control (PUC) (if applicable)
 5. Fitness certificate from RTO (if applicable)
 6. Operator's valid license, experience and/or competence certificate.
 7. Swing horn
 8. Reverse horn
 9. Boom aviation light
 10. Approved Load chart (inside cabin)
 11. Fire extinguisher (inside cabin)
 12. First aid kit (inside cabin)
 13. Boom angle indicator
 14. Hook Latch
 15. Reflector strips on around cabin and on boom
- **Loader backhoe (JCB), crawler excavators (Poclain), Hydra,**
 1. Valid third-party inspection certificate.
 2. Valid Insurance policy
 3. Registration Certificate (if applicable)
 4. Valid Pollution under control (PUC) (if applicable)

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5. Fitness certificate from RTO (if applicable)
6. Operator's valid commercial license, experience and/or competence certificate.
7. Reverse horn
8. Approved Load chart (inside cabin) (Hydra)
9. Fire extinguisher (inside cabin)
10. First aid kit (inside cabin)
11. Hook Latch (Hydra)
12. Reflector strips on around cabin and on boom

- **Tipper, Transit mixtures (TM), Self-loading concrete mixture (Ajax Fiori), Tractors**

1. Valid third-party inspection certificate.
2. Valid Insurance policy
3. Registration Certificate
4. Valid Pollution under control (PUC)
5. Fitness certificate from RTO
6. Operator's valid commercial Heavy license, experience and/or competence certificate.
7. Reverse horn
8. Fire extinguisher (inside cabin)
9. First aid kit (inside cabin)
10. Reflector strips on around cabin and on body

Note: 1. Tractors may be allowed with Light Commercial/non-commercial license on customer's consent.

- **Cars, Taxis, scooters, motor cycles and other public carriers**

- Valid 2/4-wheeler license (as applicable- commercial/non-commercial)
- Registration Challan
- Valid Insurance
- Pollution under control

g. Man-lifts (Cherry pickers), Scissors Lifts

1. Trained operator with experience/competence certificate and license
2. Valid third-party inspection certificate.
3. Valid Insurance policy
4. Registration Certificate (if applicable)
5. Valid Pollution under control (PUC) (if applicable)
6. Swing horn
7. Reverse horn
8. Boom aviation light
9. Fire extinguisher (inside cabin)
10. First aid kit (inside cabin)
11. Reflector strips on around cabin and on boom

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Note:

1. No one shall ride man-lift bucket without safety belt, safety shoes, helmet and reflective jacket.
2. Not more than 3 persons at a time will board in bucket of man-lift (without any heavy materials) including operator.
3. Operator will not leave the machine while persons are elevated and working.
4. No one other than the authorised operator will operate the man lifts/Scissors lifts.

h. Excavation

Prior permission/clearance from customer is a must for excavations in areas where underground service services such as gas/water/oil/chemical/electrical lines may be routed. Due precautions shall be taken during excavation in such area. Excavations near water bodies (ponds/canals etc.) shall be done with sand/soil bags ready to plug water from accidental damaged/burst of edges. All the excavations shall be done by either step cutting (min. 600mm step at every 1.5m depth) or slope cutting at 1:2(X:Y axis) (or greater depending upon the soil condition). Where step cutting/slope cutting is not possible due to space constraints, shoring/shuttering or sheet piling to be used to check collapse of soil.

Excavated soil shall be stacked away from edge of the pit, at-least 1.5 meters or half of the depth whichever is higher. Height of the stack shall not exceed 2m in height.

Ramps shall be provided for access of the workers in large pits and ladder of metal/good built for small pits. Ladders shall be of sufficient length protruding at least 1m above the ground level.

Pumps of adequate capacity shall be available for pumping out of water. No lone worker shall be allowed to work in any excavation. Overloaded vehicle shall not be allowed near excavated pits.

i. Bar bending and Binding

Bar bending machine shall be installed under shed/roof. It shall be properly earthed and maintained for operation. Housekeeping of the area shall be team's responsibility on daily basis. All be bar benders shall be given hand gloves (leather/cotton) in addition to mandatory PPEs. Scrap shall be segregated and moved to scrap yard on regular basis. Bar bending station shall be located away from Main plying roads/passages. The station shall be well illuminated, shall have a maintained first aid kit and potable water. Station shall be located in such a way that the movement of the material be minimised.

j. Concreting

No electric vibrators shall be allowed to use. All the concrete workers shall be issued gum boots, safety helmets, reflective jackets and PVC hand gloves. Free fall of concrete from chute shall not exceed 1m in height. Heavy machineries/ vehicles shall be kept at least 2m away from the edge. Emergency vehicle shall be available near concreting work. Late night works shall be avoided, if it is unavoidable, a prior permission from BHEL/Customer is mandatory.

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k. Welding, Gas Cutting & other hot works

Welding: Only experienced welders should be deployed for welding jobs. Welders shall be provided with apron, hand gloves, arm pads, leg pads, face shield and safety shoes. Welding leads shall be joint less and insulated. Power input point shall be fully covered at machine.

Gas cutting: If LPG is being used, domestic cylinder is strictly prohibited inside the project premises, (not allowed for site kitchen too). Hose pipes shall be in good condition without cracks, cuts, punctures or joints. Ends should be clamped with worm clamps. Dial gauges shall be of good quality and duly calibrated. Flash back arresters is a must for both oxygen/acetylene or LPG/Oxygen combination. Cylinders shall be stored, transported and used in vertical position only. When not in use, they shall be capped. Empty and filled cylinders to be stored separately with distinct marking.

Cylinders shall neither be rolled on the ground nor thrown during loading/unloading.

Grinding: Grinder shall be given clear glass face shield, apron, safety shoes, ear muffs and hand gloves. Grinder machines shall have wheel guard. Plug tops to be used for power connection preferably three wire type. Only trained persons shall be allowed to use grinders, abrasive cutters. Electrical connection shall be free from cuts, joints etc.

l. Erection & Height Work

Only trained filters and experienced helpers shall be engaged in erection work. Step bolts of lattice towers shall be checked for full tightness with spring washers before use. Height pass shall be issued to the identified group of erectors who have passed medical test and have working experience at height. Name of such workers shall be displayed at appropriate place. These workers only shall be allowed to work at height. Height work shall not be permitted in high wind/bad weather condition, during raining or in night/dark.

m. Electrical Safety

BHEL usually provided single point power source and sub-contractors draw power from there. Otherwise agencies make their own arrangement for construction power like DG sets etc. Sub-contractors shall submit their load requirement (amperage & phase) to BHEL before start of work. Accordingly, they shall make arrangements to draw power and distribution arrangements too in a safe way. MCCBs and HRC fuses to be put in circuit for short circuit and overload protections and RCCBs of 30mA sensitivity to be put at each distribution panel for human safety. Earthing pits shall be installed at each distribution point and maintained below three Ohm resistivity which shall be inspected randomly. The distribution points shall be clean, free from vegetation and water logging, easily accessible and covered/protected from three sides and top for rain. Earthing of DBs shall be done by 25x3mm GI flats connected from proper earth pits. Insulation mat, PVC Sheet/Wooden plank to be placed before DBs as platform. DB Sheds shall be legibly marked with name of agency, contact no of electrician and SLD of that DB. Only industrial plugs and sockets shall be allowed. Three wire (Phase, neutral and earth) system shall be used for tools, lights and machineries and two wire power draws shall be strictly prohibited. PTW and LOTO system shall be maintained to work on LT system. Name and contact no of authorised electricians who will be responsible of electrical power facility maintenance shall be submitted to BHEL by Agencies. Unauthorised sharing of power from one agency to other is strictly prohibited. Electricians shall use standard PPEs and insulated

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tools only. Standard and tested/certified discharge rods to be used in the areas where there is a possibility of residual current or induction charge. The induction rod to be connected to the earth first and removed in the last. Induction helmets only to be used in the charged area. Electricians to be provided with electrical resistant safety shoes having FRP/PVC toe.

n. Dust Gases and fumes

Sub-contractor shall make arrangements to avoid accumulation of dust fumes and gases. Cement handlers inside store or at batching plant and gravel spreader shall be given effective nose masks and jaggery (at least 200g per person per day). DG sets and other machineries like cranes excavators etc. shall have valid and effective PUC certificate and shall have maintained engine with silencer. No IC engine operated machine shall be used in confined and covered area like hall, sheds, store etc. where accumulation due to lack of ventilation can increase to harmful levels. Dedicated arrangements (tanker or tractor with sprinkler) shall be made by the sub-contractors (individual or jointly) to continuously subside the dusts arising out of the movement of the vehicle's roads/passages. Welding activities near roof accumulates harmful gases. Welders in such positions shall be provided with effective masks conforming to IS standards.

o. Vehicular Traffic

Speed limits defined within the premises shall strictly be followed by the drivers/commuters of construction as well as other vehicles.

Every construction machinery, man-lift shall display the name, contact no and passport size photograph of the authorised operator (There can be one or more authorised operators).

No one other than operator and co-operator shall sit inside the cabin of any construction machine while it is working.

Construction machineries (tractor, trucks, tippers, JCBs, hydra, Fassi cranes etc. shall never be used as mode of public transport. Machineries like Ajax Fiori and hydra shall not be driven in back direction except for small distances. No overloaded vehicle shall be permitted entry in the project premises.

Over speeding shall be reported and driver/operator shall be barred from entry or shall be penalised.

Drunken drivers shall be barred from entry in the project.

Carrying harmful weapons like knives (>6"), guns etc. shall permanently disqualify the person from entry in project premises.

p. Barricading and floor openings

Every pit deeper than 4 feet (1.2m) shall be barricaded immediately after excavation and will remain barricaded till backfilling.

Pits/trenches drains near roads, passages whether temporary or permanent shall be hard barricaded and well illuminated. Roof edges and openings shall be strictly hard barricaded and illuminated. Height works like masonry works, structure erection, erection by cranes, Lattice tower/beam erection areas shall be barricaded to restrict entry. Areas under charging/commissioning shall be barricaded and caution boards shall be displayed on newly charged areas.

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q. Scaffold & Ladder

No bamboo/wooden scaffold shall be allowed to be used. Only tubular steel scaffolds with couplers conforming to the relevant IS codes shall be allowed with base plates. Standard steel or wooden planks to be used as platforms and no packing materials shall be used. All the platforms shall be built with provisions of **top rail at 1m height, mid rail at 0.5m height and toe boards of min 6" height** at floor level. Minimum width of platform shall be 900mm and if wheel barrow is to be used then 1200mm. Means of access to be provided in the form of ladders, ramps or staircase. Multilevel work platforms or those platforms having passage underneath shall be provided with safety net, screen or canopy at each level for protection from falling objects. Platforms shall be free from concrete, debris or other materials. Platforms shall not extend out of the putlogs and shall be secured and fastened. Decking shall be made non-skidding.

Scaffolds under erection shall be tagged "**RED**", under repair/maintenance/inspection shall be tagged "**YELLOW**" and ready for use shall be tagged "**GREEN**"

Only metal ladders in the construction site and FRP ladders in charged areas shall be allowed. Ladders made from packing materials shall not be used. Ladders shall be securely fixed at bottom, top and long ladders at middle points too at an interval not more than 2400mm and must have a landing at every 6m. Inclination angle should be approximately 1:4 (X:Y) or 75deg. Ladder must extend at least 1m above the platform/access area. Gap between two rungs shall not exceed 300mm. Portable ladder should not be more than 4m in length. Minimum width of the ladder shall not be less than 300mm.

Use of Mobile aluminium scaffold is preferably advisable for erection of transformers/reactors.

r. Illumination

The sub-contractor shall ensure that the areas such as work stations, buildings, batching plants, passages/roads, stores, rest areas, power sources, staircases etc. are illuminated sufficiently to make safe work conditions at site and shall not be less than the relevant IS standards. Excavations/ below ground level structures near passages/roads shall also be sufficiently illuminated.

s. Safety banners/posters, caution boards

Sub-contractors shall display boards and banners in sufficient quantity having safety signs, slogans, important messages, pictures, cautions at prominent locations to promote safety and spread awareness for important precautions such as "Deep Excavation Ahead", "Speed Limit", "Charged Area", "Do not operate", "Hard hat area", "No smoking Zone" etc. Boards containing messages of Emergency contacts, First aid facility, rates of minimum wages, working hours, rest day etc. should be displayed at specific areas.

t. Waste management and disposal

Sub-contractor shall make suitable and effective arrangement to remove waste material from site on regular basis and store them in an identified and safe location. Disposal of wastes shall also be done as per manufacturer's instructions or as per the guidelines laid by legal authorities. Re-bars, Cement bags, packing material (wooden/metal/plastic/paper), paint, oil, grease, cables (armour, sheathing, insulation),

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civil debris, metal chips, GI sheet scraps, batteries etc. are the common waste materials. Sub-contractor shall arrange disposal of the hazardous wastes/materials in conformance to the legal and contractual requirements only.

u. Inspection of PPEs, T&Ps, Machineries and lifting appliances

All the PPEs, T&P and lifting appliances purchased newly by sub-contractors shall have test certificates which shall be submitted to BHEL office periodically or on demand. There shall be at least monthly joint inspection schedule for inspection of healthiness of all the PPEs, T&Ps and lifting appliances. All the lifting appliances shall be tested and examined by a competent person before taking into use for the first time or after it has undergone any alterations or repairs liable to affect its strength or stability

and also once at least in every twelve months. To confirm quality of the PPEs as per the relevant IS codes, BHEL may ask sub-contractors to get any or all types of PPEs tested through NABL approved lab as per relevant IS codes. At any stage, the 100% cost of such tests shall be in the scope of respective sub-contractors.

v. Cable Laying

Sub-contractor shall ensure cable trenches free from water, mud, debris, snakes, Scorpios, lizards before start of the work in trenches. Cable drum rollers shall be used to pull cables out of drums to avoid twisting of cables. Hand gloves, Safety shoes/gum boots, reflective jackets, safety helmets shall be provided to the workers. Cable laying area shall be well illuminated.

w. Fire Protection

Every sub-contractor has to maintain their working area, store and office area free from bushes. Stacking of flammable materials like wood, paper, plastic, paint, oil, grease, fuel, cotton, gases etc. at isolated place disconnected from other storage and office areas. Adequate arrangements of firefighting means like suitable extinguishers, fire/water buckets, water tanks, sand dunes etc. shall be made by the agency depending upon the fire capacity assessed or as per MSDS. Fire drills and trainings on how to operate fire extinguishers and how to react in case of fire breakouts shall be the part of regular training program. Guards and store persons must be a regular participant of such training programs. A list of trained firefighting persons and periodicity of such training programs shall be submitted to BHEL by every agency and same to be adhered. Sufficient number of fire extinguishers with suitable class shall be placed at such locations where there can be fire hazard like stores, pantry, office, DG set, electrical distribution panels etc.

x. Fencing of exposed rotating parts

Exposed rotating parts poses great threat to the person in vicinity. Such parts need to be fenced/covered. Guards are mandatory of grinders, abrasive cutters. Flywheels of the engines of heavy machines, Diesel engines, DG sets need to be covered. Electric winch machines, pulleys, chains, shafts, exhaust fans at reachable height, table fans, need to be caged/fenced. Such fencing/guard shall not be removed while machinery is in operation.

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y. Emergency preparedness response plan and periodic mock drills.

Sub-contractor shall comply JSA (Job Safety Analysis) and arrange to mitigate the effects of identified possible hazards. He shall also define following in response to emergency preparedness:

An emergency assembly point and put a board of the same with information to all in induction training.

Have facility of ambulance or tie-up with nearest hospital for service in minimum possible time (Max-30min) if there is not ambulance inside the premises.

Ensure availability of emergency vehicle with driver all the time at site during work.

Conduct mock-drills on possible risks like electrocution, fall from height, fire, heat stroke etc., record responses and take photographs to submit in BHEL office. Stretchers availability in emergency vehicle or at work place should be well accessible. Provide fire extinguishers of right type at right place in right quantity with information to all. Display emergency contact nos. to various risk locations and at office, service building or at major work locations. Provide first aid training by doctors for and display names of such trained first aiders and fire fighters. Rescue kit with trained staff or man lift or both to rescue a man hanging by safety belt at height. Provide running water tap near chemical storage and handling points. Agencies shall follow emergency response plan prepared by BHEL in each area of work, store and office.

z. Safety reports & Reporting of accidents

BHEL will provide “formats and checklists” for the purpose of records/documents pertaining to the compliance of aforesaid clauses. Agencies shall be responsible for strict adherence and compliance for timely generation and fill-up of the checklists and reports. These shall be submitted on weekly and monthly basis as specified in the formats.

Agency shall also promote such an environment that the near misses, incidents and accidents are reported by every person, whosoever witnesses them. These shall help in analysing the trend and taking measures in reducing/stopping the accidents/incidents. Initial reporting can be in any form-by call, SMS, WhatsApp, e-mail, letter etc.

Major and fatal accidents or high potential incidents shall be investigated for root cause and outcomes shall be immediately implemented to check recurrences.

6. General conditions and penalty clauses

Following are the general conditions:

PPEs shall not only bear the ISI mark but also be conforming to the required standards, 100% compliance of the PPEs is mandatory.

Over speeding of vehicles shall attract penalty/notice and recurrence will attract debarring from entry into project premises.

Hiding of facts like incidents, accidents, fake/forged reports/certificates shall also attract penalty/ notice or both. Only approved third party agencies shall be allowed to inspect the machines, T&Ps. Reports shall directly be sent to BHEL/customers by the third parties.

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Insurance and TPIs to be renewed before expiry. Machines, T&Ps shall not be allowed to work if renewal delayed. Continuity of WC policy to be maintained religiously by the respective agencies.

Agency shall submit the status report of his labour license, BOCW registration, WC Policy, insurance & TPI validity on monthly basis with list of machineries and T&Ps

Sub-contractors shall also maintain a buffer stock of all the PPEs in at least 20% excess to the present strength of the work force.

If construction power is not drawn as per the guidelines laid in clause no. 5(m), given above, BHEL may take-up this work at the risk and cost of the agency and/or may withhold a sum of min. Rs. 50,000/- (Rs. Fifty Thousand) or more as the site in-charge deems fit till the system is aligned as per aforesaid requirement.

Agencies shall be responsible for the compliance of the above requirements. Failure in one or more clauses/area shall attract a notice or monetary penalty or a combination of above.

Monitory penalty will be

- Rs. 1000/- per person/incident per day for non-conformity in above areas.
- A Major/severe accident shall attract a penalty of Rs. 2,00,000/- per head
- Fatality or permanent disability with total loss of earning capacity, if any, will attract a penalty of Rs. 5,00,000/- (Rs. Five Lakh).
- Further fatality/permanent disability shall attract double the last penalty imposed on the agency.
- Above penalties are exclusive of medical expenses of the victim or compensation to the family through insurance policy (WC Policy or group insurance).
- **Penalties imposed by customer shall be fully transferable to the sub-contractor. In the event of above cases, penalties shall be imposed whichever will be higher.**
- Evaluation of agency's performance on HSE compliance shall be done as per BHEL guide lines/system.

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Revision History

Revision Date	Revision No.	Old Text	New Text	Reason	Revised by (with sign)
03.05.2019	00	N/A	Full Document	New Release	
12.10.2021	01	Nil	Attend HSE familiarization program at TBG-HQ with his site management team. This will be a half day long awareness session on HSE requirements and compliances which the agency is supposed to fulfil during contract execution at site. The session shall be taken by TBG HSE department on intimation by TBSM. (at page no. 5)	For better understanding of HSE requirements to agency. (HSE Review meeting dated 23.08.2021)	
12.10.2021	01	Edition	Inclusion of penalty provisions in case of non-deployment of safety person(page-8)	Introduction of HSEP-14	
17.01.2024	02	Edition	Appointment and duties of qualified safety officer (Page-8)	As per BOCW 1996	

-:End of Document:-

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP,
NEW DELHI



CONDITIONS OF CONTRACT
FOR
ERECTION WORKS

DOC. NO. – TB-ETC-GCC,REV.-02
20th JUNE, 2005

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

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BHARAT HEAVY ELECTRICALS LTD.
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SECTION- A

GENERAL

INSTRUCTIONS TO

TENDERERS

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

SECTION - A

GENERAL INSTRUCTIONS AND INFORMATION FOR TENDERER

A.1.0 : PROCEDURE FOR SUBMISSION OF SEALED TENDERS

Please refer Annexure to the Conditions of Contract for Erection work attached with the tender documents

PART - II (PRICE - BID) COVER - II:

Rate/Price Schedule only shall be given in this part - II "Price Bid".

A.2.0 : PROCEDURE FOR EVALUATION OF PRICE BID

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS" attached with the tender document

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

A.3.0

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

A.4.0

A.5.0

A.6.0

A.7.0

A.8.0

A.9.0

BHARAT HEAVY ELECTRICALS LTD.
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A.10.0

A.11.0

A.12.0

A.12.1

A.12.2

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

A.12.3 Three years financial turn over (certified), present commitments with all orders in hand, value of total order, value completed, and balance with completion dates as per Annexure-A.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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A.12.4 ORGANISATION CHART & MANPOWER DEPLOYMENT:

The organisation pattern and the manpower that are totally available with him & that will be deployed by the tenderer for this work in the form of month wise and category wise deployment plan duly indicating the number of Engineers, Supervisors, Skilled and Unskilled Workers etc. as per proforma at Annexure-B shall be submitted.

A.12.5 A list of machines, tools and plant that the tenderer is having and those that will be deployed on this job giving proof of ownership or any tie-up of equipment as per proforma enclosed at Annexure-C.

A.12.6 Analysis of unit rate quoted as per proforma enclosed at Annexure-D.

A.12.7 Declaration sheet as per proforma enclosed at Annexure-E.

A.12.8 Checklist as per proforma enclosed at Annexure-F.

A.12.9 Certificate from schedule Bank to prove his financial capacity to undertake the work or solvency certificate from the concerned Government Authority.

A.12.10 A certificate of Income Tax/Sales Tax verification from the appropriate authority in the forms prescribed duly indicating annual turnover. These certificates shall be valid for one year from the date of issue or for the period prescribed therein for all tenders submitted during the period.

A.12.11 In addition to the above, the particulars required elsewhere in the tender documents.

A.12.12 NOTE: In terms of clauses A.12.1 to A.12.11 above, all the data required to be enclosed with the tender need to be furnished neatly typed, signed & stamped in the given formats only (in the form of separate sheets) failing which the tender may be considered as incomplete and is liable for rejection. Documentary proof wherever necessary also need to be enclosed.

A.13.0 EARNEST MONEY DEPOSIT

A.13.1 Please refer "Annexure to conditions of contract for ETC Work" attached with the tender documents.

BHARAT HEAVY ELECTRICALS LTD.
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Conditions of Contract for Erection Works, Rev-02

A.13.2

A.13.3

A.13.4

A.13.5 Please refer " Annexure to conditions of contract for ETC Work"
attached with the tender documents.

A.13.6

A.13.7

A.13.8

Above clause No. A.13.0 stands deleted. Please refer Annexure to conditions of contract for ETC works.

A.14.0 **AUTHORISATION AND ATTESTATION:**

A.14.1 Tenders shall be signed by persons duly authorised / empowered to do so. Certified copies of such authority and relevant documents shall be submitted along with the tenders.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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A.15.0 VALIDITY OF OFFER:

A.15.1 THE OFFER SHALL BE KEPT OPEN FOR ACCEPTANCE FOR A MINIMUM PERIOD OF FOUR MONTHS FROM THE DATE OF OPENING OF TENDERS. In case the BHEL calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderer.

A.16.0 EXECUTION OF CONTRACT :

A.16.1 The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent by BHEL. The successful tenderer shall be required to execute an agreement in the prescribed form as per Annexure-H with BHEL within a reasonable time after the acceptance of his tender and in any case before submitting the first bill for payment. The expenses for completion, stamping and registration of the agreement with prescribed authority if necessary, shall be borne by the contractor.

A.17.0 SECURITY DEPOSIT:

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

A.17.1

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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e)

f)

Please refer " Annexure to conditions of contract for ETC Work"
attached with the tender documents.

g)

h)

i)

j)

k)

l)

Note

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

A.17.2

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

A.17.3

A.17.4

A.17.5

A.17.6

A.17.7

Above clause No. A.17.0 stands deleted. Please refer Annexure to conditions of contract for ETC works.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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A.19.0 **REJECTION OF TENDER & OTHER CONDITIONS:**

A.19.1

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

A.19.2

A.19.3

A.19.4

A.19.5

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A.19.6

A.19.7

A.19.8

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

A.19.9

A.19.10

A.19.11

A.19.12

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

- A.19.13 The tenderers must go through Annexure 'Q' of Section-B which details out the List of Tools, Tackles & Calibrated Test Equipments to be arranged by ETC contractor together with special purpose instruments which can be provided by BHEL free of cost for execution of work provided the same is informed to BHEL on award of contract.

Also, Annexure 'Q' gives the details of specialised Services which can be provided by BHEL for system commissioning on NO CHARGE basis with advance intimation to 'ENGINEER' in this regard. The tenderer must also see Clause E.4.2 & E.6.3 of Section E for more details.

- A.19.14 IT WOULD BE PREFERRED THAT YOUR OFFER IS WITHOUT ANY DEVIATION w.r.t. TENDER SPECIFICATIONS AND THE SAME MAY BE CLEARLY MENTIONED ON THE COVERING LETTER ACCOMPANYING THE TECHNICAL BID. Offers with deviations are likely to be rejected. However if the bidder insists on any technical or commercial deviations, from the specification and/or tender conditions, the price implication if any, of withdrawing the deviations must be submitted along with the price bid in a separate sealed envelope superscribed "Price Implication for withdrawal of deviations". No price implication for withdrawal of deviation shall be accepted at a later date, after the opening of technical bid.

BHARAT HEAVY ELECTRICALS LTD.
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ANNEXURE - A

DETAILS OF WORK EXECUTED / BEING EXECUTED

A) WORK EXECUTED

SL. NO.	FINANCIAL YEAR	CUSTOMER	DESCRIPTION OF WORK	TOTAL ORDER VALUE	REMARKS

B) WORK BEING EXECUTED

SL. NO.	CUSTOMER	DESCRIPTION OF WORK	TOTAL VALUE	VALUE OF THE PORTION COMPLETED	ACTUAL START DATE	EXPECTED COMPLETION DATE	REMARKS

**(SIGNATURE OF TENDERER)
WITH STAMP**

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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ANNEXURE - B

**(A) PROPOSED MANPOWER (ENGINEERS / SUPERVISORS) RESOURCES
FOR EXECUTION OF WORK**

SL. NO.	NAME OF STAFF	QUALIFICATION	EXPERIENCE IN YEARS	REMARKS

(B) MONTH WISE MANPOWER DEPLOYMENT PLAN

SL. NO.	CATEGORY	INDICATE NO. OF PERSONS TO BE DEPLOYED IN EACH MONTH								
		1st	2nd	3rd	4th	5th	6th	7th	8th	AND SO ON

(C) Total Man-days planned to be deployed for the work :Man-days
Plus man-days for unskilled labour as per site requirement.

**(SIGNATURE OF TENDERER)
WITH STAMP**

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02**

ANNEXURE - C

(A) STATUS OF TOOLS, PLANTS & INSTRUMENTS

Sl. No.	Name of Eqpt.	Quantity owned	Registration No. wherever applicable	Documents enclosed for proof of Ownership/Tie-up	Present Location	Quantity proposed to be deployed for this job

(B) MONTH WISE TOOLS, PLANTS & INSTRUMENTS DEPLOYMENT PLAN

Sl. No.	Description of Tools, Plants and Instruments	(Indicate No. to be deployed in each month)							
		1st	2nd	3rd	4th	5th	6th	7th	and so on

**(SIGNATURE OF TENDERER)
WITH STAMP**

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

ANNEXURE - D

ANALYSIS OF UNIT RATE

Sl. No.	DESCRIPTION	PERCENTAGE OF THE UNIT RATE	REMARKS
01	Salary & Wages for staff & workers		
02	Materials (a)) (b)) (c)) (d))		
03	Depreciation & maintenance for T & P		
04	Depreciation & maintenance for other items		
05	Establishment & Admn. expenses of site		
06	Overheads		
07	Profit		

**(SIGNATURE OF TENDERER)
WITH STAMP**

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

ANNEXURE -E

DECLARATION SHEET

I hereby certify that all the information and data furnished by me with regard to this Tender Specification No. are true and complete to the best of my knowledge. I have gone through the specification, conditions and stipulations in detail and agree to comply with the requirements and intent of specifications.

(SIGNATURE OF TENDERER)
WITH STAMP

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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ANNEXURE - F

CHECKLIST & SCHEDULE OF GENERAL PARTICULARS

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

1. Name & Address of the Tenderer :
2. Telegraphic/telex address :
3. Phone/Fax No. (Office) :
4. Name & designation of the official of the tenderer to whom all the references shall be made :
5. Tenderer's Proposal No. & date :
6. Whether EMD submitted (by cash/ Bank Guarantee/Bank Draft) : By.....
7. Validity of offer/rates quoted for six months from the date of opening of tender : Yes/No
8. Attested copy of power of attorney as per Clause-A.12.1 : Yes/No
9. Solvency Certificate submitted as per Clause-A.12.9 : Yes/No
10. Income Tax/Sales Tax Certificate submitted as per Clause-A.12.10 : Yes/No
11. Details of work executed/being executed as per Annexure-A : Yes/No
12. Monthwise & Category wise manpower deployment plan as per Annexure-B : Yes/No
13. Status of Tools, Plants and Instruments & their month wise deployment plan as per Annexure-C : Yes/No
14. Analysis of unit rate quoted as per Annexure-D : Yes/No
15. Declaration sheet as per Annexure-E : Yes/No
16. Request for registration (for new tenderers) submitted : Yes/No

Date

(SIGNATURE OF TENDERER)
WITH STAMP

WITNESS : (Signature with full particulars)

- 1.
- 2.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
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ANNEXURE - H

CONTRACT AGREEMENT

CONTRACT NO. :
LETTER OF INTENT NO. :
WORK ORDER NO. :

1. The Contract Agreement entered into the day of, 20... (..... day oftwo thousand and..... ..) at New Delhi between M/S BHARAT HEAVY ELECTRICALS LIMITED, TRANSMISSION BUSINESS GROUP, New Delhi, having it's Registered Office at BHEL House, Siri Fort, New Delhi - 110 049 (hereinafter called the FIRST PARTY which expression shall include their executors, administrators, successors and permitted assigns)

AND

M/S (hereinafter called the SECOND PARTY which expression shall include their executors, administrators, successors and permitted assigns).

2. And whereas the FIRST PARTY called for the offer for the work of..... as per approved specifications, drawings and quality plan at as per Tender Specification No..... , dated
3. Whereas the SECOND PARTY submitted their offer No. dated against above.
4. Whereas the FIRST PARTY has accepted the offer referred to above & issued Letter of Intent No....., dt..... and also detailed Work Order No..... dt
5. Whereas the SECOND PARTY has agreed to work as Sub-Contractor of the FIRST PARTY on the conditions specified in the Tender Specifications at a contract price of Rs.....(Rupees.....)
6. Now, therefore it is hereby mutually agreed to by and between the parties hereto as under :
- a) The SECOND PARTY shall execute the works of at on the conditions specified in Tender Specifications of FIRST PARTY and Letter of Intent referred to herein before at a total contract price of Rs..... (Rupees))
- b) That the SECOND PARTY shall organise all activities and mobilisation of facilities so that the work specified herein before is completed byas per the time bound programme mentioned in the Tender Specifications.

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- c) That all disputes arising out of or relating to this agreement shall be referred to the sole Arbitrator as per arbitration clause mentioned in the Tender Specifications. The Arbitrator from time to time with the consent of the parties enlarge the time for making and publishing award without reference to the court for the purpose.
 - d) That the jurisdiction in all suits or claims arising out of this agreement shall be of New Delhi Courts only.
 - e) The Following documents shall form part of this agreement :-
 - i)
 - ii)
 - iii)
 - iv)
 - v)
 - vi)
7. Deviation Limit : The contract value is subject to deviations depending upon the actual requirement within plus or minus 30%. Quantities of individual items may vary to any extent or may get deleted.
8. Terms of Payment : The terms of payment applicable to this contract shall be those covered under Point No.... of Work Order dt. and as per Tender Specifications.
9. Abandoning the work : In the event of the SECOND PARTY abandoning the work, FIRST PARTY reserves the right to get the unfinished work done at the risk and cost of the SECOND PARTY.
10. All other terms and conditions shall be as stipulated in the Tender Documents.
11. This contract agreement consists.... pages.

IT WITNESS WHEREOF, the parties have signed this agreement on the date, month and year first above written in presence of:

For and on Behalf of
(FIRST PARTY)

WITNESS (WITH ADDRESS)

For and on Behalf of
(SECOND PARTY)

- 1.
- 2.

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ANNEXURE - I

MODEL FORM OF BANK GUARANTEE (FOR SECURITY DEPOSIT)

1.

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

2.

b)

c)

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5.

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

6.

7.

NOTE

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ANNEXURE - J

PROFORMA FOR PERFORMANCE GUARANTEE
(to be used in appropriate value non - judicial stamp paper)

1. This deed of guarantee made this day of 20... by Bank Limited in favour of Bharat Heavy Electricals Limited, having their registered office at BHEL House, Siri Fort, New Delhi - 110 049.
2. Whereas M/s (hereinafter called the CONTRACTOR / SELLER have entered into a Contract bearing No. dated..... (hereinafter called the CONTRACT) for supply / civil works /erection, testing and commissioning of M/s Bharat Heavy Electricals Limited (hereinafter called the COMPANY).
3. And whereas the said CONTRACT Inter - alia provides that the CONTRACTOR / SELLER shall pay to the COMPANY a sum of Rs. only towards Performance Guarantee in the form and manner therein specified.
4. And whereas the SELLER / CONTRACTOR have approached Bank Limited (hereinafter referred to as the GUARANTOR) and at their request and in consideration of the arrangement arrived at between the CONTRACTOR and the GUARANTOR, the GUARANTOR has agreed to give the Guarantee as hereinafter mentioned in favour of the COMPANY.

NOW THIS DEED WITNESSES AS FOLLOWS:

5. The GUARANTOR by the hand of Mr. and its lawfully and fully constituted attorney and do hereby guarantee the due and faithful performance of the said CONTRACT and do hereby irrevocably undertake and promise to pay the COMPANY without any demur merely on demand made by them a sum not exceeding Rs. only in case the COMPANY sustains any loss or damage by reason of any breach, default by the CONTRACTOR / SELLER of any of the terms, conditions, stipulations or undertakings or any one of them contained in the said CONTRACT and the tender documents attached hereto and for payment of any moneys payable by the CONTRACTOR / SELLER to the COMPANY under the terms and conditions of the said CONTRACT. The decision of the COMPANY regarding the breach, default, loss, damage and payment shall be conclusive and binding in the GUARANTOR, irrespective of the fact whether the CONTRACTOR / SELLER admits or denies such claims or questions its correctness in any court, tribunal or arbitration proceedings or before any other authority.

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6. The COMPANY shall have the fullest liberty without effecting in any way the liability of the GUARANTOR under this guarantee, from time to time to vary any of the terms and conditions of the CONTRACT or extend time by the SELLER / CONTRACTOR or to postpone for any time and from time to time any of the powers exercisable by its against the SELLER / CONTRACTOR and either to enforce or forbear from enforcing any of terms and conditions governing the CONTRACT or securities available to the COMPANY and the GUARANTOR shall not be released from its liability under these presents by any exercise by the COMPANY of the liberty with reference to the matters aforesaid or by reason of time being given to the SELLER or any other forbearance, act or omission on the part of the COMPANY or any indulgence by the COMPANY to the SELLER / CONTRACTOR or of any other matter or thing whatsoever which under the law relating to sureties, would but for this provision have the effect of so releasing the GUARANTOR / CONTRACTOR from its liability under this Guarantee.
7. This Guarantee shall remain in full force and effect and the GUARANTOR shall be liable under the same irrespective of any concession or time being granted by the COMPANY to the CONTRACTOR in or for fulfilling the said CONTRACT and this Guarantee shall remain in full force irrespective of any change in terms and conditions, stipulations or any variations in the terms of CONTRACT irrespective of whether notice of such change and / or variation is given to the GUARANTOR or not and the claim to receive such notice of any change and or variation of the terms / or conditions of the CONTRACT is hereby specially waived by the GUARANTOR.
8. The GUARANTEE herein contained shall not be determined, prejudiced or effected by the liquidation or winding up or insolvency of or change in the constitution of the CONTRACTOR but shall in all respects and for all purposes be binding and operative until all payments or all moneys due or that may hereafter become payable to the COMPANY are paid in respect of any liability or obligation of the CONTRACTOR under the CONTRACT.
 - b) The GUARANTOR further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the commencement of the CONTRACT till end of the CONTRACT and its claim satisfied or discharged and till the COMPANY certified that the terms and conditions of the CONTRACT have been fully and properly carried out by the SELLER and accordingly discharges this guarantee, subject, however, that the COMPANY shall have no claim under this Guarantee after months from the date of completion of the Guarantee has been served on the GUARANTOR before the expiry of the said period in which case the same shall be enforceable against GUARANTOR notwithstanding the fact that the same is enforced after expiry of said period.

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The GUARANTOR undertake not to revoke this Guarantee during the period it is in force except with the previous consent of the COMPANY in writing and agree that any liquidation or winding up or insolvency or dissolution or any change in the constitution of the SELLER or the GUARANTOR shall not discharge the GUARANTOR's liability here under.

It shall not be necessary for the COMPANY to proceed against the SELLER before proceeding against the GUARANTOR and the Guarantee herein contained shall be enforceable against them notwithstanding any security which the company may have obtained or obtained from the SELLER shall at the time when proceedings are taken against the GUARANTOR here under be outstanding or unrealized.

The GUARANTOR hereby declares that it has power to execute this Guarantee and the executant has full powers to do so on its behalf under the proper authorities granted to him / them by of the guarantor.

10. Notwithstanding anything herein before contained, our liability under this Guarantee is restricted to Rs. (Rupees only) and will expire on and unless a claim in writing is presented to us or an action or suit to enforce the claim is filed against us, within six months from the date, all our rights shall be forfeited and we shall be relieved and discharged from all our liabilities thereunder.

IN WITNESS whereof the (Bank) have hereunto set and subscribed their hands the day, month and year first above written.

**SIGNED FOR AND ON
BEHALF OF THE BANK**

WITNESS:

NAME AND ADDRESS

SIGNATURE

1.

2.

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ANNEXURE - K

**REVISED PRICE OFFER IN LIEU OF WITHDRAWAL OF DEVIATIONS/
CLARIFICATIONS OFFERED BY BHEL DURING TECHNICAL DISCUSSION**

Sl. No.	Clause Ref.	Description of Deviation/ Clarification	Whether Increase/ Decrease in Price	Unit Rate (if applicable)	Total Increase/ Decrease	Remarks

NOTE: Total increase or decrease in total price shall be indicated either in percentage or in value (Rs.).

**(SIGNATURE OF TENDERER)
WITH STAMP**

BHARAT HEAVY ELECTRICALS LTD.
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ANNEXURE -L

(On Bank's Letter Head)

To,
AGM(Finance)
Transmission Business Group,
Block-VI, Central Annexe, IInd Floor,
Bharat Heavy Electricals Ltd.
Bhopal – 462 022

Ref & Date

Sub : Confirmation of Bank Guarantee no. <<BG No.>>

We are a Scheduled Bank other than Co-operative sector Bank under the RBI Act 1934. The aforesaid << BG No.>> for Rs. <<BG Amount>>/ (In Words Also) and valid up to <<validity date>> is issued by us on behalf of M/s << Beneficiary's Name>> in favour of BHARAT HEAVY ELECTRICALS LTD.

The format of the Bank guarantee is strictly as per the format prescribed by M/s BHEL and the stamp papers forming part of the BG are as per the state rules extant.

The signatures to the Bank Guarantee are duly authorised.

Thanking you,

For & On behalf of
Name of the Bank & Seal

(Please Sign here)

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SECTION-B

GENERAL TERMS AND **CONDITIONS**

BHARAT HEAVY ELECTRICALS LTD.
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SECTION - B

GENERAL TERMS AND CONDITIONS

- B.1.0 The following terms shall have the meaning hereby assigned to them except where the context requires otherwise:-
- B.1.1 BHEL (or B.H.E. Ltd.) shall mean Bharat Heavy Electricals Limited, a Company registered under Indian Companies Act 1956, with its Registered Office at BHEL House, Siri Fort, New Delhi-110 049 or its Authorised Officers or its Engineer or other Employees authorised to deal with any matters with which these persons are concerned.
- B.1.2 "GENERAL MANAGER" shall mean the Officer in Administrative charge of the Contracting Unit of BHEL.
- B.1.3 "ENGINEER" OR "ENGINEER-IN-CHARGE" shall mean Engineer deputed by BHEL. The term includes "Deputy General Manager, Construction Manager, Resident Engineer, Assistant Site Engineer of BHEL/at the site as well as the officers in charge at Head Office.
- B.1.4 "SITE" shall mean the place or places at which the plants/equipments are to be erected and services are to be performed as per the specification of this tender.
- B.1.5 "CLIENTS OF BHEL" or "CUSTOMER/OWNER" shall mean the organisation to whom BHEL is responsible for this work.
- B.1.6 "CONTRACTOR" or "ETC CONTRACTOR" shall mean the individual, firm or Company who enters into this Contract with BHEL and shall include their executors, administrators, successors and assigns.
- B.1.7 "CONTRACT" or "CONTRACT DOCUMENT" shall mean and include the agreement, the work order, the accepted appendices of rates, Schedules of Quantities, if any, General Terms and Conditions of Contract, Special Conditions of Contract, Instructions to Tenderer, the drawings, the Technical Specifications, the Special Specifications, if any, the tender documents and the Letter of Intent/Accepting Letter issued by BHEL. Any conditions or terms stipulated by the tenderer in the tender documents or subsequent letters shall not form part of the Contract unless specifically accepted in writing by BHEL in the Letter of Intent and incorporated in the Agreement.
- B.1.8 "GENERAL CONDITIONS OR CONTRACT" shall mean the "Instructions and Information for Tenderer and General Terms and Conditions" pertaining to the work detailed.

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- B.1.9 "TENDER SPECIFICATIONS" shall mean the Special Conditions, Technical Specifications, Appendices, Site Information and drawings pertaining to the work for which the tenderer are required to submit their offer. Individual Specification Numbers will be assigned to each technical specifications.
- B.1.10 "TENDER DOCUMENTS" shall mean the General Terms and Conditions and Tender Specifications.
- B.1.11 "LETTER OF INTENT" shall mean the intimation by a letter/telegram/telex/ fax to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all the terms and conditions of contract are applicable from this date.
- B.1.12 "COMPLETION TIME" shall mean the period by date specified in the Letter of Intent/Work Order or date mutually agreed upon for handing over of the erected equipment/plant which are found acceptable by the Engineer being of required standard and conforming to the specifications of the contract.
- B.1.13 "ZERO DATE" shall mean the planned commencement date of work under this tender and shall be date of issue of Letter of Intent.
- B.1.14 "PLANT OR PROJECT OR SWITCHYARD" shall mean and connote the entire assembly of the plant and equipments covered by the contract.
- B.1.15 "EQUIPMENT" shall mean all equipments, machineries, materials, structural, electrical and other components of the plant covered by the contract.
- B.1.16 "TESTS" shall mean and include such test or tests to be carried out by the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contracted work or part thereof.
- B.1.17 "APPROVED" "DIRECTED" or "INSTRUCTED" shall mean approved, directed or instructed by BHEL.

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- B.1.18 "WORK OR CONTRACT WORK" shall mean and include supply of all categories of labour, specified consumables, tools and tackles required for complete and satisfactory site transportation, handling, stacking, storing, civil and electrical works, erection, testing & commissioning of the equipment to the entire satisfaction of BHEL.
- B.1.19 "SINGULAR AND PLURAL" etc. words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting masculine gender shall be taken to include the feminine gender and words imparting persons shall include any Company or Association or Body or Individuals, whether incorporated or not.
- B.1.20 "HEADINGS" The headings in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation of construction thereof or the contract.
- B.1.21 "MONTH" shall mean calendar month.
- B.1.22 "WRITING" shall include any manuscript typewritten or printed statement under the signature or seal as the case may be.

B.2.0 LAW GOVERNING THE CONTRACT & COURT JURISDICTION:

The Contract shall be governed by the Law for the time being enforce in the Republic of India. The Civil Court at New Delhi having ordinary Original Civil Jurisdiction shall alone have exclusive jurisdiction in regard to all claims in respect of this contract.

B.3.0 ISSUE OF NOTICE:

The contractor shall furnish to the Engineer, the name, designation and address of his authorised agent and all complaints, notices, communications and references shall be deemed to have been duly given to the Contractor, if delivered to the Contractor or his authorised agent and shall be deemed to have been so given in the case of posting on the day on which they would have reached such address in the ordinary course of post or at which they were so delivered or left.

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B.4.0 USE OF LAND:

No land belonging to BHEL or its customer under temporary possessions of BHEL shall be occupied by the contractor without the written permission of BHEL.

B.5.0 COMMENCEMENT OF WORK:

B.5.1 The contractor shall commence the work within fifteen days of Letter of Intent or the time indicated in the Letter of Intent/Work Order and shall proceed with the same with due expedition without delay.

The Contractor shall have to give programme of work in Annexure 'M' to the ENGINEER-IN-CHARGE after mobilisation at site. This will have to be regularly updated / revised so as to meet the Project completion schedule as per requirement of BHEL /Owner.

B.5.2 If the successful tenderer fails to commence the work within the stipulated time, BHEL, at its sole discretion will have the right to cancel the Letter of Intent/Contract. His Earnest Money and/or Security Deposit will stand forfeited without any further reference to him without prejudice to any and all of BHEL's other rights and remedies in this regard.

B.5.3 All the works shall be carried out under the direction and to the satisfaction of BHEL/Customer/Owner.

B.5.4 The transported equipment, erected/constructed plant or work performed under the contract, as the case may be, shall be taken over when it has been completed in all respect and/or satisfactorily put into operation at site.

B.6.0 MEASUREMENT OF WORK AND MODE OF PAYMENT:

B.6.1 All payments due to the contractor shall be made only by "Account Payee Cheques".

B.6.2 For progress/running bill payments, the contractor shall present detailed measurement sheets in duplicate duly indicating all relevant details based on technical documents, protocols & material test reports and connected drawings for the work done during the calendar month/period under different categories in line with terms of payment as per Letter of Intent. The basis of arriving at the quantities/ weights shall be the relevant documents and drawings released by BHEL.

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These measurement sheets shall be prepared jointly with Engineer and signed by both parties. Where required, joint measurement with Customer/Owner shall have to be taken.

- B.6.3 The measurement sheets will be checked by the Engineer and quantities and percentage eligible for payment under different groups shall be decided by him. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in the Measurement Book & signed by both the parties. Where required counter signature of Customer/Owner shall have to be taken.
- B.6.4 Based on the above quantities, contractor shall prepare the bills in the prescribed proforma and work out the financial value. These will be entered in the Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the Contractor.
- B.6.5 All recoveries due from the contractor for the month/period shall be effected in full from corresponding running bills unless specific approval from Competent Authority is obtained to the contrary.
- B.6.6 Measurement shall be taken jointly by person duly authorised by BHEL and the Contractor.
- B.6.7 The Contractor shall bear the expenditure involved, if any, in taking the measurements and testing of materials to be used in the works. The Contractor shall without extra cost to BHEL, provide all the assistance with appliances and other things necessary for measurement.
- B.6.8 If at any time due to any reason whatsoever, it becomes necessary to remeasure the work done, in full or in part, the expenses towards such re-measurement shall be borne by contractor.
- B.6.9 Passing of bills covered by such measurement does not amount to acceptance by BHEL of the completion of the work measured. Any left out work has to be completed by the Contractor, as directed by BHEL.
- B.6.10 Final measurement bill shall be prepared in the proforma prescribed for the purpose, based on the certificate issued by the Engineer that the entire work as stipulated in the tender specification has been completed in all respects to the entire satisfaction of BHEL.

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The contractor shall give unqualified "No claim" and "No Demand" certificates. All the tools and tackles loaned to him should be returned in condition satisfactory to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Book and signed by both the parties. The final bill shall be paid after completion of all the defects/deficiencies etc. pointed out by BHEL. The contractor should submit all the original documents such as material consumption, site order book etc. maintained at site. After payment of final bill only guarantee obligation, percentage value shall remain unpaid which shall be released in accordance with Clause A.15.0.

B.7.0 RIGHTS OF BHEL:

B.7.1 Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

B.7.2

B.7.3

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B.7.4

B.7.5 Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

B.7.6

B.7.7

B.7.8

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B.7.9

Please Refer "ANNEXURE TO CONDITIONS OF CONTRACT FOR ETC WORKS"
attached with the tender document

B.7.10

B.7.11

B.8.0 RESPONSIBILITY OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC:

The following are the responsibilities of the Contractor in respect of observance of local laws, employment of personnel, payment of taxes etc.

- B.8.1 As far as possible, unskilled workers shall be engaged from the local areas in which the work is being executed. In case of any necessity is felt by the contractor to bring labourers from out side State, provisions of law governing such immigration by the concerned State are to be followed.
- B.8.2 The Contractor at all times during the currency of this contract, shall in all his dealings with the local labour for the time being employed on or in connection with the work, have due regard to all local festivals, religious and other customs.
- B.8.3 The contractor shall comply with all State and Central Laws, Statutory Rules, Regulations etc., such as : The payment of wages to, The Minimum Wages Act, The Workmen Compensation Act, The Employees Liability Act, The Industrial Dispute Act, The Employees Provident Fund and Miscellaneous Provisions Act 1952, Employees State Insurance Scheme, The Contract Labour (Regulations & Abolition) Act 1970 and other Acts, Rules and Regulations for labour as may be enacted by the Government during the tenure of the contract and having in force or jurisdiction at site. The Contractor shall give to the local Governing Body, Police and other concerned Authorities all such notice as may be required under law.

The contractor should have Provident Fund Code Number and shall ensure compliance of the EPF & MP Act, 1952 by the sub-contractors, if any engaged by the contractor for the said work,

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- B.8.4 The contractor, as required, will obtain independent license under the Contract Labour (Regulations and Abolition) Act 1970 from the concerned authorities based on the certificate (Form-V) issued by the Principal Employer/Customer.
- B.8.5 The Contractor shall pay all taxes, fees, license charges, deposits, duties, tolls, royalty, commissions or other charges which may be Leviable on account of any of his operations connected with this contract. The Contractor is responsible to furnish documentary evidence towards GST Registration of the State wherein the site is located and any other documents as per GST Act which may be required from time to time by BHEL. The contractor should have to get the contract registered immediately after award of works as per rules and regulations of the State Government. The contractor will file regular return as per statute of the State/ Centre and provide all information to BHEL as required for the assessment of the project concerned . In case BHEL is forced to make any of such payments, BHEL shall recover the same from the contractor either from moneys due to him or otherwise as deemed fit.
- B.8.6 Arrangements for the periodical visits of inspection agencies such as Electrical Inspector etc. to site, inspection certificates etc. will have to be made by the contractor at his cost. The contractor will also meet all expenses in connection with his welder's qualification/ re-qualification tests etc.
- B.8.7 The contractor shall be responsible for provision of health and sanitary arrangements {more particularly described in the Contract Labour (Regulation & Abolition) Act 1970} and safety precautions as may be required for safe and satisfactory execution of the contract.
- B.8.8 The Contractor shall be responsible for proper accommodation including adequate medical facilities for the personnel employed by him.
- B.8.9 The Contractor shall be responsible for the proper behaviour and observance of all regulations by the staff employed by him.
- B.8.10 The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused, it shall be the responsibility of the contractor to make good the losses or compensate them.

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- B.8.11 All the properties/equipment/components of BHEL/its customer loaned with or without deposit, to the contractor, shall remain the properties of BHEL/its customer. The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipment/components shall be taken to in good condition unless notified to the contrary by the contractor within 48 Hrs. The Contractor shall return them in good conditions as and when required by BHEL/its customer. In case of non-return, loss, damage repairs etc., the cost thereof, as may be fixed by the Engineer, will be recovered from the contractor.
- B.8.12 It shall not be obligatory on the part of BHEL to supply any tools and tackles or materials other than those specifically agreed to be given by BHEL. However, depending upon availability/possibility, BHEL/its customer's equipment and other materials may be made available to the contractor on payment of the hire charges as fixed by them, subject to the conditions laid down by BHEL/its Customer from time to time. Unless paid in advance, such hire and other charges shall be recovered from out of dues to the contractor or Security Deposit in one instalment.
- B.8.13 The Contractor shall fully indemnify and keep indemnified BHEL/its customer against all claims of whatsoever nature arising during the course of execution of this contract.
- B.8.14 In case the contractor is required to undertake any work outside the scope of this contract, the amount payable shall be as may be mutually agreed upon.
- B.8.15 Any delay in completion of works or non-achievement of periodical targets, due to reasons attributable to the contractor, will have to be compensated by the contractor either by increased manpower and resources or by working extra hours or more than one shift at no extra cost to BHEL.
- B.8.16 The contractor shall execute the work under the conditions usual to such construction work and in conjunction with numerous other operations at site and proceed in a manner that shall help in the progress of work at site as a whole.
- B.8.17 The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving details of all payments made to the workmen duly signed by the contractor's representative should be furnished to BHEL, along with each Running Account Bill. Also, Contractor shall display wages paid by him as per The Minimum Wages Act.

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- B.8.18 In case of any class of work for which there is no specification laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.
- B.8.19 No levy, payment or charges made or imposed shall be impeached by reason of any clerical error or by reason of any mistake in the amount levied, demanded or charged.
- B.8.20 No idle labour charges will be admissible in the event of any stoppage of work resulting in the contractor's workmen being rendered idle due to any reason any time.
- B.8.21 The contractor shall take all reasonable care to protect the materials and the work till such time the place/equipment has been taken over by BHEL/its customer.
- B.8.22 The contractor shall not stop work or abandon the site for whatsoever reason or dispute, excepting for force majeure conditions. All problems/disputes shall be separately discussed and settled without effecting the progress of work. Stoppage or abandonment of work, other than under force majeure conditions, shall be treated as breach of work of contract and dealt with accordingly.
- B.8.23 The contractor shall keep the area of work clean and shall remove debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of works, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.
- B.8.24 The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/or as per instructions of the Engineers.
- B.8.25 The contractor shall furnish progress reports on work at regular intervals as required by the Engineer.

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B.9.0 RESPONSIBILITIES OF CONTRACTOR IN RESPECT OF SAFETY OF MEN, EQUIPMENT, MATERIAL & ENVIRONMENT:

- B.9.1 All safety rules and codes applied by BHEL/its customer at site shall be observed by the contractor and his workmen without exception. The contractor shall be responsible for the safety of the equipment/materials and work to be performed by him and shall maintain all lights, fencing guards, signs etc. or other protections necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer, with a view to prevent pilferage, accidents, fire hazards etc. and suitable number of clerical staff, watch and ward, store keepers to take care of equipment, materials and construction tools and tackles shall be posted at site by the contractor till the completion of the work under this contract. The contractor shall arrange for such safety devices as are necessary for this type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per usual standards and practices.
- B.9.2 The contractor shall provide to its work force and ensure the use of required personal protective equipment as found necessary & as directed by the authorised BHEL officials in line with latest Amendments / Revisions of various Indian Standards.
- i) Safety helmets conforming to IS-2925 : 1984.
 - ii) Safety belts conforming to IS-3521 : 1983.
 - iii) Safety shoes conforming to IS-1989 : 1978.
 - iv) Eye and face protection devices conforming to IS-8520 : 1977 and IS-8940 : 1978.
 - v) Hand and body protection devices conforming to IS-2573 : 1975, IS-6994 : 1973, IS-8807 : 1978 and IS-8519 : 1977.
- B.9.3 All tools, tackles, fitting appliances, material handling equipment, scaffolds, cradles, safety nets, ladders, equipment, etc. used by the contractor (as per Annexure 'N') shall be of safe design and construction and maintained in good condition. However BHEL officials shall have the right to ban use of any of them or get them tested at their discretion.

All test & measuring instruments to be pre-calibrated through certifying agency before use. Also, please see. Cl. E.4.2 & E.6.3 of section - E for more details.

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All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the relevant requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carry out electrical works.

- B.9.4 All electrical appliances including portable electric tools used by contractor shall have safe plugging system to source of power and be appropriately earthed.
- B.9.5 The contractor shall not use any hand lamp energised by electric power with supply voltage of more than 240 volts. For work in confined spaces, lighting shall be arranged with power source of not more than 240 volts.
- B.9.6 Where it becomes necessary to provide and/or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such provision and/or storage in accordance with the rules and regulations laid down in the relevant Government Acts, such as Petroleum Act, Explosive Act, Petroleum and Carbides of Calcium Manual of the Chief Controller of Explosives, Government of India etc. Prior approval of the authorised BHEL official at the site shall also be taken by the contractor in all such matters.
- B.9.7 The contractor shall arrange at his cost appropriate illumination as required at all work spots for safe working, when natural day light may not be adequate for clear visibility.
- B.9.8 In case of a fatal or disabling injury/accident to any person at construction sites pertaining to this work, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial penalty on the contractor & recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.
- B.9.9 In case of any damage to property due to lapse by the contractor, BHEL shall have the right to recover the cost of such damages from the payments due to the contractor.
- B.9.10 In case of any delay in the completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay

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from the payments due to the contractor, after notifying the contractor suitably and giving him opportunity to present his case.

- B.9.11 If contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorised BHEL official, BHEL shall have the right to take the corrective steps at the risk and cost of the contractor after giving appropriate notice indicating the steps that would be taken by BHEL.
- B.9.12 The contractor shall submit report of all accidents, fires, property damaged & dangerous occurrences connected with his area of work or caused due to his action/ inaction, to the authorised BHEL official immediately after such occurrence, but in any case not later than 12 hours of the occurrence.
- B.9.13 During the course of construction, alteration or repairs scrap lumbers with protruding nails, sharp edges etc. and all other debris including combustibles scrap shall be kept cleared from working areas, passage ways and stairs in and around site.
- B.9.14 Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally/ negligently dropped, struck or permitted to strike each other violently. When cylinders are transported by powered vehicles, they shall be secured in a vertical position.
- B.9.15 The contractor shall be responsible for the safe storage of his radioactive sources if same have been permitted to use.
- B.9.16 All contractor's supervisory personnel and sufficient number of workmen shall be trained for fire fighting and first aid duties and shall be assigned specific duties. Enough number of such trained personnel must be available during the tenure of the contract.

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- B.9.17 Contractor shall provide enough fire protecting equipment of the types & numbers at his office, stores, construction/erection site, other temporary structures, labour colony area etc. Access to such fire protection equipment shall be easy and kept open at all times. Compliance of the above requirement under fire protection system at project site shall in no way relieve the contractor of any of his responsibilities & liabilities to fire accident occurring. In the event of fire safety measures being not to BHEL's satisfaction, BHEL shall have option to provide the same and recover the cost plus incidentals from contractor's bills and/or impose penalty as deemed fit by the Engineer.
- B.9.18 Before commencing the work, the contractor shall appoint/nominate a responsible officer to supervise implementation of all safety measures and liaison with BHEL Engineer at site.
- B.9.19 If safety record of the contractor in execution of the awarded job is to the satisfaction of Safety Department of BHEL, issue of an appropriate certificate to recognise the safety performance of the contractor may be considered by BHEL after completion of the job.
- B.10.0 **CONSEQUENCES OF CANCELLATION:**
- B.10.1 Whenever BHEL exercises its authority to terminate the contract/withdraw a portion of work, the work may be got completed by any other means at the contractor's risk and cost provided that in the event of the cost of completion (as certified by the Engineer which shall be final and binding on the contractor) being less than the contract value, the advantage shall accrue to BHEL. If the cost of completion exceeds the money due to the Contractor under the Contract, the Contractor shall either pay the excess amount demanded by BHEL or the same shall be recovered from the contractor. This will be in addition to the forfeiture of Security Deposit and recovery of liquidated damages as per relevant clauses.
- B.10.2 In case BHEL completes the work under the provisions of this clause, the cost of such completion to be taken into account for determining the excess cost to be charged to the contractor shall consist of cost of materials purchased and/or labour provided by BHEL with an addition of such percentage to cover supervision and establishment charges as may be decided by BHEL.

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B.11.0 INSURANCE:

- B.11.1 BHEL/its customer shall arrange for insuring the project materials/properties of BHEL/its customer covering the risks during transit, storage, construction, erection and commissioning.
- B.11.2 It shall be the sole responsibility of the Contractor to insure his workmen against risks of accident and injury while at work as required by the relevant rules and to pay compensation, if any, to them as per Workmen's Compensation Act. The Contractor shall also insure his staff against accidents. The work will be carried out in a protected area and all the rules and regulations of BHEL/its client in the project area which are in force from time to time will have to be followed by the contractor.
- B.11.3 If due to negligence and/or non-observance of safety and other precautions any accident/injury occurs to any other person/public, the contractor shall pay necessary compensation and other expenses, if so decided by the appropriate authority.
- B.11.4 It shall be the responsibility of the contractor to provide security and insurance claim related information/reports, FIRs etc. for the equipment/material belonging to BHEL/its customer and handed over to the contractor for transportation/erection/ construction till these are taken over by BHEL after erection/construction or are returned to BHEL/its customer's store.
- B.11.5 If due to Contractor's carelessness, negligence, non-observance of safety precautions, improper security arrangements or due to non-compliance of paper work needed for lodging insurance claim, damage to BHEL/its Customer's property and/or personnel should occur, and if BHEL is unable to recover its claim from the Insurance Company, the deficit will be recovered from the Contractor. **All losses arising out of theft of material from the contractor's store/erection site shall be recovered from the contractor irrespective of the insurance claims.**

B.12.0 STRIKES & LOCKOUTS:

- B.12.1 The Contractor will be solely responsible for all disputes & other issues connected with his workmen. In the event of the contractor's workmen resorting to strike or the contractor resorting to lockout and if the strike or the lockout so declared is not settled within a period of one month, BHEL shall have the right to get the work executed by employing its own men or through other agencies or both. The cost incurred by BHEL in this regard shall be recovered from the Contractor.

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B.12.2 For any purpose whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL/its Customer.

B.13.0 FORCE MAJEURE:

B.13.1 The following shall amount to force majeure conditions:-

Acts of God, Act of any Government, war, Sabotage, riots, civil Commotion, Police Action, Revolution, Flood, Fire Cyclone, Earthquake, Epidemic and other similar causes over which the contractor has no control.

B.13.2 If the contractor suffers delay in the due execution of the contract, due to delays caused by force majeure conditions, as defined above, the agreed time of completion of the work covered by this contract may be extended by a reasonable period of time in consultation and after agreement of BHEL's clients / owner, provided that on the occurrence of any such contingency, the Contractor immediately reports to BHEL in writing the causes of delay. The Contractor shall not be eligible for any compensation on this account.

B.14.0 GUARANTEE:

B.14.1 Even though the work will be carried under the supervision of BHEL Engineers, the contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of 12 months from the date of putting the complete system into commercial operation or 18 months from the date of system is declared completely erected duly tested and accepted by customer whichever is later and shall rectify free of cost all defects due to faulty erection detected during the guarantee period starting from the date of the completion of rectification. In the event of the contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works at the contractor's risk and expense without prejudice to any other rights and recover the same from Security Deposit/other dues.

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B.15.0 **ARBITRATION:**

B.15.1

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

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Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

NOTE:

Above clause No. B.15.0 stands deleted. Please refer Annexure to conditions of contract for ETC works.

B.16.0 VARIATIONS AND VALUATIONS:

B.16.1 QUANTITIES:

The quantities set out in the Bill of Quantities are the estimated quantities of the work but they are not to be taken as the actual and correct quantities of the works to be executed by the Contractor in fulfilment of his obligations under the Contract.

B.16.2 VARIATIONS:

B.16.2.1 The Engineer shall have power to make any variation of the form, quantity of the Works or any part thereof that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable shall have power to order the Contractor to do and Contractor shall do any of the following:-

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- a) Increase or decrease the quantity of any work included in the contract.
- b) Omit any such work.
- c) Change the character or quality or kind of any such work.
- d) Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way vitiate or invalidate the contract but the value (if any) of all such variation shall be taken into account in ascertaining the amount of the Contract Price.
- e) Restrict the extent of work of any item covered under Clause E.10.0 of Section - E "Schedule of Equipment".

B.16.2.2 Orders for Variations to be in writing. No such variation shall be made by the contractor without an order in writing of the Engineer provided that, no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this clause but is the result of the quantities exceed in for being less than those stated in the Bill of Quantities. Provided also that if for any reason the Engineer shall consider it desirable to give any such order verbally the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Engineer whether before or after the carrying out of the order shall be deemed to be an order in writing within the meaning of this clause. Provided further that if the contractor shall confirm in writing to the Engineer any verbal order of the Engineer and such confirmation shall not be contradicted in writing by the Engineer, it shall be deemed to be an order in writing by the Engineer.

B.16.3 VALUATION OF VARIATIONS:

The Engineer shall determine the amount (if any) which in his opinion should be added to or deducted from the sum named in the Contract in respect of any extra or additional work done or work omitted by his order. All such work shall be valued at the rates set out in the Contract if in the opinion of the Engineer the same shall be applicable. If the contract shall not contain any rates applicable to the extra or additional work then suitable prices shall be derived from the nearest item of BOQ or arrived at from the actual cost of manpower utilised (the cost of T&P and testing equipment etc. are not to be taken into account for arriving at the rates of additional/extra works) plus 10% for contractor's OH and profit. The rates for manpower shall be as per the minimum wages applicable for the project area.

Above clause No.B.16.3 shall be read in conjunction with clause No.1.of of Annexure to conditions of contract for ETC works.

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B.16.4 POWER OF ENGINEER TO FIX RATES:

If the nature or amount of any omission or addition relative to the nature or amount of the whole of the contract work or to any part thereof shall be such that in the opinion of the Engineer the rate or price contained in the Contract for any item of the Work is by reason of such omission or addition rendered unreasonable or inapplicable then a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such other rate of price as shall in his opinion be reasonable and proper having regard to the circumstances and the same shall be binding on the contractor. But under no circumstance the contractor shall suspend the work on the plea of non-settlement of rates falling under the clause or claim any compensation on that account.

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ANNEXURE - M

PROGRAMME OF WORK

SL.NO.	ACTIVITY	DURAION
01.	Award of work.	Zero week
02.	Mobilisation & setting up of site office	..... weeks
03.	Start / finish of structure erection	..... weeks
04.	Start / finish of stringing of shielding wire and conductors	..... weeks
05.	Start / finish of Circuit Breaker erection	..... weeks
06.	Start / finish of other equipment erection	..... weeks
07.	Start / finish of testing and precommissioning	..... weeks
08.	Start / finish of commissioning weeks
09.	Final Handing over weeks

**(SIGNATURE OF TENDERER)
WITH STAMP**

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ANNEXURE - N

LIST OF TEST EQUIPMENTS TO BE ARRANGED BY ETC CONTRACTOR

All measuring and testing instrument shall be pre-calibrated through a certifying agency before use. The certificate of calibration shall be submitted to BHEL Site Engineer for records. Also see clause E.4.2 & E.6.3 under Section E of the tender specification for more details.

<u>A -</u>	<u>General purpose</u>	<u>Qty.</u>
1.	Digital multimeter - 4½ digits Accuracy ± 1% (Any reputed make - preferably Fluke - make)	4 Nos.
2.	Megger 2.5 kV - 5kV, range 0.5 MΩ - 10,000 MΩ (Motorised/Electronic) (Any reputed make)	1 No.
3.	Megger having voltage multiplier 0-500V- 1000V, (Motorised / Electronic) Range 0.5 MΩ - 1000 MΩ (Any reputed make)	1 No.
4.	Single phase variac 8 A, 0.-250V, 50 HZ	2 No
5.	Three phase variac 15A, 0-440V, 50 HZ	1 No
6.	Single phase transformer 220V / 4000V, 500VA, 50HZ	1No
7.	Stop watch	1No
8.	Micro- ohm- meter (mV drop test kit) 0-200ADC, 0-2000 micro ohm with suitable calibrated cable leads for current injection and mV drop.	1 No
9.	Phase sequence meter	1 No
10.	Two way intercom set with 50 to 100 M cables for checking of cable continuity	2 sets
11.	Walkie - Talkie sets with battery charging sets Receiver + Transmitter, Type GP 300 - Motorola - make	1 set
12.	Variable D.C. power supply 0-220VDC, 10 A	2 Nos
13.	4 pole Miniature moulded case breaker 16 A	3 No
14.	Capacitance meter having range 20 PF- 100mfd ± 1%	1 No
15.	Isolation Transformer 1KVA, 240V AC, 1 phase, 50Hz	2 Nos

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B **For testing of current transformer**

- | | | |
|----|---|--------|
| 1. | Primary injection test kit, range 0-2000A with a pair of leads & C clamps for testing of CT's | 1 No |
| 2. | Secondary injection test kit suitable for 5A& 1A with banana plug cable leads. | 1 No |
| 3. | Digital Tongue tester 0-2000A, 600VAC, 50 Hz (Any reputed make). | 1 No |
| 4. | Digital Tongue tester 0-20A, 600V AC, 50 Hz (Any reputed make). | 1 No |
| 5. | Digital Tongue Tester, 0-1A, 600V AC, 50Hz | 2 Nos. |

C - **For testing of oil cooled transformer and AC reactor**

- | | | |
|----|--|------|
| 1. | Transformer winding resistance meter or Kelvin's double bridge | 1 No |
| 2. | Transformer turns ratio meter | 1 No |
| 3. | PPM tester for transformer oil | 1 No |
| 4. | BDV tester for transformer oil | 1 No |

D **For testing of relays**

- | | |
|--|------|
| Single phase / 3 phase relay test kit having timer current source 5A, 1A, voltage source 0-220VDC, 0-110 VAC 50 HZ. (Any reputed make) | 1set |
|--|------|

E- **For time measurement of breaker**

- | | |
|--|------|
| Breaker closing and / opening time measurement timer | 1 No |
|--|------|

F **For testing of relays and distance protection**

- | | | |
|----|---|-------|
| 1. | CFB kit or equivalent - of any reputed make | 1 Set |
| 2. | ZFB kit or equivalent - of any reputed make | |

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ANNEXURE - P

ACTIVITIES FOR TESTING AND COMMISSIONING BY ETC CONTRACTOR

1. Preparation of joint inspection records / observation by BHEL, BHEL customer and the contractor on the pending activities of erection holding for starting of testing and commissioning.
2. Issue of certificate for completion of erection activities to the satisfaction of BHEL customer.
3. Compilation of documents (scheme, cable schedules, FQP, technical literature, operation and maintenance manuals, technical reports, works test certificate for the equipments / components, and other relevant documents to expedite commissioning) in a systematic manner to present to customer/owner to meet the contractual requirement.
4. To expedite the testing activities contractor has to arrange the engineers and his staff and instruments at site for testing and commissioning of switchyard equipments as follows:
 - 4.1 Testing of individual relay, energy meter, transducer and meters for their satisfactory operation.
 - 4.2 Protection devices / relays will be tested with appropriate current and voltage injections.
 - 4.3 Individual control and protection panels testing for their satisfactory operation as per scheme.
 - 4.4 Individual CT, PT, CVT, Breaker, Transformer and Isolator LA, MB, Battery Charger etc. where ever possible to test them independently.
 - 4.5 Wiring check as per scheme and cable schedule preferably in the following sequences:
 - Between marshalling Kiosk in the yard to other yard equipments.
 - Between equipments in the yard.
 - Yard equipments to control room equipments.
 - Inter connection between control room equipments.
5. All cables to be properly glanded, identified and terminated suitably.
6. Cables should have proper / accurate cross reference ferruling and necessary cable tags for identifications as per recommendation by BHEL/ Customer.
7. Green marking in cable schedule and scheme after wiring check. Contractor to make also "As Built" scheme and cable schedule for submission to BHEL/Customer.
8. List of wiring mistakes, component damage and mal-operation of components.

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9. Successful completion of equipment level testing operative from local and remote and desired FQP filled up and approved by ultimate customer. Approval/acceptance on FQP results by customer has to be obtained by Contractor. For any technical clarifications, BHEL will only assist.
10. In case the contractor is finding difficulty to understand the technicalities to undertake testing and commissioning of a particular equipment, subsystem and system he has to inform BHEL in advance with in 2 months from the date of award of contract for necessary information and explanation.
11. For erection/commissioning of SF6 Circuit Breakers (If called for in BOQ), the services of experts +for supervision will be extended by BHEL free of cost. Contractor will provide adequate support by providing skilled manpower and tools & tackles. However the complete responsibility for erection and commissioning lies with subcontractor.
12. Contractor has to keep a senior and experienced person in the area of testing and commissioning associated with his skilled staff till charging and handing over of complete switchyard to the satisfaction of BHEL customer.
13. Contractor has to be well equipped at site with testing instruments and safety measures (like helmet and hand globes) while doing testing and commissioning.
14. Contractor will also carry out design validation tests as per BHEL / BHEL customer documents.
15. If the contractor fails to take up testing and commissioning work as per the requirement of contract or project requirement, then BHEL will be at liberty to hire services of third agency for this work at the risk and cost of subcontractor.
16. Testing of mandatory spares or any other spare (if required by customer / BHEL), cleaning and handing over to customer's stores is also included in the scope of this Tender Specification. The site Test Reports of these mandatory spares will also be generated by subcontractor in such a case.
17. In case contractor fails to arrange Test equipments as referred in Annexure 'N' (as per requirement of equipment covered in BOQ), BHEL will arrange the instruments at the risk and cost of contractor for providing such instruments.
18. Contractor has to repeat any tests free of cost, even if already conducted, whenever required to prove and check the healthiness of system before power flow, such tests could be primary injection and secondary injection in CT, CVT, meggering, and functional tests or any other tests as required by BHEL/customer.

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19. Oil processing/filtering in a transformer, CT and CVT shall also be repeated free of cost if required before charging and handing over of the switchyard to the owner in case BDV and PPM of oil is not satisfactory.
20. As isolator is a rotating equipment and its alignment is likely to get disturbed. Therefore contractor has to do alignment of isolators and measurement of contact resistance repeatedly free of cost as and when required till handing over of the station.
21. Commissioning means charging of total system in a sub-station and inter connected equipments by power flow. Accordingly the payment will be made to the contractor as per payment terms.
22. Contractor has to deploy adequate and experienced man power at site as per project requirement and advice of BHEL site in-charge. Non compliance of this requirement will be treated as indiscipline and non cooperation of the contractor. Accordingly BHEL will hire the man power as required at the risk and cost of the contractor after giving a single notice.
23. Based on site requirement, for the works not stipulated in the contract, the contractor has to provide assistance of skilled manpower with required tools and test instruments.
24. If any Expert services of manufacturer for commissioning supervision of special protection relays / numerical relays / equipment is felt necessary by the contractor, the same shall be arranged by the contractor themselves at their cost. Contractor shall provide testing & Commissioning, Engineer, electrician, other tools tackles and consumables for these equipments and for total system.

Any delay in arranging special testing & commissioning equipment and expert supervisor shall not entitle the contractor to any claim (idle labour, additional time etc.) whatsoever.
25. Any idle days of the expert supervisor at site due to reasons attributable to the contractor, due to lack of readiness in erection, delay in arranging of manpower, tools etc. shall be to contractor's account.

NOTES :-

- (1) Above is only an indicative list. Contractor has to mobilise and keep adequate competent commissioning staff at site to ensure that all mile stones & events and relevant commissioning activities are completed successfully in a scheduled time.
- (2) In case contractor is not finding competent and adequate staff with him, he can hire the commissioning services from out side agencies approved and accepted by BHEL. Contractor will furnish the details (experience, qualification) of all commissioning staff and the commissioning tools and instruments available with the contractor OR obtained on loan basis with in 60 days from the date of award of the work.

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ANNEXURE - Q

LIST OF TOOLS & TACKLES TO BE ARRANGED BY CONTRACTOR

<u>Sl. No.</u>	<u>PARTICULARS</u>
01.	Electrical Drilling Machine & Hand drilling Machine.
02.	Hydraulic Bending Machine for Al. pipes.
03.	Gas Welding Set & Gas Cutting Set.
04.	Hand Operated Winches.
05.	Electric Welding machine.
06.	Jack with axle for lifting Cable Drum.
07.	Jointers Tool Box.
08.	Blow Lamps.
09.	Compression Tools suitable for Cables.
10.	Pull Lifts.
11.	Pulley Blocks.
12.	Hooks/Chains
13.	Cable Rollers.
14.	Hydraulic Jacks
15.	Aluminium Rollers.
16.	D- Shackles.
17.	Dynamometers.
18.	TIG, Welding machine (for Aluminium welding).
19.	High Vacuum 1000 GPH Oil Filtration Machine for Transformer / Reactor oil suitable for 760mm vacuum. In case 250 MVA / 315 MVA transformer ETC work is covered in the scope, Oil filtration equipment of 1500 GPH suitable for High Vacuum along with 30 kL capacity storage tank for oil storage and processing of oil should be provided.
20.	Hydraulic cranes including accessories (20 tonne or more and boom height of 15mts. Vertical or more) suitable for erection of transformer bushings accessories and other equipments.
21.	Hydraulic Crimping tools for conductor / Shield wire.
22.	Crimping tools for cable termination.
23.	Torque wrenches of different ranges in sufficient numbers.
24.	All general purpose hand tools in sufficient quantities.
25.	Shearing Machine for cutting of Earthing Flat.



- For cable laying.

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26. Tool Kit for fitters.
27. Tool Kit for Electrician.
28. Bench Vice.
29. 'A' type collapsible Al. ladder height 8M.
30. 'H' type Al. ladder height 5M.
31. Pressure Gauge 0-1kg/Sq.cm for measurement of N2 pressure.
32. Vacuum gauges for measuring fire vacuum of less than 1 torr in transformer.
33. Nylon slings for 4T capacity with different lengths.
34. Turper
35. Angle meter for measurement of bushing angle during erection.
36. Nylon hammer.
37. Wedge for cutting of 'O' rings/neoprene gaskets.
38. Die/Drill tool for making holes in gland plates (All sizes in sufficient numbers)
39. Phoenix screw drivers for handling of Terminal Blocks.

IMPORTANT NOTE:

1. The Contractor shall submit the copies of latest test certificate of lifting tackles, slings, pulleys etc. after mobilisation at site to the ENGINEER-IN-CHARGE.
2. Above is only a specimen/indicative list and any other Tools & Tackles as may be required by Owner/ BHEL at site during the execution of work will be arranged by the contractor promptly.
3. The status of tools, plants and instruments mentioned in annexure C of section - A does not relieve the subcontractor of his responsibility to make available all the test equipments and tools & tackles mentioned in the annexures of section B as per requirement of project.

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SECTION-C

SPECIAL CONDITIONS OF **CONTRACT**

SECTION - C

SPECIAL CONDITIONS OF THE CONTRACT

C.1.0 QUALIFICATION OF THE CONTRACTOR :

- C.1.1 The contractor must have the experience of execution of identical work in the past as specified in the tender documents and must have executed contracts of similar nature. The contractor must furnish enough evidence to establish his capacity in erection, testing and commissioning of similar equipments covered under this specification.
- C.1.2 The contractor should be able to obtain clearance from the Electrical Inspector/ State Authorities on completion of the installations. If required, the Contractor is supposed to obtain such clearances on part completion of the installation as required by BHEL / Owner time to time. Also, before the start of work the contractor should obtain the supervisory license from the concerned Electrical Authorities.
- C.1.3 The Contractor will have following certificates.
- a) Contractor electrical licence.
 - b) Supervisor competency certificates to deal with Electrical high voltage equipments for their installation and for their installation and testing.
- Such certificates from two persons of subcontractors representatives who will be posted at site will be required.
- C.1.4 The contractor should be aware of the local conditions and be well acquainted with the site.
- C.1.5 The contractor shall be preferred who has worked for State Electricity Boards/BHEL/Steel Authorities/Public Undertakings.
- C.1.6 The contractor should have a very good engineering background and capability of carrying out erection and commissioning work of large scale.

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~~C.2.0~~ **TERMS OF PAYMENT FOR ERECTION, TESTING AND COMMISSIONING :**

C.2.1

C.2.2

C.2.3

C.2.4

C.2.5

C.2.6

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

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C.2.7

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

C.2.8

Above clause No. C.2.0 stands deleted. Please refer Annexure to conditions of contract for ETC works.

C.3.0 **SECURITY DEPOSIT:**

C.3.1

C.3.2

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

C.3.3

C.3.4

C.3.5 **RETURN OF SECURITY DEPOSIT:**

The contractor should refer the clause A.17.7.

No interest shall be payable by BHEL on Earnest Money/Security Deposit or on any money due to the contractor by BHEL.

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C.4.0 PERFORMANCE GUARANTEE:

C.4.1 The contractor shall be responsible for any defects in the execution of work noticed in guarantee period of 12 months reckoned from the date of putting the complete system into commercial operation/handing over to customer or 18 months from the date of system is declared completely erected, duly tested and accepted by BHEL and customer. The Contractor shall submit a bank guarantee worth 10% of the total contract value of erection, testing and commissioning of equipment in the prescribed proforma form of BHEL. If the contract is for more than one sub-station and the substations are completed and taken over by customer in stages, then the performance BG for the substation completed and handed over may be submitted based on the contract value of individual substation at the time of submitting the final bill, substation wise.

~~C.5.0 LD/PENALTY FOR DELAY IN EXECUTION:~~

C.5.1

Please refer " Annexure to conditions of contract for ETC Work" attached with the tender documents.

Above clause No.C.5.0stands deleted. Please refer Annexure to conditions of contract for ETC works.

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C.6.0 RECEIPT/ UNLOADING, HANDLING, TRANSPORTATION, SECURITY AND PRESERVATION OF EQUIPMENT AT SITE:

- C.6.1 The contractor shall take the delivery of all the equipment, structures and materials etc. at site and their security shall be the responsibility of the contractor. Further transportation of materials to work place as per requirements will be in the scope of the contractor. For any delay, demurrage/wharfage/detention charges will be borne by the contractor.

In order to ensure timely completion of project, some of the equipment/material as covered under clause no. E.10.0 of Section-E (Schedule of equipment) may arrive at site and are unloaded and stacked/stored prior to mobilisation of ETC Contractor for the work covered under this Tender Specification. In such a case, the amount actually spent by BHEL on unloading and storage till the time of mobilisation by the ETC contractor shall be debited to their account. Immediately after mobilisation, the contractor shall take these into their custody and all the conditions as applicable for the material directly received by the contractor will be applicable for these material.

C.7.0 FACILITIES TO BE PROVIDED AT SITE BY THE CONTRACTOR:

- C.7.1 Watch and ward by authorised/licensed agency for the safe custody of the equipment shall be responsibility of the contractor.
- C.7.2 It is the responsibility of the contractor to dismantle and take away all the materials of his office accommodation as soon as the project is handed over to BHEL/Owner and clean the area off debris.

C.8.0 TESTING AND COMMISSIONING:

- C.8.1 All the electrical/mechanical test of the materials and equipment will be arranged by the contractor as per standard Specification/Field Quality Plan/ Erection Manual/Directive of the Site Engineer and Owner. The contractor shall have to fill the check list (site inspection record forms) for receipt, storage, erection, testing and commissioning of all the equipments as per BHEL systems to ensure proper quality of work.

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- C.8.2 All the testing equipment required to carry out the site test for all the equipment or the erected equipment shall be calibrated and shall be arranged by the contractor at his own cost. However, necessary instruction and the guidelines will be given by BHEL/owner.
- In case Contractor is unable to provide the calibrated measuring and test instruments to the satisfaction of 'ENGINEER' then as per his own wisdom/judgement can recommend a deduction of maximum limit up to 5% from the Contractor's bill. But this in no way relieves the Contractor from arranging the test & measuring instruments / equipment as required for completion of the 'PROJECT' without affecting the quality of work and meeting any Contractual obligation whatsoever.
- C.8.3 The contractor shall be completely responsible for the satisfactory erection and providing Test Equipment and skilled manpower for testing, commissioning of all equipment, notwithstanding the fact that he may be assisted by BHEL or its authorised representative.
- C.8.4 The installation of all electrical equipment shall be carried out only by an electrical contractor holding a valid License for carrying out installation work of the voltage classes involved, under the direct supervision of and by persons holding valid certificates of competency for the same voltage classes, issued or recognised by the State Government. Contractor shall submit the particulars of the License held by him.
- C.8.5 The contractor shall furnish to BHEL the names and particulars of certificates of competency of the supervisors and workmen to be engaged for carrying out installation work against this specifications.
- C.8.6 The work shall be executed in a workman like manner in accordance with the requirements specified in the General Specification of Electrical Equipment installation, testing and commissioning specifications. Copy of such specifications/ drawings will be given to successful bidder before starting the work.

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- C.8.7 All electrical work shall also comply with standard norms and practices adopted by the State Electricity Board. Site test reports shall be prepared and submitted by the contractor.
- C.8.8 Before charging the installation in part or full, this shall have to be approved by Statutory Govt. Authorities like Electrical Inspector, other concerned agency and the contractor has to arrange approval for the same as and when required by BHEL/Owner.
- C.8.9 Any feasible modification in the equipment or installation that may be demanded by Electrical Inspector shall have to be carried out by the contractor at no extra charges to BHEL. The contractor shall take all necessary steps to enable BHEL/Owner to get the installation approved by the above authorities & shall render all necessary assistance to BHEL/Owner in the matter.
- C.9.0 **COMPLETION OF CONTRACT:**
- C.9.1 All equipment, mountings, fittings accessories or apparatus which may not have been specifically mentioned but which are usual or necessary for completing the erection and commissioning work of system, shall be done by the contractor without any extra charges.
- C.10.0 **TRIAL OPERATION AND HANDING OVER:**
- C.10.1 On completion of erection of the equipment and before pre-commissioning tests of the equipment, each of the equipment shall be inspected by the BHEL/Owner for the correctness and completeness of the installation. Thereafter commissioning engineers shall carry out all pre-commissioning tests. The results of such pre-commissioning tests shall be signed jointly by the contractor's representative and BHEL/Owner.
- C.10.2 On conclusion of satisfactory pre-commissioning tests, the trial operation of the equipments shall start. The equipment shall be on trial operations during which period all necessary adjustments shall be made.

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- C.10.3 After completion of trial operation, the plant will be handed over to the owner, after the period to be specified by BHEL. On taking over the plant, the owner shall issue a certificate to that effect.
- C.10.4 BHEL/Owner shall be at liberty from time to time or at any time before the completion of the works to take possession and use any part of the completed works and in such case the contractor shall completely finish the said uncompleted part or parts of the works as and when the engineer shall direct whether before or after the respective prescribed time or extended time (if any) for the completion of the works and if required by the engineer while the owner is in possession of the said part or parts, of the site or works.
- C.10.5 If due to reason of any default on the part of Contractor, a taking over certificate has not been issued in respect of any portion of the works, within one month after the time for completion or extended time as the case may be, the Owner/BHEL shall be at liberty to use the works or any portion thereof in respect of which a taking over certificate has not been issued, provided that the works or the portion so used as aforesaid shall be reasonably capable of being used and that the Contractor shall be afforded the earliest opportunity of taking such steps as may be necessary to permit the issue of the taking over certificate.

C.11.0 **ADDITIONAL EXPENDITURE:**

In case any additional expenditure is incurred in the works arising out of the faulty execution of the works by the contractor, such additional expenditure shall be borne by the contractor.

C.12.0 **SPLITTING THE WORK:**

BHEL reserves the right to split the work and award any part of the work to any agency without assigning any reason whatsoever.

C.13.0 **SUPPLY OF MATERIAL:**

- C.13.1 The Contractor shall in no case be entitled to any compensation or damage on account of any delay in supply or non-supply thereof for all or any such materials and stores but the contractor shall be entitled to suitable extension of time as may be determined by the Engineer whose decision shall be final and binding.

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C.13.2 The contractor shall satisfy himself of the quantity and quality of the materials at the time of taking delivery from the BHEL/Owner. No claim whatsoever will be entertained by the BHEL/Owner on account of quality or quantity after the materials are taken by the contractor from the BHEL/Owner.

C.14.0 **ELECTRICITY AND WATER:**

C.14.1 Electricity for construction work shall be provided at one point on chargeable basis at the rate prevailing at the time of drawal of power, unless specified otherwise. The contractor shall have to make their own arrangements, at their cost, for distribution to various locations for their works including proper switch/fuse units, distribution boards, cables, poles etc. to ensure safety of men and equipment. Where required the contractor shall employ diesel operative equipment in addition to electric operated ones to ensure timely completion of work.

In case BHEL is unable to provide Electricity on chargeable basis then the contractor has to arrange same at his end.

C.14.2 The contractor shall indicate in his offer the power load required by him along with the load details for which power is required.

C.14.3 The owner shall not be responsible for any inconvenience caused due to any failure of lighting and power supply and no compensation for delay in works can be claimed by the contractor due to such non-supply on the grounds of idle labour, machinery or any other grounds.

C.14.4 The contractor should ensure that the work in critical areas is not held up in the event of lighting and power breakdown and for the same he should have some standby arrangement at his cost. In the event of breakdown in the electric supply, if the progress of work is hampered, it will be the responsibility of the contractor to step up the progress after restoration of electric supply so that over all progress of work is not affected. The contractor shall make proper arrangement of illumination at work place while working in late hours or in darkness.

C.14.5 Unless stated otherwise in the scope of works, the contractor shall make his own adequate arrangement for procuring clear water to be used in the works.

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C.15.0 **INSURANCE :**

C.15.1 Contractor shall take insurance cover(s) to cover his Tools and Plants, Assets, workmen compensation and third party liability. The contractor shall make available the original insurance cover(s) to the Engineer for necessary verification before commencement of work.

C.16.0 **ESCALATION/PRICE VARIATION :**

C.16.1 Under this contract, **No escalation/ Price variation** is allowed. The quoted prices are FIRM till complete commissioning and handing over of the Project to Customer/Owner.

C.17.0 **OVERRUN CHARGES:**

C.17.1 **Above clause No.C-17.0 stands deleted. Please refer Annexure to conditions of contract for ETC works.**

C.18.0 **CONSTRUCTION SCHEDULE:**

C.18.1 While submitting the offer the contractor shall furnish Bar Chart detailing out all major activities, as to how he proposes to complete the work maintaining the completion schedule as given in Notice Inviting Tender. If the contractor fails to achieve any milestone indicated in the Bar Chart/completion schedule mentioned elsewhere, the contractor shall be levied penalty as per clause C.5.0.

C.19.0 **HEAVY MATERIAL HANDLING EQUIPMENT:**

The contractor must clearly indicate the details of all Heavy Materials Handling Equipment owned by him in Annexure-C of Section-A, General Instructions to the Tenderer. The boom length, capacity of handling load and other relevant details must also be given.

C.20.0 **CALIBRATED TEST INSTRUMENTS:**

Contractor is required to bring all the required testing equipments and instruments for conducting pre-commissioning test. All instruments should be calibrated as this is an ISO System requirement and the contractor should furnish test certificate for calibration. Also, please see clause E.4.2 and E.6.3 of Section-E for more details.

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- C.21.0 Contractor should maintain moisture free store.
- C.21.1 Illumination system in & around store should be maintained by the contractor.
- C.21.2 All the material stored in the open yard shall be covered by tarpaulins to be arranged by the contractor.
- C.22.0 **PROTECTION OF WORK :**
- C.22.1 Contractor shall effectively protect his work, equipment, material from theft, damage or tempering at his own expenses till the work is finally taken over by the BHEL/Owner.
- C.22.2 Finished work where required, shall be suitably covered to keep it clean and free from defacement or damage.
- C.22.3 Necessary fire protection arrangement is to be made by the contractor for store and place of work.
- C.23.0 **SAFETY MEASURES :**
- C.23.1 All safety rules and codes as applicable to work shall be followed without exception.
- C.23.2 All safety appliances and protective devices including safety belt, hand gloves, aprons, helmets, shield goggles etc. shall be provided by the contractor to his personnel. Also, the Contractor must follow BHEL Quality system to ensure safety in all activities of site work.
- C.24.0 **QUALITY RECORDS (FQPs, MATERIAL MANAGEMENT ETC.)**
- C.24.1 Contractor should follow field quality plan furnished by BHEL to ensure quality in all activities of work performed at site.
- C.24.2 The contractor shall have to maintain records pertaining to Material Verification on receipt at site as well as Daily Receipt Register, Stock Register as per the various quality systems of BHEL.

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- C.25.0 The contractor shall remove all scaffolding, ladders, temporary structures etc. erected by him during erection in order to leave place neat and clean to the satisfaction of the owner.
- C.26.0 All packing/items are to be checked immediately on receipt at site. Any shortages, damages are to be reported to BHEL within a week's time in writing.
- C.26.1 All parts shall be thoroughly cleaned, all rust removed and surface polished as required before erection of any equipment.
- C.26.2 Cleaned and polished parts shall be coated with anti-corrosive paints wherever necessary.
- C.27.0 After completion of work, reconciliation is to be done for all the material issued to the contractor. Balance materials are to be returned to BHEL/Owner.

C.28.0 **WORKING HOURS:**

If in the opinion of BHEL, the progress of the erection work by the contractor at any stage needs expediting so as to ensure completion of work within stipulated time, BHEL shall have the right to instruct the Contractor to increase the Contractor's manpower and working hours and the contractor shall comply with such instructions without any Extra Charges.

C.29.0 **DIVISION OF WORK:**

Prices are to be quoted for schedule of Equipment - E.10.0 of Section-E. Work can be split-up and awarded to more than one contractor as per requirement of BHEL/Owner for timely completion of Project.

C.30.0 **INCOME TAX / SALES TAX / WORKS TAX/VAT**

~~The items to be quoted by bidder shall be EXCLUSIVE of Government~~
Please refer "Annexure to conditions of contract for ETC Work" attached with the tender documents.

Above clause No.C-30.0 stands deleted.Please refer Annexure to conditions of contract for ETC works.

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C.31.0 **DISCREPANCIES AND ADJUSTMENT OF ERRORS**

- C.31.1 The several documents forming the contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawings & figures dimensions in preference to scale & special conditions in preference to general conditions.
- C.31.2 In case of discrepancies between schedule of quantities, the specification and/or the drawings the following order of preference shall be observed.
- a) Description in Schedule of Quantities.
 - b) Special Conditions.
 - c) Drawings
 - d) Technical Specifications.
 - e) General Conditions of Contract.
- C.31.3 If there are varying or conflicting provisions made in any one document forming part of the contract, the Engineer shall be deciding authority with regard to the document.
- C.31.4 Any error in the description, quantity in schedule of quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to the drawings and specifications or from any of his obligations under the contract.
- C.31.5 If on check there are found to be differences between the rates given by the contractor in words and figures or in the amount worked out by him in the schedule of quantities and general summary, the same shall be adjusted in accordance with the following rules. :
- a) In the event of discrepancies between description in words and figures quoted by tenderer, the description in words shall prevail.
 - b) In event of an error occurring in the amount column of schedule of quantities as a result of wrong extension of the unit rate and the quantity, the unit rate shall be regarded as firm and extension shall be amended on the basis of the rates.
 - c) All errors in totalling in the amount column and in carrying forward totals shall be corrected.

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- d) The totals of sections of bill of quantities amended shall be carried over to the general summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of tender be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the tenderer. Any rounding of quantities or in sections of bill of quantities or in general summary, by the tenderer, shall be ignored.

- C.31.6 If neither drawings nor specifications contain any mention of minor details of construction which in the opinion of the Engineer, whose decision shall be final and conclusive, are reasonable and obviously and fairly intended for satisfactory completion of work, such details shall be provided by the contractor without any extra cost, as if they were specially mentioned and shall be deemed to be included in the contract.

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SECTION-D

ERECTION CONDITIONS **OF CONTRACT**

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SECTION - D

ERECTION CONDITIONS OF CONTRACT

D.1.0 GENERAL:

D.1.1 The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this contract to be performed at site.

D.1.2 The contractor upon signing of the contract shall, in addition to a Project Coordinator, nominate another responsible officer as his representative at site suitably designated for the purposes of overall responsibility and co-ordination of the works to be performed at site. Such person shall function from the site office of the contractor during the pendency of the contract.

D.2.0 REGULATION OF LOCAL AUTHORITIES AND STATUTES:

D.2.1 The contractor shall comply with all the rules and regulations of local authorities during the performances of his field activities. He shall also comply with the **Minimum Wages Act, 1948 and the Payment of Wages Act** (Both of Government of India) and the rules made there under in respect of any employee or workman employed or engaged by him or his sub-contractor.

The Contractor should note that all instructions of Engineer shall be binding for example display of Minimum Wages paid to the workmen, construction of toilets etc. in the vicinity of working area from health and sanitation standpoint etc.

D.2.2 All registration and statutory inspection fees, if any in respect of his work pursuant to this contract shall be to the account of the contractor. However any registration, statutory inspection fees lawfully payable under the provision of the statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the Owner/BHEL shall be to the account of the Owner/BHEL. Should any such inspection or registration need to be rearranged due to the fault of the Contractor or his sub-contractor, the additional fees for such inspection and/or registration shall be borne by the contractor.

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D.3.0 OWNER'S LIEN ON EQUIPMENT :

The owner/ BHEL shall have lien on all equipments including those of the contractor brought to the site for the purposes of erection, testing and commissioning of the plants. The Owner/ BHEL shall continue to hold the lien on all such equipments through out the period of contract. No material brought to the site shall be removed from the site by the contractor and/ or his Sub-contractors without the prior written permission of BHEL.

D.4.0 RE-WORKS ETC. :

In case Owner/BHEL/consultant during inspection at site rejects an item already agreed and the same is agreed to by BHEL and any re-execution of works of other contractors and/or his agencies, which might have got damaged or affected by the replacements will have to be attended to by the contractor free of cost.

D.5.0 ACCESS TO SITE AND WORKS ON SITE :

D.5.1 Suitable access to and possession of the site shall be provided to the contractor by Owner/ BHEL in reasonable time.

D.5.2 The works so far as it is carried out on the owner's premises shall be carried out at such time as the owner/BHEL may approve and the Owner/ BHEL shall give the contractor reasonable help/ facility for carrying out the works.

D.5.3 In the executions of the works, no persons other than the Contractor or his duly appointed representative, Sub- contractor and workmen shall be allowed to do work on the site except by the special permission in writing by BHEL.

D.6.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT:

The contractor shall establish site office at the site and keep posted an authorised representative for the purpose of contract. Any written order or instruction of BHEL or his duly authorised representative shall be communicated to the contractor at the site office and the same shall deemed to have been communicated to the contractor at his legal address.

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D.7.0 CO-OPERATION WITH OTHER CONTRACTORS:

D.7.1 The contractor shall co-operate with all other contractors or tradesmen of the owner/BHEL who may be performing other works on behalf of them and the workmen who may be employed by the owner/BHEL doing work in the vicinity of the works under the contract. The contractor shall also arrange to perform his work as to minimise to the maximum extent possible interference with the work of other contractors and his workmen. Any injury or damage that may be sustained to the employees of the other contractors, BHEL and the owner due to the contractor's work shall promptly be made good at contractor's own expenses. The owner/ BHEL shall determine the resolution of any difference or conflict that may arise between the contractor and other contractor's or between the contractor and workmen of the owner and BHEL in regard to their work. If the works of the contractor is delayed because of any acts or omission of another contractor, the contractor shall have no claim against the owner/ BHEL on that account other than an extension of time for completing his works.

D.7.2 BHEL shall be notified promptly by the contractor of any defects in the other contractor's works that could affect to the contractor's works. The owner/BHEL shall determine the corrective measures if any, required to rectify this situation which shall be binding on the contractor.

D.8.0 DISCIPLINE OF WORKMEN:

D.8.1 The contractor shall adhere to the disciplinary procedure set by the owner in respect of his employees & workman at site. The owner/BHEL shall be at liberty to object to the presence of any representatives or employee of the contractor at the site, if in the opinion of the owner/ BHEL such employee has misconducted himself or be incompetent or negligent or otherwise undesirable and then the contractor shall remove such a person objected to and provide in his place a competent replacement.

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D.9.0 CONTRACTOR'S FIELD OPERATION:

D.9.1 The contractor shall keep informed in advance regarding his field activity plans & schedule for carrying out such part of the works. Any review of such plan or schedule or method of work by the BHEL shall not relieve the contractor of any of his responsibilities towards the field activities and its schedule. Such reviews shall also not be considered as an assumption of any risk or liability by the owner/BHEL or consultant or any of his representatives and no claim of the contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method or work reviewed. The contractor shall be solely responsible for the safety adequacy and efficiency of plant and equipments and his erection methods.

D.9.2 The contractor shall be completely responsible for the conditions of the work-site including the safety of all persons employed by him or his sub-contractor and all the properties under his custody during the performance of the work. This requirements shall apply continuously till the completion of contract and shall not be limited to normal working hours.

D.10.0 PHOTOGRAPH AND PROGRESS REPORT:

D.10.1 The Contractor shall furnish to BHEL photographs of the progress of work / work done at site. Photographs shall be taken as & when indicated by BHEL representative. Photograph shall be adequate in size & number to indicate various stages of erection. Each photograph shall contain the date, the name of the Contractor and the title of the Photograph. The cost of photographs is to be born by the Contractor.

D.10.2 The above Photographs along with the soft copy (on floppy/CD) shall accompany the monthly progress report detailing out the progress achieved on all erection activities as compared to the schedules. The report shall also indicate the reasons for the variance between the scheduled and actual progress and action proposed for corrective measures wherever necessary.

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D.11.0 MANPOWER REPORT:

D.11.1 The Contractor shall submit to BHEL from the first working day of every month, a Manpower report of the previous month detailing the number of persons scheduled to have been employed and actually employed skill-wise and the areas of employment of such labour.

D.12.0 PROTECTION OF WORK:

The Contractor shall have total responsibility for protecting his works till it is finally taken over by the owner. No claim will be entertained by the BHEL for damage or loss to the Contractor's works & the contractor shall be responsible for the complete restoration of the damaged work to its original condition to comply with the specification & drawings. Should any such damage to the Contractor's works occur because of other party not under him directly, & if disagreement or

conflict or dispute develops between the contractor & the other party or parties concerns works the same will be resolved as per the provisions of the clause D.7.0 above entitled cooperation with other contractors. The contractor shall not cause any delay in the repair of such damaged works because of any delay in the resolution of such dispute. The contractor shall proceed to repair the work immediately & no cause thereof will be assigned pending resolution of such dispute.

D.13.0 EMPLOYMENT OF LABOUR:

D.13.1 The Contractor will be expected to employ on the work only his regular skilled employees with experience of his particular work. No female labour shall be employed after darkness. No person below the age of eighteen years shall be employed.

D.13.2 All travelling expenses including provision of all necessary transport to and fro for Site, lodging allowance and other payments to be Contractor's employees shall be the sole responsibility of the contractor.

D.13.3 The hours of work on the Site shall be decided by the owner/BHEL and the Contractor shall adhere to it. Working hours will normally be eight (8) hours per day Monday through Saturday or depending upon the situation/ requirement.

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D.13.4 Contractor's employees shall wear identification badges while on the work at site.

D.13.5 In the case of owner/BHEL become liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen Compensation Act, Contractor Labour Regulation Abolition Act or any other law due to act or omission of the Contractor, BHEL may make such payment and recover the same from the Contractor's bills or from any amount which is already under process of payment to the Contractor.

D.14.0 **FACILITIES TO BE PROVIDED BY OWNER:**

D.14.1 Space: The Contractor shall advise BHEL within Fifteen (15) days from the date of acceptance of the Letter of Intent about his exact requirement of space for his office, storage area. The above requirements shall be reviewed by the Owner/BHEL & space will be allotted to the Contractor for construction of his temporary structures like office and storage sheds.

D.14.2 Construction water and power (Electricity) (Refer Clause C.14.0).

D.15.0 **FACILITIES TO BE PROVIDED BY THE CONTRACTOR:**

D.15.1 **CONSTRUCTION EQUIPMENTS, TOOLS, TACKLES AND SCAFFOLDINGS:**

The Contractor shall provide all the construction equipments, tools, tackles and scaffoldings required for pre-assembly, erection, testing and commissioning of the equipments covered under the contract. He shall submit a list of all such materials to the BHEL before the commencement of work at Site. These tools and tackles shall not be removed from site without the written permission of the owner/BHEL.

D.15.2 **COMMUNICATION:**

The Contractor will make his own arrangement for all his communication needs such as telephone, fax etc., at his site office and his residential accommodation.

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D.15.3 FIRST AID:

The Contractor shall provide necessary first aid facilities for all the employees, representatives and workmen working at the Site. Enough number of contractor's personnel shall be trained in administering first aid.

D.15.4 CLEANLINESS:

D.15.4.1 The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris, etc. during the period of contract. The Contractor shall employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the owner/BHEL. Materials and stores shall be so arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of the flame resistant, oil proof shield shall be provided to protect the floor from such damage.

D.15.4.2 Similarly the labour colony, the office & the residential areas of the Contractor's employees and workmen shall be kept clean & neat to the entire satisfaction of the Owner/BHEL. Proper sanitation arrangements shall be provided by the contractor in the workmen areas, office and residential areas of the contractor.

D.16.0 LINES AND GRADES:

All the works shall be performed to the lines, grades and elevations indicated on the drawings. The Contractor shall be responsible to locate the layout of the works. Basic horizontal and vertical control points as required will be established & marked by the Owner/BHEL at Site at suitable points.

These points shall be used as datum for the works under the contractor. The contractor shall inform the Engineer well in advance of the time and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by Owner/BHEL to enable the contractor to proceed with his works. Any work done without being properly located may be removed and/or dismantled by the Owner/BHEL at Contractor's expenses.

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D.17.0 FIRE PROTECTION:

- D.17.1 The work procedures that are to be used during erection shall be those which minimise fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the site at least once each day. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipments and material storage and areas in safe containers. Untreated canvas paper, plastic or other flammable materials shall not at all be used at site for any other purpose unless otherwise specified, if any such materials are received with the equipment at the Site, the same shall be removed and replaced with acceptable materials before moving in to the construction area or storage.
- D.17.2 Similarly corrugated paper fabricated cartons etc., will not be permitted in the construction area either for storage or for handling of materials. All such materials used shall be of water proof and flame resistance type. All other materials such as working drawings, plants etc. which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.
- D.17.3 All the contractors supervisory personnel and sufficient number of workers shall be trained for fire-fighting and assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.
- D.17.4 The contractor shall provide enough fire protection equipment of the types and number for the ware-houses, office, temporary structures, labour colony area etc., access to such fire protection equipment shall be easy and kept all times.

D.18.0 SECURITY:

The Contractor shall have total responsibility for all equipments & materials in his custody stored, loose, semi assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipments and works from theft, fire, pilferage & other damages and losses. All materials belonging to the Contractors shall enter and leave the project site only with the written permission of the Owner/BHEL in the prescribed manner.

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D.19.0 CONTRACTOR'S AREA LIMITS:

The Owner will make out the boundary limits of access roads, parking spaces, storage and construction areas for the contractor and the contractor shall not trespass the areas not so marked out for him. The contractor shall be responsible to ensure that none of his personnel move out the areas marked out for his operations. In case of such a need for the contractor's personnel to work in the areas not marked out for him, the same shall be done only with written permission of the Owner/BHEL.

D.20.0 CONTRACTOR'S COOPERATION WITH THE OWNER/ BHEL:

In cases where the performances of the erection work by the contractor affects the operation of the system facilities of the Owner/BHEL such erection work of the contractor shall be scheduled to be performed only in the manner stipulated by the Owner/BHEL and the same shall be acceptable at all times to the contractor. The Owner/BHEL may impose such restriction on the facilities provided to the contractor such as electricity, water etc., as he may think fit in the interest of the Owner/BHEL and the contractor shall strictly adhere to such restrictions and cooperate with the Owner/BHEL. It will be the responsibility of the contractor to provide all necessary temporary instrumentation and other measuring devices required during start up and operation of the equipment system which are erected by him. The contractor shall also be responsible for flushing and initial filling of all the oil and lubricant required for the equipment furnished and erected by him, so as to make such equipments ready for operation. The contractor shall be responsible for supplying such flushing oil & other lubricants unless otherwise specified elsewhere in these documents and specifications.

D.21.0 PRE-COMMISSIONING TRIALS AND INITIAL OPERATIONS:

The pre-commissioning trials and initial operations of the equipments furnished and erected by the contractor shall be the responsibility of the contractor as detailed in relevant clauses. The contractor shall provide in addition, test instruments calibrating devices etc. and the labour required for the successful performance of these trials. If it is anticipated that the above test may prolong for a long time, the Contractor's workmen required for the above test shall always be present at site during such trials.

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D.22.0 MATERIAL HANDLING AND STORAGE:

D.22.1 All the equipments furnished under this contract arriving at site shall be promptly received, unloaded, transported and stored in the storage spaces by the contractor.

D.22.2 Contractor shall be responsible for examining all the shipments immediately on receipt at site and notify BHEL immediately if any damage, shortage, discrepancy. Filling of material verification reports on receipt of materials shall be carried out by the Contractor as per the instructions of Engineer. For any shortages or damages in transit, handling and/or in storage and erection of the equipments at site shall be intimated to BHEL/ equipment supplier promptly to enable them lodge claim with the underwriters. Any financial and/or time loss happened due to contractor's negligence in this regard shall be to the account of the contractor. Any demurrage, wharfage and any other charges claimed by the Transporter or Railways due to any reason attributable to the contractor such as delay in taking delivery in time shall also be to the account of the contractor.

D.22.3 The Contractor shall maintain an accurate and exhaustive record detailing out the list of all equipments received and keep such record open for the inspection of the Owner/BHEL at any time.

BHEL is an ISO Company and the contractor shall extend all help in maintaining records of receipts, issue and stock in line with Material Management System issued by BHEL. Also, he shall assist in periodic inspection of equipment/materials in stores as per this system.

The Contractor shall carryout all field activities related with ETC work as per Field Quality Plans (FQPs) provided by Engineer to ensure Quality of work at site as well as meet the contractual obligation to BHEL/Owner.

D.22.4 All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/or handling of the equipments without the specified written permission of BHEL. The equipment stores shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

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- D.22.5 All electrical panels, control gears, motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotation parts if any, in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.
- D.22.6 All the electrical equipment, such as motors, transformers etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and record for such measured insulation values maintained by the contractor. Such records shall be open for inspection by the Owner/BHEL.
- D.22.7 The contractor shall ensure that all the packing materials and protection devices used for the various equipments during transit and storage are removed before the equipments are installed.
- D.22.8 The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.
- D.22.9 All the materials stored in the open or dusty location must be covered with suitable weather proof & flame proof covering materials wherever applicable.
- D.22.10 If the materials belonging to the contractor are stored in areas other than these earmarked for him, the Owner/BHEL will have the right to get it removed to the area earmarked for the contractor at the contractor's cost.

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D.22.12 STORAGE INSTRUCTION FOR GAS FILLED EQUIPMENTS:

- D.22.12.1 All transformers despatched to site are fitted with Nitrogen cylinder in the tank to maintain positive pressure. It will be the responsibility of the contractor to maintain the pressure and replace the empty Nitrogen cylinder with Nitrogen filled cylinder of required purity at his own cost whenever such cylinders are become empty. Contractor should also maintain the periodic record of the pressure of Nitrogen in the transformer in a register for this purpose.
- D.22.12.2 For all other gas filled equipments, like CTs, VTs, CVTs etc. the contractor should also maintain the gas pressure & if it falls below the required value, contractor should refill the leaked gas of required purity at his own cost.

D.23.0 CONSTRUCTION AND ARRANGEMENTS:

- D.23.1 The field activities of the contractors working at site, will be coordinated by BHEL and BHEL decision shall be final in resolving any dispute or conflicts between the contractor and other contractor's and tradesmen of the BHEL regarding scheduling and coordination of work. Such decisions shall not be cause for extra compensation for time to the contractor.
- D.23.2 The Owner/Consultant shall hold weekly meetings of all the contractors working at the site at a time and a place so designated. The contractor along with BHEL shall attend such meetings and take notes of discussions during the meeting and the decisions of the Owner/BHEL/Consultant shall be strictly adhered to in performing his works. In addition to the above weekly meetings, the Owner/Consultant/BHEL may call for other meetings either with individual contractors or with selected number of contractors and in such a case the contractor, if called will also attend such meetings with BHEL.
- D.23.3 Time is the essence of the contract & the contractor shall be responsible for performance of his work in accordance with the specified construction schedule. If at any time the contractor is falling behind the schedule, he shall take necessary action to make good for such delay by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the BHEL satisfying them that his action will compensate for the delay. The contractor shall not be allowed any extra compensation for such action.

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D.23.4 BHEL shall however not be responsible for provision of additional labour and/or materials or supply or any other service to the contractor except for the coordination work between various contractors as set out earlier.

D.24.0 **FIELD QUALITY PLANS AND RECORDS:**

The contractor shall maintain at his Site Office upto date copies of all drawings, specifications, FQPs and other contract documents and any other supplementary data complete with all the latest information thereto. The contractor shall also maintain in addition the continuous record of all changes to the above contract documents, drawings, specifications, supplementary data etc. effected at the field and on completion of his total assignment under the contract, shall incorporate all such changes on the drawings and other engineering data to indicate as installed/build conditions of the equipments furnished and erected under the contract.

Such "AS BUILT DRAWINGS" and "ENGINEERING DATA" shall be submitted to BHEL in required number of copies.

D.25.0 **CONTRACTOR'S MATERIALS BROUGHT ON TO SITE:**

D.25.1 The contractor shall bring to site all equipments, components, parts, materials, including construction equipment, tools & tackles for the purpose of the works under intimation to the owner/BHEL. All such goods shall, from the time of there being brought to site but may be used for the purpose of the works only and shall not on any account be removed or taken away by the contractor without the written permission of the BHEL.

D.25.2 After the completion of the works the contractor shall remove from the site under the direction of the BHEL the material such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of BHEL. If the contractor fails to remove such materials within fifteen (15) days of issue of a notice by the BHEL to do so, then BHEL shall have the liberty to dispose/remove such materials and expanses incurred by BHEL in this regard will be recovered from the Contractor.

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D.26.0 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY:

- D.26.1 The contractor shall be responsible for any damage resulting from his operation. He shall also be responsible for protection of all persons including members of public and employees of the Owner/BHEL and the employees of other contractors and subcontractors building, other plants and equipments and utilities either above or below the ground.
- D.26.2 The contractor will ensure provisions of necessary safety equipments such as barriers, sign-boards, warning lights and alarm etc. to provide adequate protection to persons and property. The contractor shall be responsible to give reasonable notice to Owner/BHEL of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his work shall make all necessary arrangements with such owners related to removal and or replacement or protection of such property and utilities.

D.27.0 PAINTING:

All exposed metal parts of the equipment including pipings, structures, railings etc. wherever applicable shall be first painted with at least one coat of suitable primer after thoroughly cleaning all such parts off dirt and rust scales, greases, oil and other foreign materials by wire brushing, scraping or/and blasting and the same being inspected and approved by the Engineer for painting. After wards the above parts shall be finished with two coats of enamel paint. The quality of the finish paint shall be as per the standards of ISI equivalent and to be of the colour as approved by the Owner/BHEL.

D.28.0 PROTECTION OF MONUMENTS AND REFERENCE POINTS:

The contractor shall ensure that at points such as relic, antiquity, coins, fossils etc. which he may come across during the course of performance of his works either during excavation or elsewhere are properly protected & handed over to the owner under intimation to BHEL. Similarly the contractor shall ensure that the bench marks reference points etc. which are marked out either with the help of owner or by BHEL shall not be disturbed in any way during the performance of his works. If any work is to be performed which may disturb such references, the same shall be only after these are transferred to other suitable locations under the direction of BHEL. The contractor shall provide all necessary materials and assistant for such relocation of reference points etc.

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D.29.0 WORK AND SAFETY REGULATIONS:

- D.29.1 The contractor shall ensure the safety of all the workmen, materials, and equipment either belonging to him or to others working at site.
- D.29.2 The contractor will notify the BHEL office of his intention to bring on to site any equipment or any container with liquid or gases, fuel or other substances which may create hazards. BHEL shall have the right to prescribe the conditions under which such equipment or container may be handled and used during the performance of the works and the contractor shall strictly adhere to such instructions. BHEL shall have strictly the right to inspect any construction plant and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition shall be entertained by BHEL.
- D.29.3 Where it is necessary to provide and/or store petroleum products or petroleum mixtures & explosive, the contractor shall be responsible for carrying out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act,1934. Explosively Act,1948 and petroleum and carbide of calcium manual published by the Chief Inspector Of Explosive of India. All such storage shall have prior approval of BHEL in case any approval are necessary from the Chief Inspector of Explosive of any statutory authorities, the contractor shall be responsible for obtaining the same.
- D.29.4 The contractor shall be responsible for the safe storage of his & his sub-contractor's radio-active source if any.

D.30.0 ELECTRICAL SAFETY REGULATIONS:

- D.30.1 In no circumstances will the contractor interfere with fuses and Electrical Equipment belonging to BHEL/Owner or to the other contractors.
- D.30.2 Before the contractor connects any electrical appliances to any plug or sockets belonging to the other contractor or Owner, he shall:
- (a) Satisfy the Owner/BHEL that the appliances are in good working conditions.
 - (b) Inform the Owner/BHEL of the maximum current, relating, voltage etc. of the appliances.
 - (c) Obtain permission of the Owner detailing the sockets to which the appliances may be connected.

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- D.30.3 The BHEL will not grant permission to the contractor until he satisfies that:
- (a) The appliance is in good conditions and fitted with suitable plug.
 - (b) The appliance is fitted with a suitable cable having proper earthing provisions.
- D.30.4 No cable in use will be disturbed by the contractor without prior permission. No weight of any description will be imposed on any such cable and no ladder or similar equipment will rest against or attached to it.
- D.30.5 No work shall be carried out on any live equipment. The equipment must be made safe by the BHEL/Owner and a permit to work issued before any work is carried out.
- D.30.6 The contractor shall employ the necessary number of qualified full time electrician to maintain his temporary electrical installation.
- D.31.0 **CONSUMABLES:**
- The contractor shall make arrangements for an adequate inventory at site of necessary consumable prior to erection so that the requirements of the same will not come in the way of timely completion of the works under the contract.
- D.32.0 **MILD STEEL AND ALUMINIUM WELDING & OTHER SPECIAL PROCESSES :**
- D.32.1 Only an approved and qualified welder shall be employed by the contractor. The welder will be subjected to pre-qualification test by Owner/BHEL.
- D.32.2 The Contractor shall ensure that personnel employed for doing other special processes like tube/pipe bending etc. are having proper experience and are qualified for doing such work.
- D.32.3 Erection of Aluminium tubular bus bar shall include cutting, bending, aluminium welding with sleeves (sleeves supplied by BHEL), Radiographic testing and D.P test of 100% welded joints, fixing corona end bells etc to complete.

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- D.32.4 For MS welding, red lead paint shall be applied followed by aluminium paint and bitumen after welding. For GS welding , two coats of cold galvanising anti-corrosive paint shall be applied after welding. In case any special process is indicated in customer's specification, then the same shall be applicable.
- D.32.5 10% welded joints in earthing shall be tested for Dye penetration test.

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SECTION – E

SCOPE OF WORK AND **COMPLETION** **SCHEDULE**

SECTION - E

SCOPE OF WORK AND COMPLETION SCHEDULE

E.1.0 SCOPE OF WORK :

The scope of work of the successful tenderer shall comprise but not limited to the following. The Tenderer shall read this scope of work in conjunction with all terms and conditions (Section -A,B,C & D) contained else where in this document. The quoted rates for various equipments/activities are deemed to include all the below mentioned activities and nothing extra is payable on account of these.

- E.1.1 For Contractor supplied materials:** It shall be prime responsibility of contractor to ensure safe storage of material supplied by him. The contractor may construct open/ covered store to ensure proper storage of the materials as per site requirement. Contractor will be permitted to dismantle and take back the stores after completion of the work. No additional payment shall be made/deducted on account of stores constructed by contractor for storing these materials.

For BHEL supplied materials: Contractor shall construct open/ covered store only if the same is mentioned in the Bill of Quantities.

If due to any reason the material can not be unloaded in designated store/open yard and it is unloaded at some nearby place on instructions of site Engineer then this material has to be shifted by subcontractor to designated store/open yard when it is ready without any additional claim. Any multiple handling of material within project premises is not payable by BHEL

Some items may get delivered at stores of other BHEL unit on account of convenience of despatch within the plant area. These material will be collected/shifted by subcontractor to switchyard store at no extra cost.

- E.1.2.1** Inspection / verification of equipment / materials received for any shortage / damage after opening the packing cases and intimating the same to BHEL/ Owner and underwriters within the time period specified by BHEL and to strictly follow the procedures specified. Storage of equipment indoor / open stores in line with the instructions of the manufacturer / BHEL.

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Conservation / maintenance / upkeep of the equipment in the store.

Temporary lighting in stores & construction area wherever required.

Safety / Security of equipments / materials.

E.1.2.2 **Watch and ward of Erected Equipment/Material** - Soon as the erection of switchyards are taken up, the watch and ward for the erected items will also be arranged by the subcontractor till the switchyards are taken by BHEL/customer

E.1.3 Erection, levelling and fixing of GI Structures of towers, beams including all the equipment support structures on their respective foundations in line with drawings to be furnished by BHEL. Final adjustment of foundation levels by chipping and dressing, checking location, elevation, etc., and checking position of foundations / anchor bolts and grouting/under pinning of anchor bolts and base plates wherever necessary for certain aux. equipment and accessories of main equipment. Materials such as M.S. packing shims of required thickness for levelling and alignment and civil material for final grouting with 1:1 cement mortar with approved make anti-shrinkage compound and finishing shall be arranged by contractor. *The grouting/underpinning of all tower and equipment foundation bolts as per specifications is in the scope of Contractor ie Bidder.*

Fixing and assembly including minor modification, where required, of all cable trench materials like cable tray racks, cable trays, coupler plates, 'T' and 'L' bends etc in line with drawings to be furnished by BHEL. The work shall also covers laying of all cables including glanding and termination for all the equipments covered under BOQ . At various crossing and wherever necessary the cables to pass through pipes laid underground in line with drawing to be furnished by BHEL. Pipes will be supplied by BHEL for cabling from trench to equipment and laying of the same including excavation and backfilling and making and finishing of holes in trench walls will be carried out by the contractor.

E.1.4 Transportation of equipment/material from stores to erection site, erection of equipment materials in line with the drawings/instructions to be furnished by BHEL including filtration of oil wherever required, testing and commissioning and handing over to owner/customer.

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- E.1.5 Earthing (if called for in BOQ) : laying of earth mat and risers including excavation, bending, cutting, welding, cleaning and painting of joints, backfilling and earth compaction etc. as per BHEL drawings/specifications.

Cutting, pointing and driving of MS rod electrode, installation of pipe electrode and construction of chambers as per drawings.

Earth connections from risers to equipment, structures etc. through GI flat including bending, cutting, welding, cleaning and painting of welded joints as per BHEL's drawings/specifications.

Welding electrode should be of reputed make company ISI certified, and as per BHEL's specifications.

- E.1.6 Providing for all consumables : It shall be noted by the tenderer that BHEL shall supply only the equipments/materials listed in schedule of equipments as free issue items. Any other sundry items required for completion of the job shall be procured by the contractor.

All Equipment fixing hardware shall be arranged by BHEL.

All cable glands shall be arranged by BHEL. However cable accessories like ferrules, lugs and markers, cable dressing and tying material etc. shall be in the scope of the contractor. The lugs shall be of reputed make company and as advised by BHEL site Incharge.

- E.1.7 Maintenance of switchyard and associated equipment till handing over to the owner, any other activity necessary for completion of the job but not specifically mentioned in this specification.
- E.1.8 Unloading, shifting, storing, verification, preservation during storage and handing over of spare items/maintenance equipment to Customer/Owner.
- E.1.9 Reconciliation and shifting of all the balance excess material and scrap material to BHEL store or handover in customer store, as the case may be.

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This excess material may include erection spares for various items of BOQ such as ACSR/AAC conductor, Al tube, Cable trench materials, Cables etc. Excess erection spare (except main equipment) supplied by purchaser upto 10% of the erected quantity shall be absorbed by the contractor & shall not be payable. Only as erected quantity of the various items of BOQ shall be payable as per the unit rates. However, any erection spares (excluding main equipment) handled in excess of 10% of the erected quantity shall be payable @ 10% of the unit rate (to account for only unloading, storage and watch & ward. However, any additional quantity of main equipment, handled but not erected, shall be paid @ 10% of the item rate.

E.2.0 ERECTION, TESTING & COMMISSIONING REQUIREMENTS :

- E.2.1 All the switchyard equipment shall be erected, installed, tested and commissioned by the contractor to the satisfaction of BHEL/Owner adhering to the latest national standard and codes. Some of the Reference standards are given below which are normally applicable for Switchyard work. ETC activity of all other equipment to be done as per relevant standards.
- a) IS : 10118-1982 Code of practice for selection, installation and maintenance of switchgear & control gear.
 - b) IS : 10028-1985 Code of practice for installation and maintenance of transformer.
 - c) IS : 732-1963 Code of practice for electrical wiring.
 - d) IS : 3043-1963 Code of practice for earthing.
 - e) IS : 2309-1989 Code of practice for the protection of building and allied structure against lightning.
 - f) IS : 1646-1982 Code of practice for fire safety of building (General) Electrical installations.
- E.2.2 All electrical equipment and installations shall also conform to the latest Indian Electricity rules as regards safety, earthing and other essential provisions specified therein for insulation and operation of electric plants.

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E.2.3 Earthing system, earth connections, testing of earthing system and connection, lightning protection system, electrical clearance and safety shall be strictly followed as per the national specifications which will be given to the successful bidder.

E.2.4 The schedule of equipment indicates the quantity of the equipment and these will be procured by BHEL and are to be erected by the contractor. The contractor has to erect, test all equipment for system commissioning and putting the same into operation. The trial run of individual equipment and final commissioning upto the handing over of the system to the customer of BHEL is the responsibility of the contractor.

Contractor will have to provide necessary support i.e.. suitable manpower, common tools, conventional testing instruments as per Annexure 'N' and other assistance as required by BHEL wherever expert services of any equipment are arranged by BHEL viz.. SF6 circuit breakers.

E.2.5 All equipments, material and accessories provided by the contractor shall conform to the requirements of the relevant Indian standard or International standard.

E.3.0 **METHOD OF WORKMANSHIP & QUALITY OF WORK:**

E.3.1 Workmanship will be in accordance with the best engineering practices to ensure satisfactory performances and service life.

E.3.2 All works shall be installed in a first class manner with technical skill in the trade involved to achieve quality of work of high standard. BHEL site supervisor's comments regarding quality of work should be taken care by the contractor.

E.3.3 The erection work shall be supervised by the competent supervisor holding supervisory license by the state or central Government or statutory licensing authority, as the case may be.

E.3.4 The installation shall be carried out in such a manner not to obstruct access to the other equipment installed or likely to be installed in the vicinity.

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E.3.5 The complete erection shall be performed in accordance with the modern practices for similar substation equipments.

E.4.0 **EQUIPMENT, MATERIAL & SERVICES TO BE FURNISHED**

E.4.1 The contractor shall employ sufficient labours, skilled, unskilled, supervisory and administrative personnel for timely and effective execution of the contract.

E.4.2 The contractor shall arrange as per Annexure - Q erection tools and tackles, mobile crane, all transport vehicles, measuring & testing equipments necessary for timely and effectively execution of the contract. All measuring & testing instruments shall be pre-calibrated through a certifying agency before use. The certificate of calibration shall be submitted to Engineer for records. In case Contractor is unable to provide the calibrated measuring and test instruments then 'ENGINEER' according to his own wisdom / judgement can recommend a deduction of maximum limit up to 5% from the Contractor's bill. But this in no way relieves the Contractor from arranging the test & measuring instruments / equipment as required for completion of work without affecting the quality of work and meeting any Contractual obligation whatsoever.

E.4.3 All equipment including individual component fittings and accessories shall be properly stored at site so as to obviate any deterioration of electrical properties and mechanical damages.

E.4.4 All equipment shall be thoroughly cleaned of packing materials, scales rust, oil grease etc. prior to commencement of the installation work.

E.4.5 All equipment shall be checked physically for the completeness of all components and devices before taking up installation.

E.4.6 The contractor shall repair all minor defects in equipment, free of charge, if required prior to installation in consultation with equipment manufacturer of BHEL, so that manufacturer's guarantee is not affected in any way. In case of any major damage to the equipments, the same shall be rectified or replaced by the manufacturer's representatives with the approval of BHEL / Owner.

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- E.4.7 All equipments and accessories shall be installed strictly in accordance with the manufacturer's instructions / drawings. Equipment supplied in sections or in dismantled conditions shall be re-assembled at site with all associated accessories as per manufacturer's instructions.
- E.4.8 If the services of BHEL engineers, suppliers, and / or of any equipment manufacturers are required by the contractor at any stage of work, it will be made available on chargeable basis at existing rates prevailing at that time.
- E.4.9 All consumable items required to carry out welding, brazing, soldering etc. for the erection and commissioning is included in the offer of contractor and shortages in hardware (due to careless / negligent handling at site) to be made up free of cost by the contractor. The quality of such replenishment shall be at par with main supply and to be acceptable to BHEL / Owner.
- E.4.10 The successful contractor should note that after execution of work they will send marked up drawings "as erected" drawings to Project Manager at site for preparation of firm "AS BUILT" drawings. "AS BUILT" drawings will bear the signature of Project Manager of BHEL and Contractor's representative.
- E.4.11 **OIL FILTRATION (IN CASE OF TRANSFORMERS COVERED IN BOQ):**

An extra high vacuum oil filtration plant with a minimum of thousand GPH capacity shall be employed by the contractor for oil filtration.

An empty oil tank of minimum of 12000 ltrs. capacity also shall be arranged by the contractor to prepare the oil before pushing it into the transformer.

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E.5.0 TESTING AND COMMISSIONING OF EQUIPMENT:

- E.5.1 The testing of all electrical equipment as well as the system as a whole shall be carried out to ensure that the equipment and its components are in satisfactory condition and will successfully perform its functional operation. All required tests shall be carried out by the contractor using his own instruments, testing equipments as well as qualified testing personnel. The tests on power transformer (if covered in BOQ) shall include winding resistance, tan-delta, PPM of moisture, acidity in oil. For SF-6 Circuit Breaker (if covered in BOQ) closing and tripping timing test shall also be carried out in addition to other routine tests.
- E.5.2 At site all equipments shall be energised only after certification by the personnel performing the test that the equipment is ready for energising and with the concurrence of BHEL / Owner.

E.6.0 PREPARATION FOR COMMISSIONING:

- E.6.1 After completion of the installation at site and for the preparation of system commissioning the contractor shall carry out checking and testing of all equipment and installation in accordance with the agreed standards, codes of practices of Indian Standards Institutions and specific instruction furnished by the particular equipments suppliers as well as the Owner.
- E.6.2 Required checking to be made on all equipment and installation at site. This shall include but not limited to the following:
- a) Physical inspection for removal of any foreign bodies external defects such as damaged insulators, loose connecting bolts, loose foundation bolts etc.
 - b) Check for grease insulating / lubricating oil leakage and its proper level / quantity.
 - c) Check for free movement of mechanism of the circuit breaker / isolator and rotating parts of other rotating machine and devices.
 - d) Check for tightness of all the cables, busbars as well as earth connection in the main earthing net work.
 - e) Check for clearance of live busbar and conductors from the metal enclosures.
 - f) Continuity check in case of power and control cables.

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- g) Checking of all mechanical and electrical interlocks, including tripping of breakers using manual operation of relay.
 - h) Checking of alarm and annunciation circuits by manual actuation of relevant relays like buchholz relay in case of transformer.
 - i) Check and calibrate devices requiring field adjustments / calibration like adjustment of relay setting etc.
 - j) Check proper connection to earth-mat work of all non current carrying parts of equipments & installation.
- E.6.3 All the measuring and testing instruments will be arranged by the contractor and while submitting his quotation he shall furnish list of testing equipments which are readily available with him and also which can be procured by him from outside agency for the purpose of testing and commissioning.
- E.7.0 **MINOR CIVIL WORK:**
- E.7.1 Minor civil works including secondary grouting/under pinning of structure i.e. filling the gap between structure and foundation after levelling, alignment shall be done by the contractor at no extra cost. This shall also include necessary materials required for doing the work.
- E.7.2 Minor civil works of final / secondary grouting of structures, towers equipment has to be arranged by the contractor and the rate for the same should be included in respective erection. Final / secondary grouting means filling the gap between the structure and foundation after levelling, alignment etc.
- E.7.3 Minor civil work shall also include fixing of foundation bolts for radiator / cooling oil pump etc. Foundation bolts for such work shall however be arranged by BHEL.

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E.8.0 **PRICE SCHEDULE**

E.8.1 The prices to be quoted FIRM and should be valid till the work is completed to the satisfaction of BHEL / Owner and handed over the system to Owner.

E.8.2 The quantities given in schedule of equipment are estimated ones and may vary up to $\pm 30\%$ on the total value of the contract. Quantity of individual item may vary up-to any extent.

E.9.0 **START OF WORK AND COMPLETION SCHEDULE**

E.9.1 The contractor shall mobilise at site within one week from the date of LOI.

E.9.2 The entire work under this tender is required to be completed as indicated in Letter of Intent.

E.9.3 Detailed Bar Chart (activity schedule) should be submitted by the bidder in Annexure 'M' showing as to how the work is proposed to be executed in order to meet the completion schedule. This shall be filled in by the bidder after mobilisation at site and to be given to ENGINEER-IN-CHARGE at site.

E.9.4 The contractor is required to commence the work within the time as indicated in Letter of Intent failing which the contract is liable to be cancelled and EMD/SD shall be forfeited.

E.10.0 **SCHEDULE OF EQUIPMENT:**

The estimated quantities in the Schedule of Equipment given in Annexure-1 is tentative to give idea of work and to enable tenderer to quote unit rates. The actual quantities required to be erected shall be based on relevant drawings and latest revisions.

Annexure to conditions of contract for ETC Works

REF No. TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26 Date : 17-01-2026

SUB : TENDER FOR ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

The following terms and conditions shall form a part of the tender document. If any discrepancies found between below mentioned clauses and clauses in the General Conditions of Contract for ETC Works (Document No. TB-ETC-GCC, Rev-02) Annexure to conditions of contract for ETC Works the clauses mentioned in this annexure shall prevail.

A1 GENERAL INSTRUCTION

- 1 All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof. The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.
- 2 Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., tenderer shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

A2 PROCEDURE FOR SUBMISSION OF SEALED TENDERS

- 1 Bidders may please refer Cl no. 2 to Cl no. 4 of the Notice inviting tender.
- 2 The tenders received after the specified time of their submission shall be treated as 'Late Tenders' and shall not be considered under any circumstances.
- 3 Tenders shall be opened by the officers concerned of BHEL at the time, date and venue as specified in the tender enquiry. Tenderer or their authorized representative may witness the bid opening.
- 4 The tenderer shall closely pursue all the clauses, specifications and drawings indicated in the Tender Documents before quoting. Should the tenderer have any doubt about the meaning of any portion of the Tender Specifications or find discrepancies/omission in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, scope of work etc. he shall at once contact the authority inviting the tender for clarification before the submission of the tender.
- 5 Before submission of offer, the tenderers are advised to inspect the work & the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, sourcing of material and labour, means of transport and access to site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge on any of these conditions/ resources.
- 6 Tenderer must fill up all the schedules and furnish all the required information as per the instructions given in various sections of the tender specification. Each and every page of the Tender Specification must be SIGNED AND SUBMITTED ALONG WITH THE OFFER by the Tenderer in token of complete acceptance thereof the information furnished shall be complete by itself.
- 7 The tenderer shall quote the rates in English Language and international numerals. Total price offered should be entered in figures as well as in words. For the purpose of the tender, the metric system of units shall be used.
- 8 The tenderer shall quote a percentage above/ below/At Par the rates shown in the "Bill of Quantities Cum Price Schedule (Annexure-I)" of subject tender.

- 9 The quoted percentage will apply to the individual items of "Annexure-I i.e Bill of Quantity Cum Price Schedule" uniformly.
- 10 All entries in the tender shall either be typed or be written legibly in ink. Erasing and overwriting are not permitted and may render such tender liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.
- 11 The tenderer must provide the registered e-mail of their registered office along with the addresses and authorised phone/mobile nos.

A3 ADJUSTMENT PRICE DISCREPANCY (IES):

- 1 Not Applicable being e procurement

A4 EVALUATION OF TECHNICAL BIDS

- 1 Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer.
- 2 In case the same qualifying experience is claimed by more than one bidder due to subletting of work by main contractor to subcontractor (s) then following conditions shall be applicable.
 - (a) For labour + consumable contract without material and T&P:
Benefit of work experience shall be given to the subcontractor who has actually executed job and not to the contractor offloaded down the line.
 - (b) For contract with complete scope i.e. with materials, T&P, labour and consumable:
 - (i) Benefit of work experience shall be given to the subcontractor who has actually executed job and not to the contractor offloaded down the line.
 - (ii) If the contractor offloads the labour and/or T&P portion only, benefit of work experience shall be given to the main contractor and not to the subcontractor who has executed only as labour supply contractor

The bidder's qualification shall be subject to submission of documentary proof. BHEL reserves the right to ask for further proofs including submission of TDS certificates/ for the said job

- 3 In case the qualifying experience is claimed by private organizations based on Work Order and completion certificates from another private organization, BHEL reserves the right to ask for further proofs including submission of TDS certificates/ form 26AS /bills for the said job.
- 4 Credentials of all the bidders participating in open tender will be scrutinized thoroughly by the nominated committee w.r.t. the pre-qualifying requirement for the tender.
- 5 Details of qualifying work(s) executed by the bidder will be forwarded to the principle employer for verification of the work with respect to completion, commencement & completion date, scope and value of the work executed. Performance feedback of the bidder will also be sought from the principle employer.
- 6 BHEL may conduct onsite verification of at least one of the qualifying works to verify completion of the work and evaluate capability and performance of the bidder.
- 7 The bidder representative may be called for the discussion with the committee. His originals may be verified by the committee. In addition to above their organization chart and detailed list of manpower, tools & plants and technical capability may be discussed and ascertained by the committee.

A5 EVALUATION OF PRICE BIDS

- 1 Price Bids of unqualified bidders shall not be opened.
- 2 The offers will be evaluated on the basis of total price basis (refer "BILL OF QUANTITY AND PRICE SCHEDULE) as shown in the price bid.
- 3 Reasons for rejection of the bid shall be intimated in due course after issue of LOI/LOA to successful bidder and receipt of unconditional acceptance of LOI /LOA from the successful bidder
- 4 In case of electronic Reverse Auction, the unqualified bidders shall not be allowed to participate in reverse auction.

A6 DOCUMENTS TO BE ENCLOSED:

Full information shall be given by the tenderer in respect of the following.

- 1 Tenders shall be signed by persons duly authorized/empowered to do so. An attested copy of the Power of Attorney to be submitted in all cases except where the sole proprietor is the signatory to the tender documents
- 2 **PERMANENT ACCOUNT NUMBER:**
Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company / Firm / Individual Partners, etc. shall be furnished along with tender.
- 3 **AUDITED BALANCE SHEET AND INCOME TAX RETURN:**
Copy of Audited Balance sheets and income tax return for last three financial years (financial years as specified in PQR)
- 4 **SOLVENCY CERTIFICATE:**
If asked in NIT, bidder should submit solvency certificate (not older than 12 months from date of tender notification) issued by any scheduled bank.
- 5 **DOCUMENT RELATED TO INCORPORATION OF BUSINESS ENTITY:**

(i) **IN CASE OF INDIVIDUAL TENDERER:**

His/her full name, address and place & nature of business.

(ii) **IN CASE OF PARTNERSHIP FIRMS:**

The names of all the partners with address. A copy of the partnership deed/instrument of partnership duly certified by the Notary shall be enclosed.

(iii) **IN CASE OF COMPANIES:**

Date & place of registration including date of commencement certificate in case of Public Companies and the nature of business carried on by the company. Certified copies of Memorandum and Articles of Association are also to be furnished.

- 6 **OFFER FORWARDING LETTER (over the letterhead)**
- 7 **DECLARATION SHEETS** (As per Prescribed format) over the letter head
- 8 **NO DEVIATION CERTIFICATE** (As per Prescribed format) over the letterhead
- 9 **GST REGISTRATION CERTIFICATE**

All the data required to be enclosed with the tender need to be furnished neatly typed, signed & stamped in the given formats only (in the form of separate sheets) failing which the tender may be considered as incomplete and is liable for rejection. Documentary proof wherever necessary also need to be enclosed.

A7 VALIDITY OF OFFER

The rates in the Tender shall be kept valid for acceptance for a minimum period of Four Months from latest due date of offer submission (including extension(s), if any). In case BHEL (Bharat Heavy Electricals Limited) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderer.

A8 REJECTION OF TENDER & OTHER CONDITIONS:

- 1 The decision of acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:
 - (a) To reject any or all of the tenders.
 - (b) To split up the work amongst two or more Tenderer as per NIT
 - (c) To award the work in part as per NIT
 - (d) In either of the contingencies stated in (b) and (c) above to modify the time for completion suitably.
- 2 Conditional tenders, unsolicited tenders, containing abnormally low/ unworkable rates & amounts, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc. are liable to be rejected.
- 3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL, or tenderer under suspension (hold / banning / delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry / Commissions of Govt. of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule in line with 'NIT'. The decision of BHEL will be final in this regard.
- 4 In case of any adverse information is received concerning performance, capability or conduct of the tenderer after issue of tender enquiry or opening of tender or award of work, BHEL reserves the right to reject the offer at any stage as deemed fit.
- 5 Offers with inadequate Tools & Plants, Manpower Deployment Plan, and Method Statement are liable for rejection.
- 6 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at its discretion, cancel such tender. If a partner of a firm expires after the submission of the tender or after the acceptance of the tender, BHEL may cancel such tender at its discretion unless the firm retains its character.
- 7 BHEL will not be bound by any Power of Attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognise such Power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.
- 8 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract, if awarded, and forfeit the Earnest Money/Security Deposit/any other moneys due.
- 9 Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the tenderer who resorts to canvassing are liable to be rejected.
- 10 In case the Proprietor, Partner or Director of the Company / Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting tender shall be informed to the fact as per specified format along with the offer, failing this, BHEL may, at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money/ Security Deposit.

- 11 The successful tenderer should not sub-contract the part or complete work detailed in the tender specifications without written permission of BHEL's Site In charge/ Sector Head. For this the contractor shall submit request application to site in charge supported by credentials (financial and technical) and resource mobilisation schedule of such sub-contractor. Such request is to be considered in consultation with end user/ultimate customer (if applicable) and subject to satisfactory credentials, fund flow arrangement between them, HSE and other contractual and statutory obligations. The tenderer is solely responsible to BHEL for the work awarded to him.
- 12 The Tender submitted by a tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders.
- 13 unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e contract value shall be worked out after considering the discount so offered.
- 14 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

A9 NO DEVIATIONS ARE ACCEPTABLE:

Offers with deviations are likely to be rejected. However, if the bidder insists on any technical or commercial deviations from the specifications and / or tender conditions, the price implication, if any, of withdrawing the deviations must be submitted along with the price bid in a separate sealed envelope super-scribed "PRICE IMPLICATION FOR WITHDRAWAL OF DEVIATIONS". No price implication for withdrawal of deviation shall be accepted at a later date, after opening of technical bid.

A10 CONSORTIUM / JV BIDDING

Consortium/ JV bidding is not allowed under this NIT.

B EARNEST MONEY DEPOSIT (BID SECURITY)

Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) mentioned in NIT.

1 Mode of EMD deposit:

EMD can be submitted in any one of the following modes:

- i) Cash deposit as permissible under the extant Income Tax Act (before tender opening),
- ii) Electronic Fund Transfer credited in BHEL account (before tender opening). Details of BHEL account mentioned in tender document.
- iii) Banker's cheque/Pay order/Demand Draft, in favour of 'BHEL' and payable at New Delhi (Along with offer)
- iv) Fixed Deposit Receipt (FDR) issued by schedule Banks/Public Finance Institutions as defined in the companies ACT (FDR should be in the name of the contractor a/c BHEL)
- v) Insurance Surety Bonds

No other form of EMD remittance shall be acceptable to BHEL.

Note: The Submission of EMD is compulsory for subject tender. In case requisite Amount of EMD not submitted by the bidder along with offer or before technical bid opening, the offer shall not be considered for evaluation and the offer shall be rejected.

2 Forfeiture of EMD

EMD by the bidder will be forfeited as per NIT conditions, if

- i) After opening the tender and within the offer validity period, the bidder revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
- ii) The contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/contract.

3 EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provision of extant "Guidelines on Suspension of business dealing with Supplier/contractors" and forfeited/ released based on the action as determined under these guidelines.

4 In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time after award of work.

5 EMD shall not carry any interest.

6 EMD of successful bidder shall be retained as part of Security Deposit.

7 Bidders may please note that "One Time EMD" provision stands deleted. Hence, bidders who have deposited Rs. 2 Lakh as 'One Time EMD' with BHEL are also required to submit the requisite amount of EMD.

8 No MSE benefits shall be given to MSEs bidder for WORKS CONTRACT. Please refer clause no. O (facilities provided to MSEs) for detail.

C SECURITY DEPOSIT

Security Deposit means the security provided by the Contractor towards fulfilment of any obligations in terms of the provision of the contract.

- 1 Upon acceptance of Tender, the successful Tenderer should deposit the required amount of Security Deposit for satisfactory completion of work. The total amount of Security Deposit will be 5% of the Contract Value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

2 Mode of Security deposit:

The security Deposit should be furnished before start of the work by the contractor.

"Bidders agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of Performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder.

Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT / Contract, from the bills along with due interest".

The balance amount to make up the required Security Deposit of 5% of the contract Value may be furnished in any of the following forms:

- i) Cash (as permissible under the extant Income Tax Act)
- ii) Local cheques of scheduled banks (subject to realization) / Pay Order / Demand Draft / Electronic Fund Transfer, in favour of BHEL.
- iii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats enclosed with general conditions of contract.
- iv) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL and duly discharged on the back.
- v) Securities available from Indian Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly endorsed/hypothecated/pledged, as applicable, in favour of BHEL and duly discharged on the back).
- vi) Insurance Surety Bonds.

(NOTE: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

3 Submission of Security Deposit:

- i) At least 50 % of the required Security Deposit, including the EMD, shall be submitted before start of work. Balance of the Security Deposit can be submitted by way of deduction of 10% of the gross amount progressively from each running bills of the contractor till the total amount of the required Security Deposit is collected.
- ii) In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder.
- iii) If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or it shall be recovered from payment/s due to the Contractor.
- iv) The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, at the discretion of BHEL.

- 4 The BG shall be submitted only through the Banker. Along with the BG, the Bank shall also furnish a letter of confirmation (in the prescribed formats enclosed with general conditions of contract).

- 5 The validity of the Bank Guarantee furnished towards Security Deposit shall be up to three months more than the period of completion of work as stipulated in the LOI and the same will be kept valid by proper renewal till the completion of the work.

- 6 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the contractor's failure to fulfil any of the contractual obligations or in the event of termination of contract as per terms and conditions of the contract. BHEL reserves the right to set off the Security Deposit, against any claims of any other contracts with BHEL.

7 Conditions for acceptance of bank guarantees

Contractors are advised to obtain Bank Guarantee preferably from any of the following BHEL consortium banks

Sl. No.	Name of Bank	Sl. No.	Name of Bank
1	State Bank of India	11	Punjab National Bank
2	Canara Bank	12	Union Bank of India
3	IDBI Bank Limited	13	Yes Bank Limited

4	ICICI Bank Limited	14	RBL Bank Ltd.
5	HDFC Bank Limited	15	Standard Chartered Bank
6	Axis Bank	16	Indian Overseas Bank
7	IndusInd Bank Limited	17	Kotak Mahindra Bank Limited
8	Bank of Baroda	18	Federal Bank Limited
9	Exim Bank	19	Hongkong and Shanghai Banking Corporation Ltd
10	Indian Bank		

Bank Guarantees from Banks outside BHEL's consortium shall be as below:

- The Bank Guarantees of all Public sector banks can be accepted (in addition to consortium banks)
- The Bank Guarantees of Co-operative banks shall not be accepted.
- Bank Guarantees of other than consortium bank and public sector bank can be accepted subject to an overall exposure limit (at New Delhi) of Rs. 10 crores for banks with net worth of more than Rs. 500 crores as on last balance sheet date and Rs 5 crores for banks with net worth between Rs. 350 to Rs 500 crores (A certificate and copy of latest Balance Sheet to be given by the Bank at the time of submission of Bank Guarantees).
- In case of private sector banks, a clause to be incorporated in the text of Bank Guarantee that it can be enforceable by being presented at any branch of the bank.
- In case of foreign vendors, the bank guarantees issued by foreign banks may be confirmed by our consortium bank in India.
- In case of Bank Guarantees given by Non-Consortium banks (Private sector or Public sector), the Bank Guarantees are to be enforceable in New Delhi or the town/ city in which the sector office is located

8 Return of Security Deposit

If the contractor duly performs and completes the work in all respects to the entire satisfaction of BHEL and presents an absolute "No demand certificate", returns properties belonging to BHEL, taken, borrowed or hired by him for carrying out the said works, and furnishes performance bond BG in the prescribed proforma, Security Deposit will be released to the contractor after deducting all costs, expenses and other amounts that are to be paid to BHEL under this contract or other contracts entered into with the contractor.

It may be noted that in no case the Security Deposit shall be refunded/released prior to passing of final bill.

D BANK ACCOUNT DETAILS FOR EMD & SD

Bank Account Details for submission of EMD/ Security Deposit through electronic fund transfer mode.

NAME OF THE COMPANY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	TRANSMISSION BUSINESS GROUP, PLOT NO. 25, SECTOR- 16A,
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH	CAG-II NEW DELHI (17313)
CITY	NEW DELHI
ACCOUNT NUMBER	00000030206227732
ACCOUNT TYPE	CASH CREDIT
IFSC CODE	SBIN0017313

E PAYMENT TERMS

Clause No. C.2.0 of GCC stands deleted. Now this clause shall be read as below.

(Description of work in this section is made for payment purpose only and the scope is not limited to the activities mentioned below. Please refer technical documents for complete scope of work)

- 1 No Mobilization Advance shall be paid.
- 2 **For BOQ items – Sl. Nos. 1 to 11 & 68 to 74 (Category-A1)- Erection, Testing and Commissioning.**
 - i) 10% of the contract item price on the monthly progressive bills on pro rata basis for receipt, material including arranging crane for unloading, maintaining proper records of receipt & storage in Field Quality Plans (FQPs) and as certified by BHEL Engineer. In case of power transformer/ reactors, 5% amount shall be paid after unloading and 5% after dragging main tank in position on foundation. The sub-items mentioned in transformer/ reactor shall be consider for payment with main item.
 - ii) 60% of the contract item price on the monthly progressive bills on pro rata basis after arranging necessary calibrated tools/tackles required for erection, submitting calibration reports, qualification/experience certificates of welder/Electrician/other staff, levelling, alignment, tightening and completion of erection including maintaining proper records of installation in FQPs and as certified by BHEL, Engineer.

- iii) 10% of the contract item price on the monthly progressive bills on pro rata basis on arranging calibrated testing equipment, submission of calibration reports, testing of equipment including maintaining proper records of testing in FQPs and as certified by BHEL, Engineer. BOQ items, which are not required to be tested as per FQP, shall be qualified for release of payment on prorated basis after completion of testing of all equipment's of corresponding bay (As per SLD/ layout).
- iv) 10% of the contract item price after completion of satisfactory commissioning and submission of complete records of erection/testing/commissioning /charging protocol as per FQPs for the corresponding bay.
- v) Last 10% of the contract item price after all test reports as per contract are jointly witnessed and signed by BHEL/customer, "As Built" changes are incorporated in relevant drawings, material reconciliation and substation is handed over to the Owner / Customer. If the contract is for more than one sub-station, then the same will be released after successful handing over of each sub-station. If for any reason, the handing over is delayed for reasons beyond the control of the contractor, in such case this payment will be released against commissioning certificate issued by the BHEL / customer and against submission of final bill of individual substation.

3 For BOQ items -Sl. Nos. 12 to 51, 60 to 67, 88 to 92 (Category-A2)- Erection works

- i) 10% of the contract item price on the monthly progressive bills on pro rata basis for receipt, material including arranging crane for unloading, maintaining proper records of receipt & storage in Field Quality Plans (FQPs) and as certified by BHEL Engineer. In case of power transformer/ reactors, 5% amount shall be paid after unloading and 5% after dragging main tank in position on foundation. The sub-items mentioned in transformer/ reactor shall be consider for payment with main item.
- ii) 80% of the contract item price on the monthly progressive bills on pro rata basis after arranging necessary calibrated tools/tackles required for erection, submitting calibration reports, qualification/experience certificates of welder/Electrician/other staff, levelling, alignment, tightening and completion of erection including maintaining proper records of installation in FQPs and as certified by BHEL, Engineer.
- iii) Last 10% payment shall be released as per E.2.(v) above.

4 For BOQ items :- Sl. Nos. 52 to 59, 75 to 78, 80, 82 to 87 (Category-B) (Supply in contractor's scope)

- i) 80% of the contract item price on the monthly progressive bills on prorated basis after supply, receipt of the material at site, unloading, proper storage and as certified by site in charge.
- ii) 10% of the contract item price on the monthly progressive bills on prorated basis after material erection as certified by BHEL site In-charge on prorated basis after erection.
- iii) Last 10% payment shall be released as per E.2.(v) above.

5 For BOQ items :- Sl. Nos. 81 (Category-C) (Only For unloading & storage)

- i) 30% of the contract item price on the monthly progressive bills on prorated basis after receipt of the material at site, unloading, proper storage and as certified by site in charge.
- ii) 60% of the contract item price on the monthly progressive bills on prorated basis after handing over to Customer and as certified by BHEL site In-charge.
- iii) Last 10% payment shall be released as per E.2.(v) above.

6 For BOQ item: -Sl. Nos.: 79 (Category-D) (Watch & Ward (Material Security)/ modification works/ dismantling work/ Manpower Support to Testing agency which has been engaged by BHEL (Fitter, Welders, Electricians)/ Hiring of T&P for Testing agency which has been engaged by BHEL/ Transport & Shifting beyond project premises/ Testing charges in case of re-work as defined in work order (DGA test, Oil testing etc))

- i) 100% of the contract item price on the monthly progressive bills on pro rata basis towards watch & ward against submission of invoice and on certification of engineer incharge of BHEL.

F OVERALL QUANTITY VARIATION

The individual quantity can vary to any extent or may be deleted for which no compensation will be payable to the contractor and **the rates will remain firm**. Also, the rate of each item remains firm as long as the variation in the total value of work executed under the contract including extra items if any remains within plus/minus 30 percent of the contract value. In case the actual value of executed work including extra work on completion of work becomes less than 70% of the basic/original contract value than the following method shall be adopted.

The actual executed value shall be raised by 7 % (For arriving at the final payment against work executed) subject to the condition that total value of work executed plus increase by 7% as above shall be limited to 70% of the basic/original contract value. The rate quoted shall be firm irrespective of any upward variation in the contract price.

G OVERRUN COMPENSATION

- 1 If the contract is extended beyond 12 months from the date of scheduled completion for any reason other than those attributable to the contractor or force majeure conditions, the contractor will be compensated by payment of over-run charges per month at the rate of 0.2 percent (point two percent) of the cumulative executed value.

Cumulative executed value as on last day of respective month(s) will be taken for purpose of calculation of overrun compensation.

- 2 The overrun compensation will be payable for the eligible period of time extension on account of reasons attributable to BHEL only. No overrun will be payable for the extension on account of reasons attributable to contractor and/or force majeure conditions.
- 3 Over run compensation for the eligible period shall be in proportion to the progress achieved against the plan for respective period.
- 4 Part of Extension attributable to the contractor, if any, in total contract extension shall be exhausted first. This shall be followed by Extension on account of force majeure conditions, if any and lastly on account of BHEL.
- 5 The compensation will be payable for the extended eligible period in months and days as applicable.
- 6 In case execution is on HOLD (Other than Force Majeure), No ORC shall be payable to contractor for the period of HOLD if contractor is permitted to demobilize from site and to re-mobilize after lifting of HOLD.
- 7 ORC shall not be applicable for following activities
 - i. Area cleaning, removal of temporary structures and return of scrap.
 - ii. Punch list points / pending points liquidation pending due to reasons attributable to contractor
 - iii. Submission of "As built Drawing"
 - iv. Material Reconciliation
 - v. Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./Statutory Authorities etc.
- 8 Total Over Run Compensation shall be limited to 10% of the executed contract value (to the maximum of 1 Cr of ORC) as certified in Final Bill. For this purpose executed contract value excludes PVC, ORC, Supplementary/Additional Items and Extra Works done.

H TAXES AND DUTIES

Clause No. C.30.0 "INCOME TAX/SALES TAX/WORKS TAX/VAT" stands deleted. Now this clause shall be read as below.

- 1 All taxes (except GST), duties, charges, royalties, cess and any other levies by Central/ State/local authorities for the execution of the contract shall be borne by the contractor and shall not be payable extra.
Any increase of the same at any stage during execution of the contract shall be borne by the contractor.
Quoted price of the same shall be inclusive of all such requirements.
- 2 GST along with Cess (as applicable) legally leviable & payable by successful bidder as per GST Law shall be paid by BHEL, extra.

Hence, bidder shall not include GST along with Cess (as applicable) in their quoted rates/ price.

- 3 Contractors have to make their own arrangement at their cost for completing the formalities, if required with relevant taxation authorities, for bringing their material, plant and machinery at site for the execution of the contract. Road permits / way bill, if required shall be arranged by the contractor
- 4 Contractor shall furnish proof of GST registration with GSTN Portal covering the services under this contract.

Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project / work

However, in case contractor submits GST Registration of a state other than the state wherein the site is located, then contractor has to submit an undertaking that contractor is not liable to take registration in the state wherein the site is located as per the provision of Place of Supply under CGST/SGST/IGST Act.

BHEL will not be held responsible for any non-compliance of the Contractor in respect of GST laws as framed from time to time.

- 5 Contractor shall comply with all statutory amendment/notifications in this respect

Contractor shall submit the tax invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder).

In case of raising any Supplementary Tax Invoice (Debit / Credit Note), contractor shall issue the same containing all the details as referred in Section 34 read with Section 31 of GST Act & Rules referred there under.

Contractor shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising the Tax Invoice.

- 6 Goods and Service Tax (GST) will be reimbursed to the Contractor subject to the following conditions: -
 - I) Submission of valid GST Compliant Tax Invoice as per the GST Invoice Rules.
 - II) The Invoice raised by the Contractor should indicate the BHEL GST Registration Number.)
 - III) Contractor shall upload the invoices raised on BHEL in IFF/GSTR-1 within the prescribed time as given in the GST Act.
 - IV) Invoice raised and uploaded in IFF/GSTR-1 by the Contractor should be available to BHEL in FORM GSTR-2B electronically through the common portal.

V) Confirmation of payment of such GST to the Government through filing of GSTR-3B of corresponding month/quarter.

5 The GST amount should get reflected within prescribed time limit in the GSTN for BHEL to avail the input credit. If the GST Credit is reversed/ denied/ delayed to BHEL due to non-receipt/delayed receipt of Services and/or tax invoice or due to expiry of timeline prescribed in GST law or due to any other factor for availing such Input Tax Credit (ITC) or for any other reason arising out of the act directly attributable to the Contractor, GST amount shall be recoverable from Contractor from any dues payable to the Contractor along with any interest levied/ leviable on BHEL.

6 Statutory variation, if any, on account of GST will be payable by BHEL at actuals on submission of documentary evidence variation, if any, on account of GST will be payable by BHEL at actuals on submission of documentary evidence.

7 TDS under Income Tax Act/ GST Act shall be deducted as per applicable rates unless Exemption certificate, if applicable, from the appropriate Authority is furnished to BHEL along with the Invoice.

8 New Taxes & duties (Introduced after tender opening date):

If any new tax or duty is levied by the Central/State Government/Municipality/Local Authority and becomes directly applicable on items specified in the Bill of Quantities, full reimbursement shall be made subject to submission of documentation as per statute.

I BOCW (TAXES, DUTIES & LEVIES):

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

In case any portion of work involves execution through building or construction workers, then compliance to the above titled Acts shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:

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

J DELAY AND EXTENSION OF TIME

- 1 If, in the opinion of the Engineer, the work is delayed:
 - i) (by reason of abnormally bad weather, or
 - ii) by reason of serious loss or damage by fire, or
 - iii) by reason of civil commotion, local combination of workmen, strike or lockout, affecting any of the trades employed on the work, or
 - iv) delay on the part of the agency or tradesman engaged by the BHEL in executing work not forming part of the contract, or
- v) By reason of any other cause which in the absolute discretion of the Engineer is beyond the contractor's control, then in any such case, the Engineer (or higher authority) may make fair and reasonable extension in the completion dates of the individual items of work of the contract as whole. Such extension which will be communicated to the contractor by the Engineer in writing shall be final and binding on the contractor. No other claim in this respect for compensation, idle labour or otherwise howsoever is admissible. Upon the happening of any such event causing delay the contractor shall immediately give notice thereof in writing to the Engineer but shall nevertheless use constantly his best endeavour to prevent or make good the delay and shall do all that may reasonably be required to the satisfaction of the Engineer to proceed with the work.

- 2 In case of delay in completion of work BHEL reserve the right to grant time extension under the following options depending upon the performance of the vendor:
- i) Time extension without levy of LD in case it is found that delay is not attributable to the vendor
 - ii) Time extension with deduction of applicable LD in line with Liquidity Damage clause if the delay is solely attributable to the vendor.
 - iii) In case facts of delay is not settled, BHEL reserve the right to grant provisional time extension for delay in completion of total work or part thereof and running/ interim payments to the vendor will be released without deduction of LD subject to submission of additional Bank guarantee equivalent to maximum LD amount valid till completion of work under their scope and grant of final time extension.
During provisional time extension period ORC/ PVC shall not be payable to the contractor. The Final Delay analysis shall be prepared on completion of the work. In case of delay is not attributable to contractor as per final delay analysis the ORC/ PVC shall be released along with the final bill without any interest charges attributable to BHEL.

In case of delay attributable to contractor, LD shall be deducted for that period in line with clause "Compensation/ LD/ Penalty for delay in execution" of conditions of contract and balance ORC/ PVC (if any) shall be released along with the final bill without any interest charges attributable to BHEL.

K LIQUIDATED DAMAGES/PENALTY FOR DELAY IN EXECUTION

The Clause No. C.5.0 "LD / Penalty for delay in execution" of Conditions of contract for ETC works stands deleted. Now the modified clause shall be read as below:

Liquidated Damages, wherever referred under this Tender/Agreement, shall mean and refer to the damages, not in the nature of penalty, which the contractor agrees to pay in the event of delay in delivery of stores, installation, commissioning, breach of contract etc. as the case may be.

Liquidated Damages leviable upon the contractor is a sum which is agreed by the parties as a reasonable and genuine pre-estimate of damages which will be suffered by BHEL on account of delay/breach on the part of the contractor.

Liquidated Damages shall be calculated in the manner stipulated hereinafter:

In case the work is not completed within the stipulated time period, BHEL at its discretion may grant provisional time extension to contractor for the sole purpose of completion of balance works keeping its right reserved under the contract and law.

Grant of any provisional time extension shall by no means be considered as waiver of BHEL rights under the contract or law.

After the completion of work, duly certified by Engineer In charge, a comprehensive delay analysis shall be carried out to ascertain the attribution of delays in the provisional time extensions granted to contractor. The delay analysis shall record:

- a) Delays solely attributable to contractor
- b) Delays attributable to BHEL
- c) Delays on account of Force Majeure (as specified elsewhere in the contract)

The total period under the final time extension shall be equal to the period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/ levied for the portion of time extensions solely attributable to contractor and recoverable from the dues payable to the contractor.

For the periods, wherein the delay as per the comprehensive delay analysis carried out is solely attributable to contractor, BHEL shall have the right to impose Liquidated Damage at the rate of 0.5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value.

Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Man-day rate basis, Supplementary/ Additional Items and PVC. Before levying LD, the contractor shall be duly intimated the amount and reasons thereof for imposition of LD.

L RIGHTS OF BHEL

The Clause No. B.7.0 "RIGHTS of BHEL" of Conditions of contract for ETC works stands deleted. Now the modified clause shall be read as below:

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any Compensation

- 1 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons/ BHEL's obligation to its customer.
In case of inadequate manpower deployed by the contractor, BHEL reserves the right to deploy additional manpower through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor and payments and other statutory compliances related to manpower shall be the contractor's responsibility. In case of contractor's failure to fulfil his obligations in respect of such manpower, BHEL reserves the right to take necessary action as per contract conditions.
- 2 **Breach of Contract, Remedies and Termination**
 - a) The following shall amount to breach of contract:
 - I) Non-supply of material/ non-completion of work by the Supplier/Vendor within scheduled delivery/ completion period as per contract or as extended from time to time.
 - II) The Supplier/Vendor fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery/ completion period to justify that supplies shall be inordinately delayed beyond contractual delivery/ completion period.
 - III) The Supplier/Vendor delivers equipment/ material not of the contracted quality.
 - IV) The Supplier/Vendor fails to replace the defective equipment/ material/ component as per guarantee clause.
 - V) Withdrawal from or abandonment of the work by the Supplier/Vendor before completion as per contract.

- VI) Assignment, transfer, subletting of Contract by the Supplier/Vendor without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
- VII) Non-compliance to any contractual condition or any other default attributable to Supplier/Vendor.
- VIII) Any other reason(s) attributable to Vendor towards failure of performance of contract. In case of breach of contract, BHEL shall have the right to terminate the Purchase Order/ Contract either in whole or in part thereof without any compensation to the Supplier/Vendor.
- IX) Any of the declarations furnished by the contractor at the time of bidding and/ or entering into the contract for supply are found untruthful and such declarations were of a nature that could have resulted in non-award of contract to the contractor or could expose BHEL and/ or Owner to adverse consequences, financial or otherwise.
- X) Supplier/Vendor is convicted of any offence involving corrupt business practices, antinational activities or any such offence that compromises the business ethics of BHEL, in violation of the Integrity Pact entered into with BHEL has the potential to harm the overall business of BHEL/ Owner.

Note Once BHEL considers that a breach of contract has occurred on the part of Supplier/Vendor, BHEL shall notify the Supplier/Vendor by way of notice in this regard. Contractor shall be given an opportunity to rectify the reasons causing the breach of contract within a period of 14 days.

In case the contractor fails to remedy the breach, as mentioned in the notice, to the satisfaction of BHEL, BHEL shall have the right to take recourse to any of the remedial actions available to it under the relevant provisions of contract.

LD against delay in executed work in case of Termination of Contract:

LD against delay in executed work shall be calculated in line with relevant LD clause of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of "LD against delay in executed work in case of termination of contract" is given below.

I)	Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor	T1
II)	Let the value of executed work till the time of termination of contract	X
III)	Let the Total Executable Value of work for which inputs/fronts were made available	Y
IV)	Delay in executed work attributable to contractor i.e. T2	= $[1 - (X/Y)] \times T1$
V)	LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor taking "X" as Contract Value and "T2" as period of delay attributable to contractor.	

b) Remedies in case of Breach of Contract is established:

- i) Wherein the period as stipulated in the notice issued under clause "BREACH OF CONTRACT, REMEDIES AND TERMINATION" of GCC has expired and Contractor has failed to remedy the breach, BHEL will have the right to terminate the contract on the ground of "Breach of Contract" without any further notice to contractor.
- ii) Upon termination of contract, BHEL shall be entitled to recover an amount equivalent to 10% of the Contract Value for the damages on account of breach of contract committed by the Contractor. This amount shall be recovered by way of encashing the security instruments like performance bank guarantee etc available with BHEL against the said contract. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, from the money due to the Contractor etc. with BHEL) or the other legal remedies shall be pursued.
- iii) wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners:
- iv) In case the amount recovered under sub clause (a) above is not sufficient to fulfil the amount recoverable then; a demand notice to deposit the balance amount within 30 days shall be issued to Contractor.
- v) If Contractor fails to deposit the balance amount within the period as prescribed in demand notice, following action shall be taken for recovery of the balance amount:
- from dues available in the form of Bills payable to defaulted Contractor against the same contract.
 - If it is not possible to recover the dues available from the same contract or dues are insufficient to meet the recoverable amount, balance amount shall be recovered from any money(s) payable to Contractor under any contract with other Units of BHEL including recovery from security deposits or any other deposit available in the form of security instruments of any kind against Security deposit or EMD.

- c) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted Contractor.
- vi) It is an agreed term of contract that this amount shall be a genuine pre-estimate of damages that BHEL would incur in completion of balance contractual obligation of the contract through any other agency and BHEL will not be required to furnish any other evidence to the Contractor for the purpose of estimation of damages.
- vii) In addition to the above, imposition of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract.

Note: The defaulting contractor shall not be eligible for participation in any of the future enquiries floated by BHEL to complete the balance work. The defaulting contractor shall mean and include:

- a) In case defaulted contractor is the Sole Proprietorship Firm, any Sole Proprietorship Firm owned by same Sole Proprietor.
 - b) In case defaulted contractor is The Partnership Firm, any firm comprising of same partners/ some of the same partners (but not including any new partner); or sole proprietorship firm owned by any partner(s) as a sole proprietor.
- 3 In case Contractor fails to deploy the resources as per requirement informed by BHEL in writing to expedite the work, BHEL can deploy own/hired/otherwise arranged resources and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.
- 4 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, whatsoever.
- 5 Whenever any Claim or Claims for payment of any sum of money(s) arises under this or any other contract against the contractor, BHEL shall be entitled to withhold and also have a lien to retain such sum of money(s) in whole or in part from any money(s) payable to contractor and/or security deposits furnished or deducted in cash from the bills of contractor, (if any) under this contract. In the event of the securities or the amounts payable to Contractor, being insufficient to cover BHEL claims, then BHEL shall be entitled to withhold and have a lien to the extent of such claims from any sum or sums found payable or which at any time thereafter may become payable to the contractor under this or any other contract with BHEL.
- a) Claim or Claims for payment of any sum of money(s) arising from the Contractor under this or any other contract against the contractor, shall mean, the sum of money(s) actually incurred by BHEL in fulfilling the contractual responsibilities of contractor under the contract, to which he has failed to fulfil plus applicable overheads (@ 5%) along with interest as applicable under the Contract on total amount (i.e. money actually incurred plus overheads)
 - b) It is an agreed term of the contract that, the sum or sums of money so withheld or retained under the lien by BHEL will be kept withheld or retained as such by BHEL till the claims arising out of this or any other contract are finally adjudicated wither through Arbitration or a Court of competent jurisdiction as the case may be in accordance with the terms of contract. Intimation given by the BHEL Engineer regarding withholding of such money(s) shall be considered as sufficient and relevant date for all purposes. No Interest shall be payable on such sum(s) of money which becomes due or as the case may be adjudged to be due from BHEL to Contractor, whether under contract or otherwise.
 - c) Where the contractor is a partnership firm, BHEL shall be entitled to withhold and also have a lien to retain towards such claims in whole or in part, from any other money(s) payable to any partner, whether in his individual capacity or otherwise.
 - d) If any money(s) shall, as a result of any claim or application made under the relevant provisions of any Labour Welfare Act and/ or Rules, including but not limited to Contract Labour Regulation & Abolition Act, Minimum Wages Act, Payment of Gratuity Act, BOCW (RE&CS) Act, Provident Fund Act, Employee State Insurance Act, be directed to be paid by the BHEL, such money shall be deemed to be moneys payable to the BHEL by the Contractor.
 - e) Where the Contractor fails to repay to BHEL such moneys along with applicable overheads (@ 5%) and interest, as aforesaid within seven days of being demanded, BHEL shall be entitled to recover the same from Contractor's bills/ Security Deposit or any other money(s) payable to Contractor under this Contract or any other Contract with BHEL.
- 6 While every endeavor will be made by BHEL to this end, yet BHEL cannot guarantee uninterrupted work due to conditions beyond its control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.
- 7 BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:
- a) suspension of work(s) at a Project either by BHEL or Customer,
 - or
 - b) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months

In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to terminate the contract and effect remedies under Clause **"Remedies in case of Breach of Contract"** In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

- 8 In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts etc. due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in any of the following cases:
- a) The balance works (including but not limited to Trial Operation, PG Test etc.) are minor vis a vis the scope of work envisaged as per the contract.
 - b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL).
 - c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other such reasons not attributable to the contractor.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test etc.) as decided by BHEL, shall however be reduced from the final contract value.

Note: The Contractor shall not be eligible for any compensation on account of Quantity Variation arising out of short-closure of contract as per clause above.

M FORCE MAJEURE

Clause No. B.13.0 (FORCE MAJEURE) of Conditions of Contract for ETC Works has been modified as below:

- 1 "Force Majeure" shall mean circumstance which is:
 - a) beyond control of either of the parties to contract,
 - b) either of the parties could not reasonably have provided against the event before entering into the contract,
 - c) having arisen, either of the parties could not reasonably have avoided or overcome, and
 - d) is not substantially attributable to either of the parties

Such circumstances include but shall not be limited to:

 - i) War, hostilities, invasion, act of foreign enemies.
 - ii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war.
 - iii) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors.
 - iv) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors.
 - v) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio-activity.
 - vi) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc.
 - vii) Epidemic, pandemic etc.
- 2 The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party:
 - a) any strike, work-to-rule action, go-slow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship.
- 3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event.
- 4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.

- 5 Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not
- a) Constitute a default or breach of the Contract.
 - b) Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure
- 6 BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Supplier/Vendor cannot consider deemed short-closure after 1 year of imposition of Force Majeure.

N SETTLEMENT OF DISPUTE

Clause No. B.15.0 (Arbitration) of Conditions of Contract for ETC Works has been modified as below:

If any dispute or difference of any kind whatsoever shall arise between BHEL and the Supplier/Vendor, arising out of the contract for the performance of the work whether during the progress of contract termination, abandonment or breach of the contract, it shall in the first place referred to **Sector Head/TBNS, TBG, BHEL** for amicable resolution by the parties. **Sector Head/TBNS, TBG, BHEL** who within 60 days after being requested shall give written notice of his decision to the contractor. Save as hereinafter provided, such decision in respect of every matter so referred shall forthwith be given effect to by the Supplier/Vendor who shall proceed with the work with all due diligence, whether he or BHEL desires to resolve the dispute as hereinafter provided or not.

If after the **Sector Head/TBNS, TBG, BHEL** has given written notice of this decision to the party and no intention to pursue the dispute has been communicated to him by the affected party within 30 days from the receipt of such notice, the said decision shall become final and binding on the parties. In the event the Supplier/Vendor being dissatisfied with any such decision or if amicable settlement cannot be reached then all such disputed issues shall be resolved through conciliation in terms of the BHEL Conciliation Scheme 2018 as per Clause "Conciliation" of GCC.

1 CONCILIATION:

Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the "Dispute") shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure as per BHEL Conciliation Scheme 2018. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in - "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com)).

Note: Ministry of Finance has issued OM reference No. 1/2/24 dated 03.06.2024 regarding "Guidelines for Arbitration and Mediation in Contracts of Domestic Public Procurement. In the said OM it has been recommended that Government departments/

Entities/agencies are to encourage mediation under the Mediation Act. 2023. The said Act has not yet been notified by the Government. Therefore, the clause "Settlement of Disputes" shall be modified accordingly as and when the Mediation Act 2023 gets notified.

2 ARBITRATION:

A Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause "Conciliation" herein above or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract (hereinafter referred to as the 'Dispute'), then, either Party may, refer the disputes to Arbitral Institution i.e. "**India International Arbitration Centre (IIAC) Delhi**" and such dispute to be adjudicated by Sole Arbitrator appointed in accordance with the Rules of said Arbitral Institution.

B A party willing to commence arbitration proceeding shall invoke Arbitration Clause by giving notice to the other party in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice') before referring the matter to arbitral institution. The Notice shall be addressed to the **Executive Director, TBG, BHEL, Noida**, executing the Contract and shall contain the particulars of all claims to be referred to arbitration with sufficient detail and shall also indicate the monetary amount of such claim including interest, if any.

C After expiry of 30 days from the date of receipt of aforesaid notice, the party invoking the Arbitration shall submit that dispute to the Arbitral Institutions and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd Judge having considerable experience in commercial matters to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged.

D The fee and expenses shall be borne by the parties as per the Arbitral Institutional rules.

E The Arbitration proceedings shall be in English language and the seat and venue of Arbitration shall be Delhi.

F Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matters relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at Delhi.

G Notwithstanding any reference to the **Sector Head/TBNS, TBG, BHEL** or Conciliation or Arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree. Settlement of Dispute clause cannot be invoked by the Contractor, if the Contract has been mutually closed or 'No Demand Certificate' has been furnished by the Contractor or any Settlement Agreement has been signed between the Employer and the Contractor.

H The Mechanism of resolution of disputes through arbitration shall be available only in the cases where the value of the dispute is less than Rs. 10 Crores.

I In case the disputed amount (Claim, Counter claim including interest is Rs. 10 crores and above, the parties shall be within their rights to take recourse to remedies other than Arbitration, as may be available to them under the applicable laws after prior intimation to the other party. Subject to the aforesaid conditions, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof as amended from time to time, shall apply to the arbitration proceedings under this clause.

J In case, multiple arbitrations are invoked (whether sub-judice or arbitral award passed) by any party to under this contract, then the cumulative value of claims (including interest claimed or awarded) in all such arbitrations shall be taken in account while arriving at the total claim in dispute for the subject contract for the purpose of clause N.2.I. Disputes having cumulative value of less than 10 crores shall be resolved through arbitration and any additional dispute shall be adjudicated by the court of competent jurisdiction.

K In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14-12-2022 as amended from time to time.

O FACILITIES PROVIDED TO MSEs:

Vide office memorandum F.No.21(8)/2011-MA dated 09.11.2016, Office of AS&DC, Ministry of MSME has issued clarification regarding definition of Goods and Services under the Public Procurement Policy of MSEs order-2012, In accordance with the Public Procurement Policy for MSEs order-2012 and OM regarding definition of Goods and Services issued by Ministry of MSME, it is clarified that benefits as envisaged in Public Procurement Policy for MSEs Order 2012 are to be provided in respect of the procurements related to the Goods and Services produced and provided by Micro and Small Enterprises (MSEs) only and **no benefits is to be given in Case of Works Contracts.**

P CLOSING OF CONTRACTS

The Contract shall be considered completed and closed upon completion of contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a performance/ experience certificate as per standard format, based on specific request of Contractor as per extant BHEL guidelines through the online portal available at <https://siddhi.bhel.in> only.

Q SUSPENSION OF BUSINESS DEALINGS

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms / principal / agents, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.

If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in any act, including but not limited to, mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or tampers the tendering process or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, or does anything which is actionable under the Guidelines for Suspension of Business dealings, action may be taken against such bidder / supplier / contractor as per extant guidelines of the company available on www.bhel.com and / or under applicable legal provisions. Guidelines for suspension of business dealings is available in the webpage:

http://www.bhel.com/vender_registration/vender.php.

R PERFORMANCE MONITORING:

The Contractors performance shall be continuously monitored during execution of work at site.

In case of contractor's performance is found not satisfactory during the execution of work at site, BHEL may take alternate remedial measures and may not consider the contractor for further tenders, if the contractor performance is not improved in spite of opportunities given by BHEL.

S MEASUREMENT OF WORK AND MODE OF PAYMENT:

- 1 All payments due to the contractors shall be made by e-mode only.
- 2 For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.
- 3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book by BHEL Engineers and signed by both the parties.
- 4 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.
- 5 Based on the above quantities, contractor shall prepare the bills, along with statutory documents, in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.
- 6 All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.
- 7 Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.
- 8 The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the Contractor.
- 9 The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/ used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.
- 10 If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.
- 11 Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

- 12 Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractor shall give unqualified "No Claim" Certificate. All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work

T NO INTEREST PAYABLE TO CONTRACTOR:

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

U PROGRESSIVE PAYMENT/ FINAL PAYMENT:

1 Running Account Bills (RA Bills)

- (i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).
- (ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.
- (iii) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.
- (iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost.
- (v) The contractor shall submit his monthly RA bills with all the details required by BHEL on specified date every month covering progress of work in all respects and areas for the previous calendar month.
- (vi) Mode of payment and measurement of work completed shall be as per relevant clauses of General Conditions of Contract
- (vii) Release of payment in each running bill including PVC Bills where ever applicable will be as per stages of progressive pro rata payments.
- (viii) The contractor will be eligible for payment of RA Bills within 30 days of submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc. and other dues in the meanwhile.

All documents like HR Clearance, Quality and Safety Compliances etc. required for processing the RA Bills should be submitted along with RA Bills.

- (ix) BHEL shall release payment through Electronic Fund Transfer (EFT)/RTGS. In order to implement this system, Contractor to furnish details pertaining to his Bank Accounts where proceeds will be transferred through BHEL's banker, as per prescribed formats.
- (x) For MSMEs, at the time of submission of first RA bill, the subcontractor has to declare whether it is registered on RXIL portal and wishes to receive the proceeds through RXIL portal throughout the contract duration.

1.1 Documents required for RA Bill:

- a) GST Complied Invoice of the work done as per approved BOQ.
- b) Jointly signed Measurement sheet, Abstract , WAM -6 for RA Bill.
- c) Valid Bank Guarantees as applicable under the contract.
- d) Labour Payment Certificate
- e) Copy of valid Workmen Compensation Insurance policy
- f) Material Reconciliation statement
- g) Test Report of the material as per FQP
- h) Power of Attorney for representative signing MBs etc, if not submitted earlier.
- i) HR compliance documents (like PF, ESI, Wage sheets etc.)
- j) Any other documents as per customer/statutory requirement.

Note :

Site in charge has to certify that all the above required documents have been received and verified and document sl no. a) to e) duly verified are to be sent to Finance alongwith RA bills.

2 Final Bill

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope, material reconciliation, removal of temporary structures, return of scrap/surplus material of BHEL. BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL.

2.1 Documents required for Final Bill:

- a) GST Complied Invoice of the work done as per approved BOQ.
- b) Jointly signed Measurement sheet, WAM -7, WAM-10 format (if Applicable).
- c) Valid Bank Guarantees as applicable under the contract.
- d) Labour Payment Certificate.
- e) 'No claim' certificate from the contractor.
- f) Copy of valid Workmen Compensation Insurance policy
- g) Deviation statement showing the Executed quantities and quantities as per the contract.
- h) Material Reconciliation statement.
- i) Submission of As Built Drawings
- j) Material Reconciliation statement duly approved by BHEL
- k) Power of Attorney for representative signing MBs etc, if not submitted earlier.
- l) HR compliance documents (like PF, ESI, Wage sheets etc.)
- m) Compliance report from BHEL/Customer for completion of punch points.
- n) Final Delay Analysis.
- o) Any other documents as per customer requirement/statutory requirement.

Note :

Site incharge has to certify that all the above required documents have been received and verified and document sl no. a) to g) duly verified are to be sent to Finance alongwith Completion certificate.

V PROGRESSIVE PAYMENT/ FINAL PAYMENT:

Notwithstanding anything to the contrary in this Contract or LOA or Work Order or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Contract or the Work Order. Neither party shall be liable to the other for any indirect or consequential loss or damage, including but not limited to loss of use, loss of profits, or loss of contracts, or special, punitive, exemplary losses whatsoever, arising out of or in connection with this contract.

This shall not be applicable on the recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor".

W CONSEQUENTIAL LOSS

Neither party shall be liable to the other for any indirect or consequential loss or damage, including but not limited to loss of use, loss of profits, or loss of contracts, or special, punitive, exemplary losses whatsoever arising out of or in connection with this contract.

NOTE : All other terms and conditions of GCC shall remain unchanged.

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION.....
Running Account Bill
(Para 4.3.1 of Works Accounts Manual)

Name of the Contractor

Name of the Work:

Sanctioned Estimate:

Code No.:

Contract Agreement No.:

Dated:

Division:

Date of written order to commence the Work:

Date of commencement of work:

Due date of completion as per agreement

Date of approval of Competent Authority for time extension as applicable (copy to be enclosed).

Departmental Bill No.

Date:

Sub-Division:

Period of work covered in this bill:

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item No. of work	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity executed since last RA bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

** 1. Whenever payment is made on adhoc basis without actual measurements the amount in whole rupees should be entered in columns 1 to 3 only and not in columns 7 to 12
 2. Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date (A) -----

Deduct value of work shown on the last Running Account Bill (B) -----

Net value of work done since last Running Account Bill (C) -----

Rupees (in words) Only

Note :

Wherever adhoc payments to contractors against running bills are made in accordance with the extant Works Policy, the amount so paid shall be adjusted.

II. MEMORANDUM OF PAYMENTS

		I	II
1.	Total value of work actually measured as per Account No. I, Column 10	(A) -----	-----
2.	Total upto date adhoc payment for work covered by approximate or plan measurements as per Account I, Col. 3	(B) -----	-----
4.	Total upto date payments [(A)+(B)]	(C) -----	-----
5.	Total amount of payments already made as per entry (D) of last Running Account Bill No. dated forwarded to the Accounts Department on	(D) -----	-----
6.	Balance [(C) - (D)]		-----
7.	Payments now to be made:	-----	
	a) by cash / cheque	-----	
	b) by deduction for value of materials supplied by BHEL vide Annexure A attached	-----	
	c) by deduction for hire of tools and plant vide Annexure B attached	-----	
	d) by deduction for other charges vide Annexure C attached	-----	
	e) by deduction on account of security deposit	-----	
	f) by deduction on account of Income Tax		-----

Note : Amounts relating to items 4 to 6 above should be entered in column II and those relating to item 7 in column I. The amount shown against item 6 and the total of item 7 should agree with each other.

III. CERTIFICATE OF THE ENGINEER IN CHARGE

1	The measurements on which the entries in column 7 to 12 of Part I of this Bill (Account of work executed) are based were made by ----- and are reorded at pages - ----- of Measurement Book No. ----- (Name and Designation)
2	Certified that the methods of measurement are correct and the work has been carried out in accordance with the terms and conditions, schedules, specifications and drawings etc. forming part of the contract agreement, subject to deviations included in the deviation statement (Annexure D)
3	Certified that in addition to and quite apart from the quantities of work actually executed as shown in column 10 of Part I, some work has actually been done in connection with several items and the value of the such work is, in no case, less than the adhoc payments as per column 3 of Part I, made or proposed to be made, for the convenience of the contractor in anticipation of, and subject to the results of, detailed measurement which will be made as soon as possible.
4	Certified that measurements by Engineer-incharge and test check of prescribed percentage of measurements by the concerned superior authorities has been carried out.
5	Certified that there are no pending recoveries from the contractor on account of chargeable items (e.g T&P, consumables, material, etc.) issued either by BHEL or by the customer and other recoveries like power, water, quarter, tax liability towards declaration forms etc.
6	Certified that with regard to the free issues, regular reconciliation is being done, completed upto ----- and there are no recoveries pending from the contractor on account of such issues in excess of requirement for execution of work as per contract.
7	Certified that there is no pending recovery for damaged material issued free of cost.
8	Certified that the contractor has fulfilled all the requirements as per contract with reference to statutory obligations (PF, ESI, Minimum Wages, BOCW, Insurance etc.), support services such as service manpower, computer system , T&P etc

Signature of Contractor

Signature of Engineer in Charge

Designation:

Date:

Date:

IV. CERTIFICATE OF THE SENIOR ENGINEER

1	Certified that the measurements have been check measured to the prescribed extent by at site and also by the undersigned and the relevant entries have been initialed in the Measurement Book. (vide pages) (Name and Designation)
2	Certified that all the measurements recorded in the measurement book have been correctly billed for
3	Certified that all recoverable amounts in respect of materials tools and plant etc. and other charges have been correctly made vide annexures A to C attached.

Certified for payment * of Rs. (Rupees only)

* Here specify the net amount payable.

Date:

Signature of Senior Engineer

V. ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Accounts Bill No. dated

Entered in Journal Book vide entry No. dated

Passed for Rs.

Less Deductions Rs.

Net amount payable Rs.

(Rupees only)

Payable to Shri / M/s by cheque / cash

Entered in Contractors ledger No. Page

Estimate No :

Debit

Credit

(Gross amount)

(Deductions)

Name of Work :

Account code head

Total

Code No.:

ALLOCATION

Assistant

Date:

Accountant

Date:

Finance Executive

Date:

ANNEXURE C

Form WAM 6 (Contd.)

Statement showing details of other recoveries to be made from the contractor Shri/M/s-----in respect of contract Agreement No.Dated

S. No.	Particulars	Unit	Quantity	Rate	Amount recoverable	Amount recovered up to previous bill	Amount now recovered	Remarks
1	2	3	4	5	6	7	8	9
1	Water charges							
2	Electricity charges							
3	Seignorage charges							
4	Medical charges							
5	Cost of empty gunny bags and empty containers not returned							
6								
7								
8								

TOTAL

Signature of Contractor
Date :

Signature of Engineer in Charge
Date :

Signature of Senior Engineer
Date:

ANNEXURE D
DEVIATION STATEMENT

Name of the Contractor:

Contract Agreement No

Name of Work:

Date:

S. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Quantity further anticipated	Total quantity anticipated on completion	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Amount further anticipated	Total Amount anticipated on completion	Difference		Reason for deviation with authority, if any
													Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Signature of Engineer in Charge
Date :

Signature of Senior Engineer
Date :

BHARAT HEAVY ELECTRICALS LIMITED
DIVISION.....
.....And Final Bill
(Para 4.3.2 of Works Accounts Manual)

Departmental Bill No:

Date:

Name of the Contractor:

Name of the Work:

Division:

Date of Written order to commence the work:

Sub-Division:

Sanctioned Estimate:

Contract Agreement/ Work Order No:

Date of actual completion of the work:

Date of commencement of the Work:

Dated:

Due date of completion as per Agreement:

I. ACCOUNT OF WORK EXECUTED

Adhoc payment for work not previously measured **			Item no. of the agreement / work order	Description of work	Quantity as per agreement	Quantity executed upto date	Rate	Unit	Payment on the basis of actual measurement upto date	Quantity since last running account bill	Payment on the basis of actual measurement since last running account bill	Remarks
Total as per last running account bill	Since last running account bill	Total upto date										
1	2	3	4	5	6	7	8	9	10	11	12	13

** Whenever there is an entry in column 12 on the basis of actual measurement, the whole of the amount previously paid without detailed measurement should be adjusted by a minus entry in column 2 equivalent to the amount shown in column 1, so that the total upto date in column 3 may become nil.

Total value of work done upto date (A) -----

Deduct value of work shown on the last Running Account Bill (B) -----

Net value of work done since last Running Account Bill (C) -----

Rupees (in words) Only

II. MEMORANDUM OF PAYMENTS

1	Total value of work actually measured as per Account No. I column 10	(A)	-----
2	Deduct amount of payments already made as per last running account bill No. dated	(B)	-----
3	Payment now to be made [(A) - (B)]	(C)	-----
4	Deduct amounts recoverable from the contractor on account of :		
	a) Materials supplied by BHEL vide Annexure A attached		-----
	b) Hire of tools and plant vide Annexure B attached		-----
	c) Other charges vide Annexure C attached		-----
	d) Income Tax		-----
	Total Deductions		-----
5	Balance		-----
6	Refunds of Security Deposit		-----
7	Net amount to be paid to the contractor		-----
	Net value Rupees (in words)		Only

I/ We hereby certify that I/We have performed the work as per the terms and conditions of Contract Agreement/Work Order No.....Dated.....for which payment is claimed as above and that I/We have no further claim under this agreement/work order.

Signature of the Contractor

Date:

III CERTIFICATE OF THE ENGINEER IN CHARGE

1. The measurements on which the entries in columns 7 to 11 of Part I of this bill (Account of work executed) are based were made by.....
are recorded at pages.....of measurement book No..... (Name and Designation)

2. A statement showing the quantities of stores issued to the contractor (whether free or on recovery basis) and their disposal is attached.

Date:

Signature of Engineer incharge

Designation:

IV CERTIFICATE OF THE SENIOR ENGINEER

Form WAM 7 (Contd.)

1. Certified that I have personally inspected the work and that the work has been physically completed on the due date in accordance with the terms and conditions, schedules, specifications and drawings etc., forming part of the contract agreement, subject to the deviations noted in Deviation Statement (Annexure D).
2. Certified that the measurements have been check measured to the prescribed extent by..... and by the undersigned at site and the relevant entries have been initiated in the measurement book (vide pages.....) (Name and Designation)
3. Certified that the methods of measurement are correct.
4. Certified that the measurements have been technically checked with reference to contract drawings, deviations etc.
5. Certified that the measurements recorded in the measurement book have been correctly billed for at the contract rates or approved rates.
6. Certified that all recoverable amounts in respect of stores, tools and plant, water, electricity charges etc. have been correctly made vide Annexures A to C and that there are no other demands outstanding against the contractor on this contract.
7. Certified that the issues of all stores as per statement attached (whether charged to the contractor or direct to the work) have been technically checked and represent fair and reasonable issues for the items of work executed vide Annexure E.
8. Certified that all statutory requirements including PF, ESI, Minimum wages, Insurance, GST, BOCW, etc. are complied with by the Contractor. This should be duly backed by the relevant documents.

Certified for payment of * Rs.....(Rupees.....only).

*Here specify the net amount payable

Signature of Senior Engineer

Date

IV ENTRIES TO BE MADE IN THE FINANCE DEPARTMENT

Passed for.....Rs.....
Less Deductions.....Rs.....
Net Amount Payable.....Rs.....
(Rupees.....only)

Account code head	Debit	Credit
	(Gross Amount)	(Deductions)
TOTAL		

Assistant

Date:

Accountant

Date:

Finance Executive

Date:

**ANNEXURE A
Part I**

Statement showing details of materials issued to the contractor Shri / M/S.....in respect of Contract Agreement / Work Order No.....Dated..... and covered by the agreement.

Sl.No.	Stores Issue Voucher No. and date	Issue voucher No. and date allotted by stores to the SIV	Description of material issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Whether recoverable from the contractor or supplied free	If recoverable from the Contractor				Remarks
							Rate at which recoverable	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Total

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

**ANNEXURE A
Part II**

Statement showing details of materials issued to the contractor Shri / M/S..... in respect of Contract Agreement / Work Order No.....Dated..... and not covered by the agreement

Sl.No	Stores Issue Voucher No. and Date	Issue Voucher No. and date allotted by stores to the SIV	Description of material issued to the contractor	Quantity issued	Quantity actually incorporated in the work	Issue Rate	Amount recoverable	Amount recovered upto previous bill	Balance now recovered	Remarks
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1	2	3	4	5	6	7	8	9	10	11
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TOTAL
Add Departmental Charges
Add GST (Wherever applicable)
GRAND TOTAL

Signature of Contractor
Date:

Signature of Engineer-in-Charge
Date:

Signature of Senior Engineer
Date:

Note: Cost of materials recovered in this bill should be shown against item 4 (a) of the memorandum of payments. The amounts of taxes and departmental charges recovered in this bill should be incorporated in Annexure C.

**ANNEXURE D
DEVIATION STATEMENT**

Name of the Contractor:
Name of the Work:

Contract Agreement/Work Order No.
Date:

SL. No.	Description of Item	Unit	Quantity as per agreement	Quantity as executed	Rate as per agreement	Rate as executed	Amount as per agreement	Amount as executed	Difference		Reason for the deviation with authority, if any
									Excess	Savings	
1	2	3	4	5	6	7	8	9	10	11	12

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE E

Statement showing the consumption of materials issued to the contractor Shri/M/s..... in respect of Contract Agreement / Work Order No.....Dated.....

Name of the Work:

ON RECOVERY BASIS

SL. No.	Description of material	Unit	Quantity actually issued	Quantity actually incorporated in the work	Balance	Particulars of disposal of balance	Quantity to be issued as per approved data for work actually done	Variation in consumption (difference between colum 5 & 8)		Rate chargeable for excess/short consumption, if any	Amount Recoverable for excess/short consumption, including materials not returned, if any	Remarks
								More	Less			
1	Cement											
2	Bricks											
3	Wood											
4	Asbestos Sheet											
5	Iron Material											
6												
7												

Signature of Contractor

Signature of Engineer in Charge

Signature of Senior Engineer

Date:

Date:

Date:

Note

- The quantities shown in columns 4 and 5 above should tally with those shown in columns 5 & 6 respectively of Annexure A (Part I and II)
- Data statement of theoretical consumption should be attached in support of quantity specified in column 8.

ANNEXURE F

Form WAM 7 (Contd.)

Statement showing details of materials issued to the contractor Shri/M/s..... in respect of Contract Agreement / Work Order No.....dated.....

Name of the Work:

FREE OF COST

Sl.No	Stores Issue Voucher No.	Description of material	Unit	Quantity issued	Quantity required as per data	Quantity consumed in the work	Balance (if any)	Nature of disposal for the balance	Rate chargeable for material not returned	Amount recoverable for material not returned	Remarks
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1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Signature of Contractor
Date:

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE G
QUESTIONNAIRE TO BE ANSWERED BY THE ENGINEER IN CHARGE AND SENIOR ENGINEER
(Correct particulars and answers to be recorded)

1. Name of the Work:
2. Name of the Contractor:
3. Date of commencement of the Work:
4. Contract agreement /Work Order No. and date:
5. Reference to the supplementary Agreement No. if any:
6. Whether administrative approval and technical sanction has been accorded by the competent authority? If so, cite reference?
7. Whether sanction of the competent authority and financial concurrence of the Finance Department for award of the work has been accorded? If so, cite reference.
8. Whether the work has been completed in time? If not whether penalty has been levied or sanction of the competent authority for extension of time granted and communicated to the Finance Department with reasons for grant of extension? (Due and actual date of completion of the work and reference to letter No. and date granting the extension of time should be given).
9. (a) Whether the rates allowed in the bill have been checked with the contract agreement?
(b) Whether the rates for extra/supplemental items have been approved by the competent authority and the sanction communicated to the Finance Department together with rate analysis? If so, cite reference
10. Whether deviations have been approved by the competent authority? If yes, give reference to the approval; if not, give reasons.
11. Whether the rates of recovery of stores issued to the contractor which are not provided for in the contract agreement have been settled in consultation with Finance?

12. Whether discrepancies pointed out by the Finance department in the stores statement have been reconciled and accepted by the Finance Department?
13. Whether materials issued to the contractor in excess of the theoretical requirements have been returned to the Stores department and the No. and date of such returned stores vouchers have been shown in Stores statement? If not, whether the cost of such excess materials has been recovered at the prescribed rate? Whether consumption statements in respect of materials chargeable to the work have been attached to the bill?
14. Whether consumption of materials shown has been technically checked by Senior Engineer?
15. Whether materials issued and used in the work is not less than that required for consumption in work according to our specifications? If consumption is less, whether necessary recovery has been made in the bill?
16. Whether measurements have been checked by the Engineer and Senior Engineer to the extent required and certificates of check recorded in the measurement books?

17. Whether contractor has signed the bill and the measurement books without reservations? If not, whether reasons have been intimated to the Finance Department?

18. Whether arithmetical calculations have been checked and certificate recorded in the measurement books by a person other than the one who calculated initially?
19. Whether any work was done at the risk and cost of the contractor and whether such cost has been recovered from him? Give particulars.
20. Whether all advance payments on running accounts have been recovered?
21. Whether all the recoveries due for services given to the contractor like rent of accommodation, water charges, electricity charges have been recovered and whether payments made by the company on behalf of the contractor have been adjusted?
22. Whether the files containing abstracts from measurement books/standard measurement books have been completed/updated?
23. Whether hire charges for tools & plant have been recovered and the statement of hire charges with full details attached?
24. Whether the certificate of workmanship and completion of work according to specifications, drawings etc. is recorded by Engineer Incharge/Senior Engineer and whether recoveries have been made for defective works, if any?
25. Whether all corrections in the bill/measurement books etc. have been neatly made and attested and there are no overwriting?
26. Whether final measurements have been taken as soon as possible after completion of the work and the certificate of completion issued? If not, whether reasons for delay have been recorded and communicated to finance department?
27. In respect of quantities reduced in the final bill as compared to the running payment, whether adequate reasons have been recorded and communicated to finance department?
28. Whether the expenditure has been classified correctly according to heads of account recorded in the sanctioned estimate?
29. Whether the work has been completed within the estimated cost? If not, what is the percentage of excess over the sanctioned estimate/ administrative approval? In case the excess is beyond the competency of the Senior Engineer, what action has been taken for obtaining the approval of the authority competent to sanction the excess?
30. (a) If the contractor has furnished bank guarantee in lieu of cash security deposit towards proper execution of works and guarantee against defects during the maintenance period, whether the period of currency of the bank guarantee covers the entire maintenance period?
(b) If not whether security deposit has been proposed to be recovered from the final bill?
31. Whether all the previous audit objections raised on running account bills have been settled? If so, cite references.

Signature of Engineer in Charge
Date:

Signature of Senior Engineer
Date:

ANNEXURE TO MODEL CONCILIATION CLAUSE FOR CONDUCT OF CONCILIATION UNDER THE BHEL CONCILIATION SCHEME, 2018

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings.
3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL.
5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.
7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within

15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.
15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall

however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:

- a. On the date of signing of the Settlement agreement by the Parties; or,
- b. By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
- c. By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
- d. By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration.
- e. On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	Particulars	Amount
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator)

Sl No	Particulars	Amount
		<p>In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator)</p> <p>In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator)</p> <p>Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.</p>
3	Secretarial expenses	<p>Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC.</p> <p>Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC</p>
4	<p>Travel and transportation and stay at outstation</p> <p>i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)</p>	<p>As per entitlement of the equivalent officer (pay scale wise) in BHEL.</p>
	Others	<p>As per the extant entitlement of whole time Functional Directors in BHEL.</p>

Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/regulatory body, as the case may be.
30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
 - a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b. admissions made by the other party in the course of the Conciliator proceedings;
 - c. proposals made by the Conciliator;
 - d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

Format 2 to BHEL Conciliation Scheme, 2018

**FORMAT FOR SEEKING CONSENT FOR REFERRING THE DISPUTES TO
CONCILIATION THROUGH IEC**

To,

M/s. (Stakeholder's name)

**Sub: Resolution of the Disputes through conciliation by Independent
Expert Committee (IEC).**

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

With reference to above referred Contract/MoU/Agreement/LOI/LOA, you have raised certain Disputes/claims. Vide your letter dated____ you have requested BHEL to refer the Disputes/claims to IEC for Conciliation.

We are enclosing herewith Format (3) for giving consent and the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. You are requested to give your unconditional consent to the said terms and conditions of the Scheme by returning the same duly sealed and signed on each page. On receipt of your consent, matter will be put to the Competent Authority for consideration and decision.

Please note that BHEL has also certain claims against you (if applicable). BHEL reserves its right to agree or not to agree conciliation of the said disputes through BHEL and this letter is being issued without prejudice to BHEL's rights and contentions available under the contract and law.

Yours faithfully,

Representative of BHEL

Format 3 to BHEL Conciliation Scheme, 2018
FORMAT FOR GIVING CONSENT BY
CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM PARTNERS FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

BHEL

.....

Sub: Resolution of Disputes through Conciliation by Independent Expert Committee (IEC).

Ref: Contract/MoU/Agreement/LOI/LOA No & date____

With reference to above referred contract, our following bills/invoices/claims submitted to BHEL are still unpaid giving rise to Disputes:

SL. no.	Claim Description	Bill submitted to BHEL (no. and date)	Amount of the bill/claim	Amount received from BHEL	Outstanding Amount

Accordingly we request you to kindly refer the Disputes in respect of above claims to IEC for Conciliation.

We hereby agree and give our unconditional consent to the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. We have signed the same on each page and enclosed it for your consideration.

Yours faithfully,

(Signature with stamp)

Authorized Representative of Contractor

Name, with designation

Date

Format 5 to BHEL Conciliation Scheme, 2018
STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO
THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA
3. Brief history of the Disputes:
4. Issues:
5. Details of Clam(s)/Counter Claim(s):

SI. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
1	400kV Circuit Breaker (3-Phase) without closing resistor -Complete in all respect along with lattice type GI supporting structure, platform with ladder, terminal connectors, Breaker Control Cabinets and interpole cabling, SF6 Gas cylinders. (Supervision of Erection, Testing and commissioning shall be done by OEM). OEM will bring DCRM/ DCRM Kit/ Breaker timing kit and Gas leak detector only. Necessary manpower support, tools, tackles and testing kits is in the scope of Erection agency), however vacuum pump and dew point meter during installation shall be in scope of erection agency/bidder.	3	No.	₹ 72,000.00	₹ 2,16,000.00
2	220kV Circuit Breaker (3-Phase) -Complete in all respect along with lattice type GI supporting structure, platform with ladder, terminal connectors, Breaker Control Cabinets and interpole cabling, SF6 Gas cylinders. (Supervision of Erection, Testing and commissioning shall be done by OEM). OEM will bring DCRM/ DCRM Kit/ Breaker timing kit and Gas leak detector only. Necessary manpower support, tools, tackles and testing kits is in the scope of Erection agency), however vacuum pump and dew point meter during installation shall be in scope of erection agency/bidder.	8	No.	₹ 55,675.00	₹ 4,45,400.00
3	220kV Isolator (3-Phase) with One E/S -Double Break Isolator complete in all respect alongwith its operating mechanism (Electrical/Mechanical Ganged) with all cabling between equipment & operating mechanism and associated support insulator, terminal connector & accessories, without support structure.(Supervision of Erection, Testing and commissioning shall be done by OEM). The multiple time alignment during the course of Testing and Commissioning shall be in included in scope of Erection agency.	12	No.	₹ 36,125.00	₹ 4,33,500.00
4	220kV Isolator (3-Phase) with Two E/S -Double Break Isolator complete in all respect alongwith its operating mechanism (Electrical/Mechanical Ganged) with all cabling between equipment & operating mechanism and associated support insulator, terminal connector & accessories, without support structure.(Supervision of Erection, Testing and commissioning shall be done by OEM). The multiple time alignment during the course of Testing and Commissioning shall be in included in scope of Erection agency.	12	No.	₹ 37,188.00	₹ 4,46,256.00
5	220kV Isolator (3-Phase) without E/S -Double Break Isolator complete in all respect alongwith its operating mechanism (Electrical/Mechanical Ganged) with all cabling between equipment & operating mechanism and associated support insulator, terminal connector & accessories, without support structure.(Supervision of Erection, Testing and commissioning shall be done by OEM). The multiple time alignment during the course of Testing and Commissioning shall be in included in scope of Erection agency.	1	No.	₹ 32,938.00	₹ 32,938.00
6	220kV Isolator (3-Phase) without E/S -Double Break Isolator (TANDEM) complete in all respect alongwith its operating mechanism (Electrical/Mechanical Ganged) and associated support insulator, terminal connector & accessories, without support structure.(Supervision of Erection, Testing and commissioning shall be done by OEM). The multiple time alignment during the course of Testing and Commissioning shall be in included in scope of Erection agency.	10	No.	₹ 32,938.00	₹ 3,29,380.00
7	220kV Current Transformer (1-Phase) With terminal connectors without support structure	33	No.	₹ 12,750.00	₹ 4,20,750.00
8	220kV Capacitive Voltage Transformer (1-Phase) With terminal connectors without support structure	21	No.	₹ 12,750.00	₹ 2,67,750.00
9	220kV BUS PT (1-Phase) With terminal connectors without support structure	6	No.	₹ 12,750.00	₹ 76,500.00
10	220kV Low level Surge Arrester (1-Phase) Complete with terminal connectors, Corona/Grading ring, Surge counter/monitor along with cable, without support structure.	27	No.	₹ 4,463.00	₹ 1,20,501.00

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
11	220kV High level Surge Arrester (1-Phase) Complete with terminal connectors, Corona/Grading ring, Surge counter/monitor along with cable, without support structure.	9	No.	₹ 5,100.00	₹ 45,900.00
12	220kV Low level Bus Post Insulator (1-Phase) Complete with corona ring & terminal connectors without support structure.	86	No.	₹ 2,975.00	₹ 2,55,850.00
13	220kV High level Bus Post Insulator (1-Phase) Complete with corona ring & terminal connectors without support structure.	42	No.	₹ 3,294.00	₹ 1,38,348.00
14	Galvanised Steel Lattice Structures including hardware for LM, Tower & Beam	226	MT	₹ 7,650.00	₹ 17,28,900.00
15	Galvanised Steel Lattice Structures including hardware for Equipment support	107	MT	₹ 7,438.00	₹ 7,95,866.00
16	Cutting and Modification - Structural Plates/Angles (Thickness up to 6mm): All tools and equipment required for cutting or modifying GI structures / other steel structures / Aluminium Structure etc are included. This includes cutting, punching, and other modifications. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also part of the scope.	25	No.	₹ 270.00	₹ 6,750.00
17	Cutting and Modification - Structural Plates/Angles (Thickness above 6mm and up to 12mm): All tools and equipment required for cutting or modifying GI structures / other steel structures / Aluminium Structure etc are included. This includes cutting, punching, and other modifications. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also part of the scope.	30	No.	₹ 270.00	₹ 8,100.00
18	Cutting and Modification - Structural Plates/Angles (Thickness above 12mm and up to 20mm): All tools and equipment required for cutting or modifying GI structures / other steel structures / Aluminium Structure etc are included. This includes cutting, punching, and other modifications. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also part of the scope.	50	No.	₹ 360.00	₹ 18,000.00
19	Modification of Hole Sizes in Structures: Increase in Hole Diameter (up to Dia+6 mm): All tools and equipment (including Pneumatic Drill Machine if required) required for modifying hole sizes in GI structures, other steel structures, aluminum structures, etc., are included in the scope. This includes cutting, drilling, and punching. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also included.	40	No.	₹ 180.00	₹ 7,200.00
20	Modification of Hole Sizes in Structures: Increase in Hole Diameter (above Dia+6 mm and up to Dia+12 mm) All tools and equipment (including Pneumatic Drill Machine if required) required for modifying hole sizes in GI structures, other steel structures, aluminum structures, etc., are included in the scope. This includes cutting, drilling, and punching. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also included.	20	No.	₹ 180.00	₹ 3,600.00
21	Modification of Hole Sizes in Structures: Increase in Hole Diameter (above Dia+12 mm and up to Dia+20 mm) All tools and equipment (including Pneumatic Drill Machine if required) required for modifying hole sizes in GI structures, other steel structures, aluminum structures, etc., are included in the scope. This includes cutting, drilling, and punching. Minor welding and the application of protective or zinc-rich paint on welded surfaces are also included.	30	No.	₹ 180.00	₹ 5,400.00
22	Drilling of Additional Holes in Structures: (Diameter Between 12mm and Up to 18mm) All tools and equipment (including Pneumatic Drill Machine if required) required for drilling additional holes in GI structures, other steel structures, aluminum structures, etc., are included in the scope. This includes drilling and any necessary modifications to accommodate the new holes. Minor welding and the application of protective or zinc-rich paint on the welded surfaces are also included.	45	No.	₹ 225.00	₹ 10,125.00

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
23	Drilling of Additional Holes in Structures: (Diameter Above 18mm and Up to 28mm) All tools and equipment (including Pneumatic Drill Machine if required) required for drilling additional holes in GI structures, other steel structures, aluminum structures, etc., are included in the scope. This includes drilling and any necessary modifications to accommodate the new holes. Minor welding and the application of protective or zinc-rich paint on the welded surfaces are also included.	25	No.	₹ 450.00	₹ 11,250.00
24	220kV String Insulator & Hardware -Double tension string insulator with hardware (with/without turn buckles) complete in all respect suitable for twin conductor.	48	SET	₹ 4,017.00	₹ 1,92,816.00
25	220kV String Insulator & Hardware - Double tension string insulator with hardware (with/without turn buckles) complete in all respect suitable for single conductor.	54	SET	₹ 4,017.00	₹ 2,16,918.00
26	220kV String Insulator & Hardware -Single suspension string insulator with hardware (drop/through type clamp) complete in all respect suitable for twin conductor.	42	SET	₹ 3,592.00	₹ 1,50,864.00
27	220kV String Insulator & Hardware -Single suspension string insulator with hardware (drop/through type clamp) complete in all respect suitable for single conductor.	33	SET	₹ 3,592.00	₹ 1,18,536.00
28	ACSR Moose Conductor complete with Tee connectors for droppers to equipment connections, PG clamps for Busbar jumpering, Twin/Quad bundle rigid/flexible spacers etc to complete	11000	METER	₹ 100.00	₹ 11,00,000.00
29	ETC of 4" Aluminium Tube -Work includes cutting, Aluminum welding, bending & installation of Al. Tube along with welding sleeve. Testing of welding joints -X- ray and DP test as per customer requirement.	12	MT	₹ 47,250.00	₹ 5,67,000.00
30	Installation of GI Stranded Shield wire 7/9SWG (7/3.66MM) including tension clamp, PG clamp and clamping on structure for down conductor, fixing/bolting with earth strip etc.	3200	METER	₹ 75.00	₹ 2,40,000.00
31	Earthing work with 75X12 GI Flat -Installation of GI Flat including cutting, bending, welding with GI Flat / MS Rod, supply and application of paint, clamping to structure/building wall etc. to complete in all respect. All arc welding shall be done with low hydrogen content electrodes. the welds should be treated with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminum paint. The red oxide and zinc chromate shall conform to IS:2074 (for complete switchyard including fencing, fire-fighting, DG set, Air-conditioning systems in various buildings, Illumination area as per the instruction of site incharge).	30	MT	₹ 21,888.00	₹ 6,56,640.00
32	Earthing work with 50X6 GI Flat - Installation of Flat including cutting, bending, welding with Flat / MS Rod, supply and application of paint, clamping to structure/building wall etc. to complete in all respect. All arc welding shall be done with low hydrogen content electrodes. the welds should be treated with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminum paint. The red oxide and zinc chromate shall conform to IS:2074 (for complete switchyard including fencing, fire-fighting, DG set, Air-conditioning systems in various buildings, Illumination area as per the instruction of site incharge).	10	MT	₹ 19,763.00	₹ 1,97,630.00
33	Cable Rack work for BOLTED TYPE steel racks for trenches in switchyard . Cable rack assembly will be of 2/3/4 tier. (Bolted type Cable Rack/Tray material shall be free issued by BHEL.) Cable racks 3 tier assembly	370	NO	₹ 377.00	₹ 1,39,490.00

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
34	Cable Rack work for BOLTED TYPE steel racks for trenches in switchyard . Cable rack assembly will be of 2/3/4 tier. (Bolted type Cable Rack/Tray material shall be free issued by BHEL.) Cable racks 1, 1 & 1/2 tier assembly	290	NO	₹ 377.00	₹ 1,09,330.00
35	Installation of Panel Supporting Angles / Channel etc on cable trench/cutouts in CRB , Vertical support for cables etc (Including Supply). Supports shall be painted after installation with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminum paint. (supply of paint is in scope of Erection agency)	5	MT	₹ 1,07,190.00	₹ 5,35,950.00
36	Installation of perforated type cable tray, 300 mm to 450 mm wide, 2.5 meters long, min. 2 mm thick Ganvanised Steel along with cover, coupler plates, mounting and clamping hardware. The tray shall be fixed/clamped on lattice/pipe structures, walls, or cable trench racks as required. The scope includes all necessary cutting, jointing, and/or welding to achieve required lengths and routing as per site conditions, complete in all respects.	40	No.	₹ 232.00	₹ 9,280.00
37	Installation of perforated type cable tray, 600 mm wide, 2.5 meters long, min. 2 mm thick Ganvanised Steel along with cover, coupler plates, mounting and clamping hardware. The tray shall be fixed/clamped on lattice/pipe structures, walls, or cable trench racks as required. The scope includes all necessary cutting, jointing, and/or welding to achieve required lengths and routing as per site conditions, complete in all respects.	580	No.	₹ 330.00	₹ 1,91,400.00
38	Installation of Ladder type cable tray, 100 mm to 200 mm wide, 2.5 meters long, min. 2 mm thick Ganvanised Steel along with cover, coupler plates, mounting and clamping hardware. The tray shall be fixed/clamped on lattice/pipe structures, walls, or cable trench racks as required. The scope includes all necessary cutting, jointing, and/or welding to achieve required lengths and routing as per site conditions, complete in all respects.	40	No.	₹ 232.00	₹ 9,280.00
39	Installation of Ladder type cable tray, 300 mm to 450 mm wide, 2.5 meters long, min. 2 mm thick Ganvanised Steel along with cover, coupler plates, mounting and clamping hardware. The tray shall be fixed/clamped on lattice/pipe structures, walls, or cable trench racks as required. The scope includes all necessary cutting, jointing, and/or welding to achieve required lengths and routing as per site conditions, complete in all respects.	140	No.	₹ 309.00	₹ 43,260.00
40	Installation of Ladder type cable tray, 600 mm wide, 2.5 meters long, min. 2 mm thick Ganvanised Steel along with cover, coupler plates, mounting and clamping hardware. The tray shall be fixed/clamped on lattice/pipe structures, walls, or cable trench racks as required. The scope includes all necessary cutting, jointing, and/or welding to achieve required lengths and routing as per site conditions, complete in all respects.	220	No.	₹ 330.00	₹ 72,600.00
41	Installation of 50 NB GI pipes/ conduits along with socket, bend and joint on trench rack support . Cutting, threading, fixing of clamps sockets/ bends/joints where required etc. complete. Mode of measurement shall be running length of pipe conduit. GI conduits shall be used for INSTALLATION OF fiber optic cables /sensor cables.	1000	METER	₹ 145.00	₹ 1,45,000.00
42	Installation of 50 mm dia PVC Pipe. Which shall be buried in the ground at a depth of 300 mm below FGL. Work includes excavation, backfilling, making trench holes and repairing of cable trench walls, cutting, fixing of sockets/ bends where required etc. complete. Both ends of PVC conduits shall be closed by plastering. (Payment will be made for the as erected pipe length)	2500	METER	₹ 162.00	₹ 4,05,000.00
43	Installation of 110 mm dia PVC Pipe. Which shall be buried in the ground at a depth of 300 mm below FGL. Work includes excavation, backfilling, making trench holes and repairing of cable trench walls, cutting, fixing of sockets/ bends where required etc. complete. Both ends of PVC conduits shall be closed by plastering. (Payment will be made for the as erected pipe length)	3500	METER	₹ 194.00	₹ 6,79,000.00

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
44	Laying & Dressing of 1.1KV Grade 2CX6 sq mm (PVC) Power Cable	2200	METER	₹ 61.00	₹ 1,34,200.00
45	Laying & Dressing of 1.1KV Grade 4CX6 sq mm (PVC) Power Cable	4000	METER	₹ 80.00	₹ 3,20,000.00
46	Laying & Dressing of 1.1KV Grade 4CX16 sq mm (PVC) Power Cable	6200	METER	₹ 110.00	₹ 6,82,000.00
47	Laying & Dressing of 1.1KV Grade 3.5CX35 sq mm (PVC) Power Cable	6000	METER	₹ 176.00	₹ 10,56,000.00
48	Laying & Dressing of 1.1KV Grade 5CX2.5 sq mm Cable	30000	METER	₹ 27.00	₹ 8,10,000.00
49	Laying & Dressing of 1.1KV Grade 10CX2.5 sq mm Cable	51000	METER	₹ 32.00	₹ 16,32,000.00
50	Laying & Dressing of 1.1KV Grade 14CX2.5 sq mm Cable	13000	METER	₹ 39.00	₹ 5,07,000.00
51	Laying & Dressing of 1.1KV Grade 19CX2.5 sq mm Cable	20000	METER	₹ 51.00	₹ 10,20,000.00
52	Supply of Cable gland for 1.1KV Grade 2CX6 sq mm (PVC) Power Cable	400	No.	₹ 338.00	₹ 1,35,200.00
53	Supply of Cable gland for 1.1KV Grade 4CX6 sq mm (PVC) Power Cable	350	No.	₹ 417.00	₹ 1,45,950.00
54	Supply of Cable gland for 1.1KV Grade 4CX16 sq mm (PVC) Power Cable	500	No.	₹ 500.00	₹ 2,50,000.00
55	Supply of Cable gland for 1.1KV Grade 3.5CX35 sq mm (PVC) Power Cable	400	No.	₹ 674.00	₹ 2,69,600.00
56	Supply of Cable gland for 1.1KV Grade 5CX2.5 sq mm (PVC) Control Cable	650	No.	₹ 451.00	₹ 2,93,150.00
57	Supply of Cable gland for 1.1KV Grade 10CX2.5 sq mm (PVC) Control Cable	550	No.	₹ 540.00	₹ 2,97,000.00
58	Supply of Cable gland for 1.1KV Grade 14CX2.5 sq mm (PVC) Control Cable	300	No.	₹ 697.00	₹ 2,09,100.00
59	Supply of Cable gland for 1.1KV Grade 19CX2.5 sq mm (PVC) Control Cable	200	No.	₹ 876.00	₹ 1,75,200.00
60	Glanding & Termination of 1.1KV Grade 2CX6 sq mm (PVC) Power Cable	400	No.	₹ 147.00	₹ 58,800.00
61	Glanding & Termination of 1.1KV Grade 4CX6 sq mm (PVC) Power Cable	350	No.	₹ 200.00	₹ 70,000.00
62	Glanding & Termination of 1.1KV Grade 4CX16 sq mm (PVC) Power Cable	500	No.	₹ 247.00	₹ 1,23,500.00
63	Glanding & Termination of 1.1KV Grade 3.5CX35 sq mm (PVC) Power Cable	400	No.	₹ 330.00	₹ 1,32,000.00
64	Glanding & Termination of 1.1KV Grade 5CX2.5 sq mm (PVC) Control Cable	650	No.	₹ 162.00	₹ 1,05,300.00
65	Glanding & Termination of 1.1KV Grade 10CX2.5 sq mm (PVC) Control Cable	550	No.	₹ 221.00	₹ 1,21,550.00
66	Glanding & Termination of 1.1KV Grade 14CX2.5 sq mm (PVC) Control Cable	300	No.	₹ 330.00	₹ 99,000.00
67	Glanding & Termination of 1.1KV Grade 19CX2.5 sq mm (PVC) Control Cable	200	No.	₹ 413.00	₹ 82,600.00
68	DISTRIBUTION BOARD : 415V AC (Approx Size 3400mm(L)x 800mm(w)x 2400mm(h))	1	No.	₹ 26,988.00	₹ 26,988.00
69	DISTRIBUTION BOARD : 220V DC (Approx Size 2500mm(L)x 800mm(w)x 2400mm(h))	2	No.	₹ 26,988.00	₹ 53,976.00
70	Relay Panel (Approx Size 800mm(w)x 800mm(d)x 2250mm(h))	20	No.	₹ 21,038.00	₹ 4,20,760.00
71	Local Control Board (LCB) (Approx Size 800mm-1200mm(w)x 800mm(d)x 2250mm(h))	4	No.	₹ 21,038.00	₹ 84,152.00
72	BMK-Bay Marshalling Kiosk (including anchoring/grouting Fdn Bolt)	6	No.	₹ 7,863.00	₹ 47,178.00
73	JB-Current Transformer Junction Box : Structure Mounted	11	No.	₹ 4,463.00	₹ 49,093.00
74	JB-Capacitive Voltage Transformer Junction Box : Structure Mounted	9	No.	₹ 4,463.00	₹ 40,167.00
75	Phase Colour Disc-Supply & Mounting of Phase Color Discs, Danger Plate and Identification Plates for bays & Equipments as per IS:2551; 1982 & IS:5; 1978.	1	Lot	₹ 1,06,250.00	₹ 1,06,250.00
76	Phase Identification-PHASE IDENTIFICATION - Painting the structures in Red, Yellow and Blue by reflecting Colour is to be provided around the top of the structure with Colour band of 100 mm width.	1	Lot	₹ 1,27,500.00	₹ 1,27,500.00
77	Bay Identification-Supply & Installation of BAY IDENTIFICATION - Bay Name Plate as per drawing no. C/ENG/STD/BAY NAME PLATE	11	Nos.	₹ 8,415.00	₹ 92,565.00
78	Cable Tag-Supply & Installation of Cable Tag - The tag shall be of aluminum with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG GI wire conforming to IS:280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables.	1	Lot	₹ 2,10,375.00	₹ 2,10,375.00
79	Watch and Ward-Watch and ward of stored / erected material at project site and storage area or any other locations as per instruction of site in charge. (round the clock security by authorized service agency).	12	Per Post Per Month	₹ 61,625.00	₹ 7,39,500.00
80	Equipment fixing Hardware-Supply & erection of Equipment Fixing Hardware - Full Threaded bolts with nut and two Plane Washer and one Spring Washer as per technical specification	100	kg	₹ 221.00	₹ 22,100.00

BILL OF QUANTITY CUM PRICE SCHEDULE (ANNEXURE-I)

Name of Project: PSPCL Shahpurkandi Hydro Electric Project (Punjab)

Name of Work: ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING, SHIFTING TO & FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB.

Tender Spec. No.: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

SR.NO.	Description of Item	Quantity	UOM	Unit Rate	AMOUNT
81	Spares-Unloading, storage , material handling and Handing over of Mandatory spares a per Annexure-Mandatory spares	1	Lot	₹ 3,18,750.00	₹ 3,18,750.00
82	Supply & installation of Sand buckets for fire fighting	52	no	₹ 3,273.00	₹ 1,70,196.00
83	Supply & installation of ABC type Wheeled extinguishers (25 Kg)	3	no	₹ 32,938.00	₹ 98,814.00
84	Supply & installation of Portable CO2 type extinguishers	10	no	₹ 19,125.00	₹ 1,91,250.00
85	Supply & installation of Portable DCP type (6Kg)	3	no	₹ 16,363.00	₹ 49,089.00
86	220kv Transmission line-Accessories -Supply of Vibration dampers	20	Nos.	₹ 4,867.00	₹ 97,340.00
87	220kv Transmission line-Accessories -Supply of Mid span compression joint	18	set	₹ 2,657.00	₹ 47,826.00
88	220kv Transmission line- Tower -Erection of various type of tower angles , tower parts and tower body / leg (equal & unequal) extensions (complete) including bolts and nuts, step bolts, hangers, D-Shackles, tower accessories etc., including tack welding and supply and application of zinc rich primer and two coats of enamel paint for both Tension and Suspension type towers for 220 kV Double Circuit Transmission Line (Each tower weight= 26 MT)	52	MT	₹ 8,925.00	₹ 4,64,100.00
89	220kv Transmission line- conductor -Installation of single ACSR Moose Conductor complete with Mid span compression joint, Repair sleeves , viabration dampers , etc. to complete	2000	Meter	₹ 109.00	₹ 2,18,000.00
90	220kv Transmission line- Shield Wire -Installation of GI Stranded Shield wire 7/9SWG (7/3.66MM) including tension clamp, PG clamp and clamping on structure for down conductor, fixing/bolting with earth strip etc.	500	Meter	₹ 94.00	₹ 47,000.00
91	220kv Transmission Tower- String Insulator & Hardware -Double tension string insulator with hardware (with/without turn buckles) complete in all respect suitable for single conductor.	18	Nos.	₹ 4,442.00	₹ 79,956.00
92	220kv Transmission Tower- String Insulator & Hardware -Single suspension string insulator with hardware (through type clamp) complete in all respect suitable for single conductor.	9	Nos.	₹ 4,017.00	₹ 36,153.00
	Total Amount (Excluding GST)				₹ 2,41,72,486.00

Validate

Print

Help

Percentage BoQ

Tender Inviting Authority: BHEL, TBG- SubContracting Department, Sector 16A Noida, UP

Name of Work: "ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING,SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB."

Contract No: TBSM/SHAPURKANDI/PSPCL-PH1/ETC/TENDER/25-26, Date: 17.01.2026

Name of the Bidder/ Bidding Firm / Company :						
PRICE SCHEDULE						
(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)						
NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Estimated Rate in Rs.	TOTAL AMOUNT Without Taxes in Rs.	TOTAL AMOUNT In Words
1	2	4	5	6	53	55
1	Total amount as per rates in BOQ (as per Annexure-I) for "ERECTION, TESTING, COMMISSIONING WORKS INCLUDES SHIFTING, UNLOADING, STORING (AT SWITCHYARD AREA OF POWER HOUSE-1), UPKEEPING,SHIFTING TO & FRO FROM STORE TO WORK LOCATION/ANY LOCATION WITHIN SITE BOUNDARY, RECEIPT & VERIFICATION OF MATERIAL, MATERIAL RECONCILIATION, VERIFICATION, RECORD KEEPING, MATERIAL RELOCATING AS PER SITE/STORAGE REQUIREMENTS, SAFE KEEPING, PRE-ERECTION ASSEMBLY, ERECTION/ INSTALLATION OF THE MATERIAL/ EQUIPMENT AS PER DRAWINGS/INSTRUCTION OF SITE INCHARGE, COMPLETE TESTING & COMMISSIONING, RECONCILIATION AFTER COMPLETION OF ETC AND HANDING OVER SURPLUS MATERIAL & SPARES TO BHEL/CUSTOMER AT 220KV SWITCHYARD OF POWER HOUSE-I, 3X33MW SHAPURKANDI HEP-I, PUNJAB STATE POWER CORPORATION LIMITED (PSPCL), PATHANKOT, PUNJAB." - Excluding GST	1.000	Nos	24172486.00	24172486.00	INR Two Crore Forty One Lakh Seventy Two Thousand Four Hundred & Eighty Six Only
Total in Figures					24172486.00	INR Two Crore Forty One Lakh Seventy Two Thousand Four Hundred & Eighty Six Only
Quoted Rate in Figures			Select		0.000	INR Zero Only
Quoted Rate in Words		INR Zero Only				

SI.No.	BOQ_ANNEXURE_1: STANDARD & PROJECT SPECIFIC TECHNICAL NOTES & SCOPE
1	<p>Brief scope of ETC (Erection, Testing & Commissioning) work includes Shifting, Unloading, storing (at switchyard area of Power House-1), taking over (with verification) of already unloaded material, receipt of complete project material, unloading from truck/trailer/ carriers, Material handling at Project Site / Project area, material reconciliation, verification, record keeping, handling, material relocating as per site / storage requirements, safe keeping, Pre-erection assembly, erection / installation, testing, pre-commissioning and commissioning Project and associated systems/equipment and reconciliation after completion of ETC & handing over surplus material & Spares to BHEL/Customer. The Scope also include all T&P including all testing and commissioning equipment (except exclusion mentioned in specification), hydra/crane, man lifter etc as required for complete installation, testing & commissioning of the system, complete in all respect. The bidder must ensure the arrangement of a man-lift (with a minimum access height of 10.5 meters) during ETC work.</p> <p>Note:</p> <ol style="list-style-type: none"> 1. Materials to be shifted from BHEL/Customer store area to PH-1 switchyard site, distance- Approx. 6 km 2. Initial Loading at BHEL/customer store shall be arranged by BHEL. <p>BOQ_ANNEXURE_1: STANDARD & PROJECT SPECIFIC TECHNICAL NOTES & SCOPE shall be read in conjunction with BOQ item description for details of work.</p>
2	<p>Bidder to offer items from approved make only (as applicable). Bidder to supply material of proven design and make, which have already been extensively used and tested. Bidder to obtain approval from BHEL Engineer incharge / Customer prior to supply. Quantity of supply items are provisional and shall be finalised during contract stage. Qty of supply item may vary upto any extent and even may get deleted. However overall contract value may vary +/- 30%. Variation will be valid up-to contract stage.</p>
3	<p>All consumables required for successful erection testing (under erection agency scope) & commissioning of present scope of work is in bidders scope, such as (not limited to) Welding Electrodes, Low hydrogen content welding electrode, Ferruls, Cable Lug, cable ties, , Paint, bitumen compound, Zinc riched enamel paint, red oxide and zinc chromate etc. complete in all respect.</p>
4	<p>All pre-commissioning tests (but not limited to) for substation equipment shall be carried out as per annexure-x.</p>
4	<p>The storage instructions of the equipment manufacturer/ Employer shall be strictly adhered to. Customer/BHEL Field Quality Plan shall be followed alongwith the provision of Technical Specification for storage.</p>
5	<p>ETC of Power / Control / Instrument Cable: Scope includes Cable laying, tagging , dressing, ferruling, lugging ,soldering, tapping, jointing, crimping and drilling/ cutting holes in cable gland plates- laying can be either on trays, supports, underground, buried in ground or through GI/PVC/HDPE pipe over / under ground, through wall , on structure/LM Erection. All erection materials viz. ferrules, copper lugs, cable ties / straps, Al. tags, markers, GI / PVC wall sleeves with rubber / nylon bushes and flexible steel conduits shall be supplied by bidder. excluding supply of Cable Gland which are covered separately (as a separate BOQ item / free supply by BHEL). Machine ferruling shall be adopted.</p>
6	<p>ETC of Directly Buried Cable (including sand bed & brick cover) - Scope includes laying of cables, directly in buried cable trench. All civil & erection activities such as excavation, supply and placement of sand, bricks, backfilling, compaction, tagging , dressing, ferruling, lugging, soldering, tapping, jointing, crimping and drilling/ cutting holes in cable gland plates etc shall be in contractor's scope. All erection materials viz. Sand, Bricks, Cable Lug, ferrules, cable ties / straps, Al. tags, route markers, joint markers, GI / PVC wall sleeves with rubber / nylon bushes etc shall be supplied by bidder. excluding supply of Cable Gland which are covered separately (as a separate BOQ item / free supply by BHEL). Machine ferruling shall be adopted.</p> <p>For Directly Buried Cable (as mentioned above) bidder to supply & install cable route marker. Location of cables laid directly underground shall be clearly indicated with cable route marker made of galvanised iron plate. The cable route marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road and drain crossings as per relevant standard.</p>
7	<p>ETC of cable work includes installation of cable glands & termination of cable & laying</p>
8	<p>CABLE LUG: Supply of cable lug is in bidders scope. cable lugs shall be tinned copper solderless crimping type conforming to IS-8309 & 8394 for all control Cables and cables with copper wire.</p> <p>For Aluminium Bimetallic lugs for power cables as required shall be used depending upon type of cables and terminations. Solderless crimping of terminals shall be done by using corrosion inhibitory compound.</p> <p>The cable lugs shall suit the type of terminals provided. The bidder shall cover the exposed part of all cable lugs whether supplied by him or not with insulating tape, sleeve or paint.</p> <p>Bidder to supply cable lug from manufacturer's authorised representative / dealer. Bidder to obtain approval from BHEL Engineer incharge / Customer prior to supply</p>

SI.No.	BOQ_ANNEXURE_1: STANDARD & PROJECT SPECIFIC TECHNICAL NOTES & SCOPE
9	Cable TAGS & Markers - Bidder to supply and install cable tag & markers. The tag shall be of aluminium with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG GI wire conforming to IS:280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables.
10	Cable Gland: Tin/ Nickel, Nichel/chromium - Plated (coating thickness not less than 10 microns) brass cable glands, double compression heavy-duty type complete with necessary armour clamp & tapered washer etc. Bidder to offer the gland from authorised representative of manufacturer. Cable gland shall be subject to customer approval prior to dispatch. Cable glands shall match with the sizes of different HT/LT/Control cables.
11	Power and control cables shall be securely fixed to the trays/supports with self locking type nylon ties with de-interlocking facility at every 5 metre interval for horizontal run. Vertical and inclined cable runs shall be secured with 25 mm wide and 2 mm thick aluminium strip clamps at every 2m.
12	Vertical run of cables on equipment support structure shall be supported on PVC pipe which shall be suitably clamped with the equipment support structure. Tray shall be supplied by BHEL.
13	Cable ends shall be kept sealed to prevent damage. In cable vault, fire resistant seal shall be provided underneath the panels. Wherever cable pass through floor or through wall openings or other partitions, GI/PVC wall sleeves with bushes having a smooth curved internal surface so as not to damage the cable, shall be supplied, installed and properly sealed by the Contractor at no extra charges.
14	All arc welding with shall be done with low hydrogen content electrodes for all earthing works i.e. MS Rod, GI Flat & MS Flat
15	50X6 mm GI flat shall run on the top tier and all along the cable trenches and the same shall be welded to each of the racks. Further this flat shall be earthed at both ends and at an interval of 30 mtrs. Thewewlding joints shall be finally painted with two coats of Red oxide primer and two coats of Zinc riched enamel paint.
16	Connection between equipment earthing lead and main earthing conductors and between main earthing conductors shall be welded type. For rust protections, the welds should be treated with red oxide primer and afterwards coated with two layers bitumen compound to prevent corrosion.
17	All welding done at site for equipment and structures, shall be painted with zinc rich paint immediately to avoid corrosion.
18	Cable racks and supports shall be painted after installation with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminium paint. The red oxide and zinc chromate shall conform to IS:2074.
19	Supervision of testing and commissioning of Relay / Prtoection / SAS / Automation / Bus Bar Panes (as applicable) is in the scope of BHEL/ Panel supplier. Necessary manpower support, tools, tackles and testing equipment to be in scope of ETC contractor.
20	Minor Civil works such as modification of civil foundations, making holes in the trenches/control room building for PVC/GI pipe entries etc.
21	Compleetete ETC package is under the scope of bidder. All T&P required to complete the job including oil filterating machine, fork lift, Manlift, cranes etc. required to complete the job shall be provided by bidder only.
22	Any other item i.e. Portable Flood Light Panel etc is in the scope of bidder.
23	MANDATORY SPARES: Please refer Annexure "ANNEXURE-MANDATORY SPARES" for details. Scope includes Unloading, storage , material handling and Handing over.
24	Welding of Aluminium tubes (supply of welding sleeve excluded) as per 'Annexure-C: PROCEDURE FOR WELDING OF ALUMINIUM BUSES' is in Erection contractor's scope and joints shall be tested as per SECTION-SWITCHYARD ERECTION. Welding and Bending machines and any other equipment will be in Erection Contractor scope.

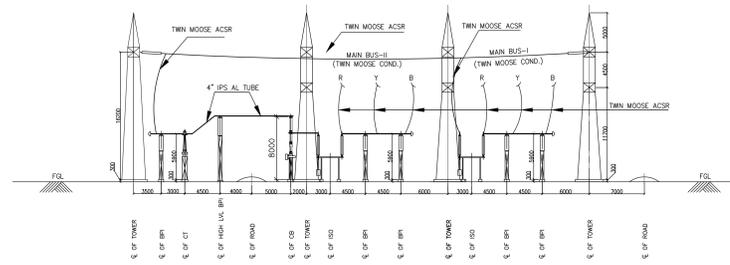
SI.No.	BOQ_ANNEXURE_1: STANDARD & PROJECT SPECIFIC TECHNICAL NOTES & SCOPE
25	Tower & Equipment foundation shall have foundation bolts pre installed by BHEL's Civil contractor. However installation of some Inserts & Embedded material, bolts, anchor fastner shall be deemed inclusive of bidder's scope of service under respective main item etc works where as required
26	Installation of Cable Trench Material include all miscellaneous activity including minor fabrication, welding, cutting, drilling holes, bolting, anchor bolting, etc. complete in all respect. Where as fabrication is required shall be painted after installation with two coats of metal primer (comprising of red oxide and zinc chromate in a synthetic medium) followed by two finishing coats of aluminium paint. The red oxide and zinc chromate shall conform to IS:2074.
27	All safety rules and codes applied by the Client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract.
28	All final adjustment of foundation levels, chipping and dressing of foundation surfaces, setting and grounding of anchor bolts, sills, inserts and fastening devices shall be carried out by the contractor including minor modification of civil works as may be required for erection. Cost of the same is deemed inclusive in the scope.
29	Any cutting of masonry / concrete work, Wall openings at suitable locations for ventilation fans, Civil works such as grouting, filling up of crevices/ cut outs etc. during installation of equipments, modification of civil foundations, making holes in the trenches/ control room building, fixing of trench material shall be done by the bidder and shall be made good including supply and installation of chicken wire mess to match the original work. Any other damage caused to civil works during ETC work of the equipment/ system shall be made good to the original finish. Cost of the same is deemed inclusive in the scope.
30	Testing istruments (dully calibrated) have to be arranged by Erection Contractor at it's own cost (List is only provided for information , if any other instrument not mentioned below but required for sucessful completion of Erection work shall be in Erection contractor's scope). Bidder to submit valid calibration certificate during commencement of testing / commissioning works.
30.01	DCRM (OPERATIONAL ANALYZER)
30.02	Contact Resistance Measurement kit (CRM)
30.03	Capacitance and Tan delta measurement Kit
30.04	Dew Point Measurement kit
30.05	5kV/1kV Insulation tester
30.06	Primary current Injection Kit
30.07	Single phase variac
30.08	Secondary current/Voltgae Injection kit
30.09	1Ph Variac
30.10	Multimeters
30.11	Clamp on meter
30.12	Power supply sockets with extension board -2 nos.
30.13	Necessary numbers of fire extinguisher
30.14	OMICRON or equivalent kit for Numerical relay testing, Automatic Relay Test Kit along with Laptop

BOQ_ANNEXURE_2
PROJECT SPECIFIC DRAWING & DOCUMENT LIST

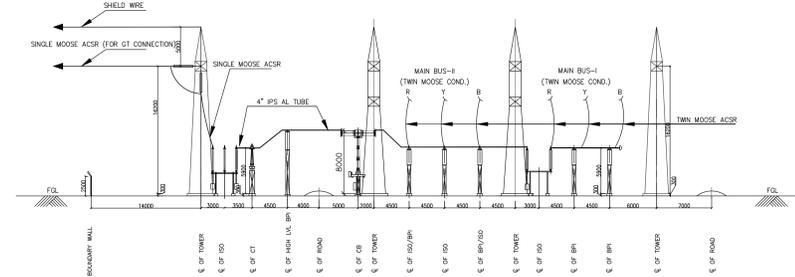
Sl. No.	DRAWING / DOCUMENT NUMBER	DRAWING / DOCUMENT TITLE
1	TB-3-371-510-01-REV 09	SINGLE LINE DIAGRAM
2	TB-0-371-316-001-REV 07	SWITCHYARD LAYOUT & SECTION
3	TB-1-371-316-005-REV 03	SWITCHYARD TRENCH LAYOUT
3	0608/04	STRUCTURAL DRAWING FOR TOWER
4	Annexure-Aluminium_Welding	PROCEDURE FOR WELDING OF ALUMINIUM BUSES
5	TB-XXX-618-002a	TECHNICAL SPECIFICATION FOR EQUIPMENT FIXING HARDWARE
6	TB-XXX-316-040-REV 02	TECHNICAL SPECIFICATION-GI PIPES & BENDS
7	ANNEXURE-X	PRE- COMMISSIONING TEST OF MAIN EQUIPMENT
8	ANNEXURE-Z	ETC SCOPE OF ILLUMINATION SYSTEM/EQUIPMENT
9	Annexure- Mandatory Spares	MANDATORY SPARES
10	Section-3	GENERAL SPECIFICATIONS

Note:

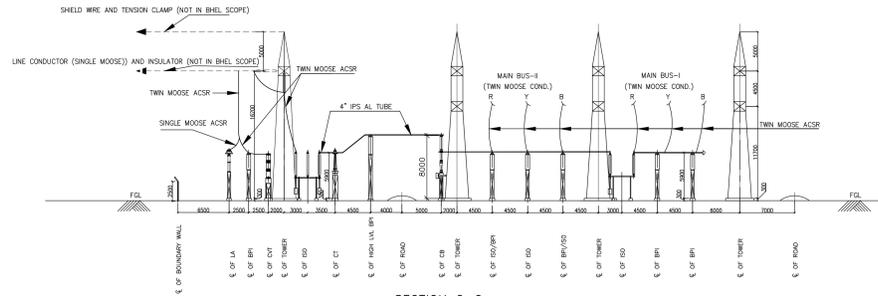
- 1 Above drawings are given for reference purpose. Latest revision of above drawings will be shared with successful bidder, which is to be followed, during contract execution stage.
- 2 Any other drawing/document related to BOQ line item will be shared with successful bidder during detailed engineering stage.



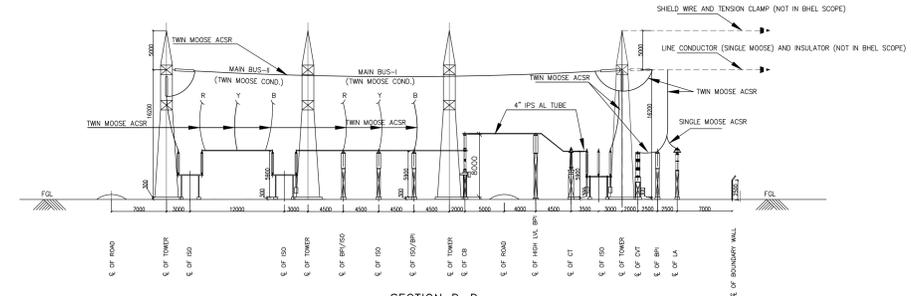
SECTION A-A



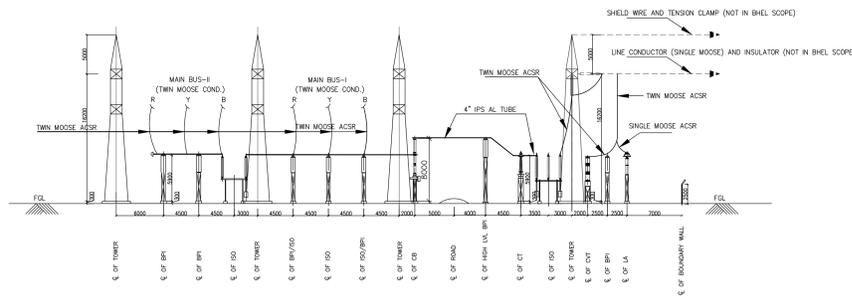
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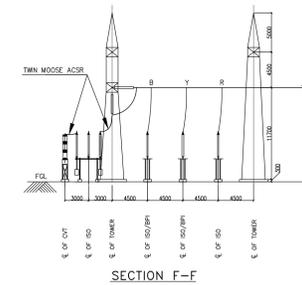
SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

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07	28.05.24	CHECKED	SS	04	14.05.24	CHECKED	SS	05	08.03.2023	CHECKED	NK	00	08.12.2021	CHECKED	NK	02	01.01.2020	CHECKED	NK	01	30.08.19	CHECKED	NK
ZONE COMMENTS REGARDING ENTRY GATE IS INCORPORATED.				ZONE REVISED SECTIONS & REMOVED WAVE TRAP FROM LAYOUT & SECTION AND INCORPORATED LATEST CO-ORDINATES.				ZONE REVISED AS PER HEAD END TOWER LOCATIONS RECEIVED VOR CUSTOMER EMAIL DATED 01.03.2023.				ZONE REVISIONS APPROVED				ZONE REVISIONS APPROVED				ZONE REVISIONS APPROVED			

NAME OF CUSTOMER	PUNJAB STATE POWER CORPORATION LTD.																	
NAME OF CONSULTANT	WAPCOS GURGAON																	
ADDITIONAL INFORMATION W.O.No.	परियोजना का नाम																	
STATUS OF DRAWING	3X33MW SHAHPURKANDI PH-I																	
DISTRIBUTION OF PRINTS	<table border="1"> <tr> <th>श्रेणी / NAME</th> <th>कुल संख्या / TOTAL</th> <th>हस्ताक्षर / SIGNATURE</th> <th>दिनांक / DATE</th> </tr> <tr> <td>शेड / SHEET</td> <td>NK</td> <td>-SD-</td> <td>15.07.23</td> </tr> <tr> <td>ड्राफ्ट / DRAFT</td> <td>SKS</td> <td>-SD-</td> <td>15.07.23</td> </tr> <tr> <td>अनुमोदित / APPROVED</td> <td>SKS</td> <td>-SD-</td> <td>15.07.23</td> </tr> </table>		श्रेणी / NAME	कुल संख्या / TOTAL	हस्ताक्षर / SIGNATURE	दिनांक / DATE	शेड / SHEET	NK	-SD-	15.07.23	ड्राफ्ट / DRAFT	SKS	-SD-	15.07.23	अनुमोदित / APPROVED	SKS	-SD-	15.07.23
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अनुमोदित / APPROVED	SKS	-SD-	15.07.23															
ड्राफ्ट / DRAFT	SKS	-SD-	15.07.23															
अनुमोदित / APPROVED	SKS	-SD-	15.07.23															
शीट / SHEET	3X33MW SHAHPURKANDI PH-I LAYOUT- PLAN & SECTION OF 220KV SWITCHYARD FOR PH-I																	
शीट नं./ SHEET No.	02	कुल शीट / TOTAL SHEETS	07															

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SIGN. & DATE REF. DRG. No. INVENTORY No.

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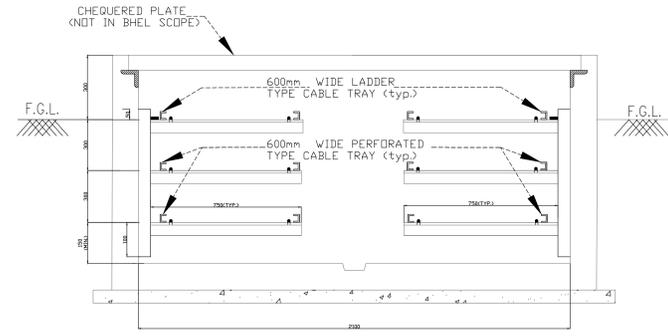
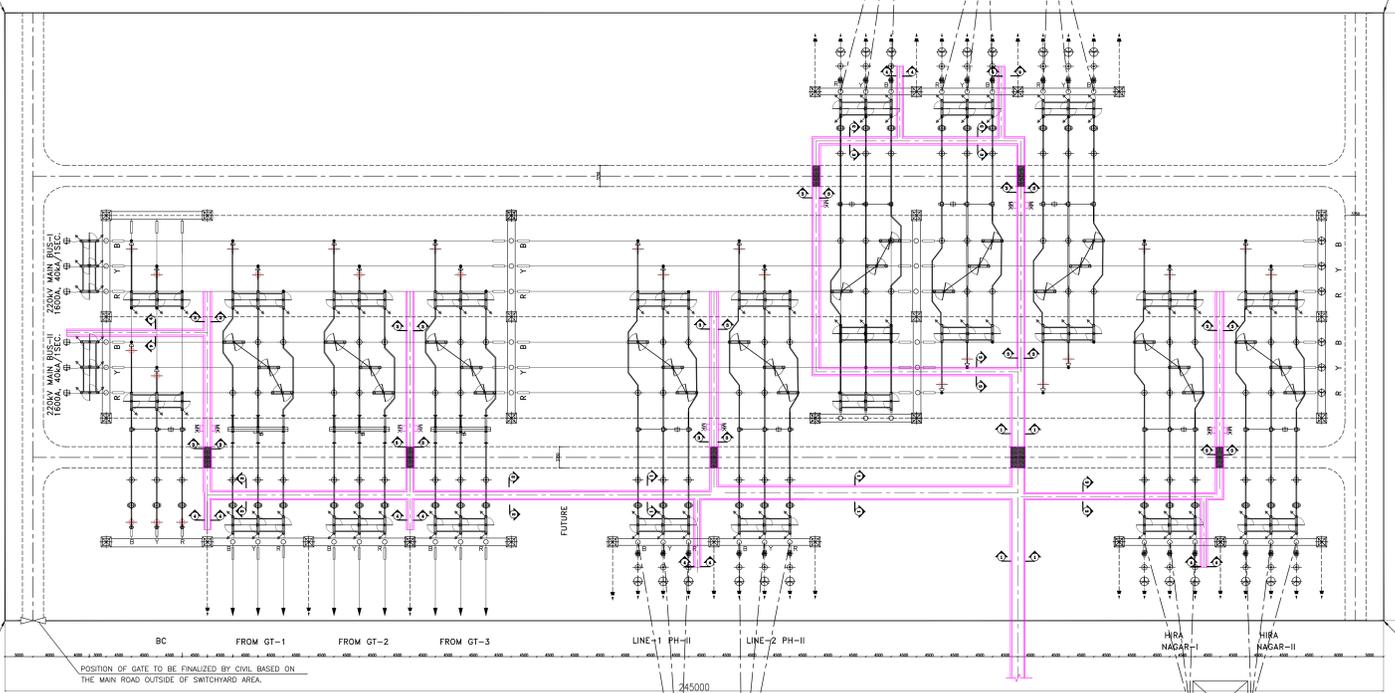
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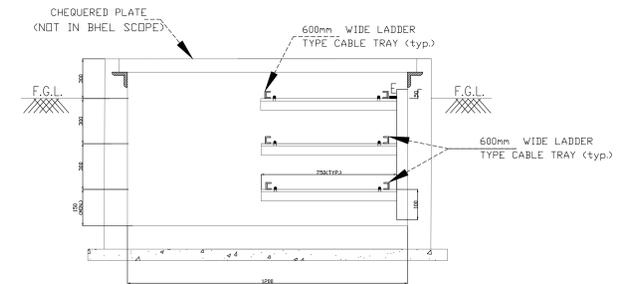
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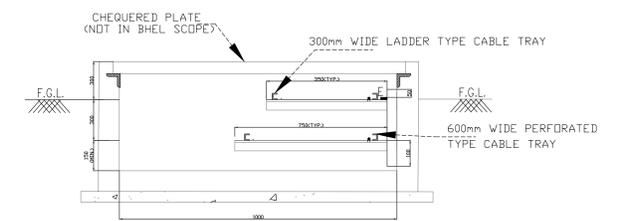
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- ☐ E OF LA
- ☐ E OF BPH
- ☐ E OF DYT
- ☐ E OF TOWER
- ☐ E OF ISOLATOR
- ☐ E OF CT
- ☐ E OF HIGH LV. BPH
- ☐ E OF ROAD
- ☐ E OF CB
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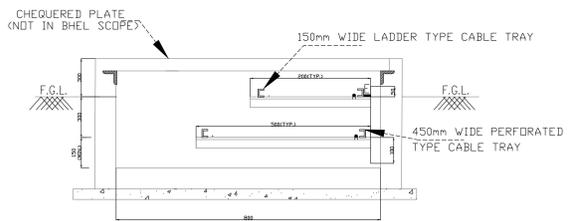
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SECTION:2-2

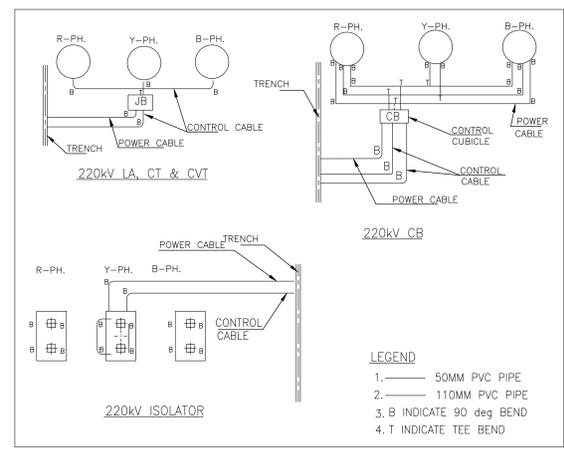


SECTION:3-3



SECTION:4-4

PVC PIPE DETAILS OF 220kV EQUIPMENTS



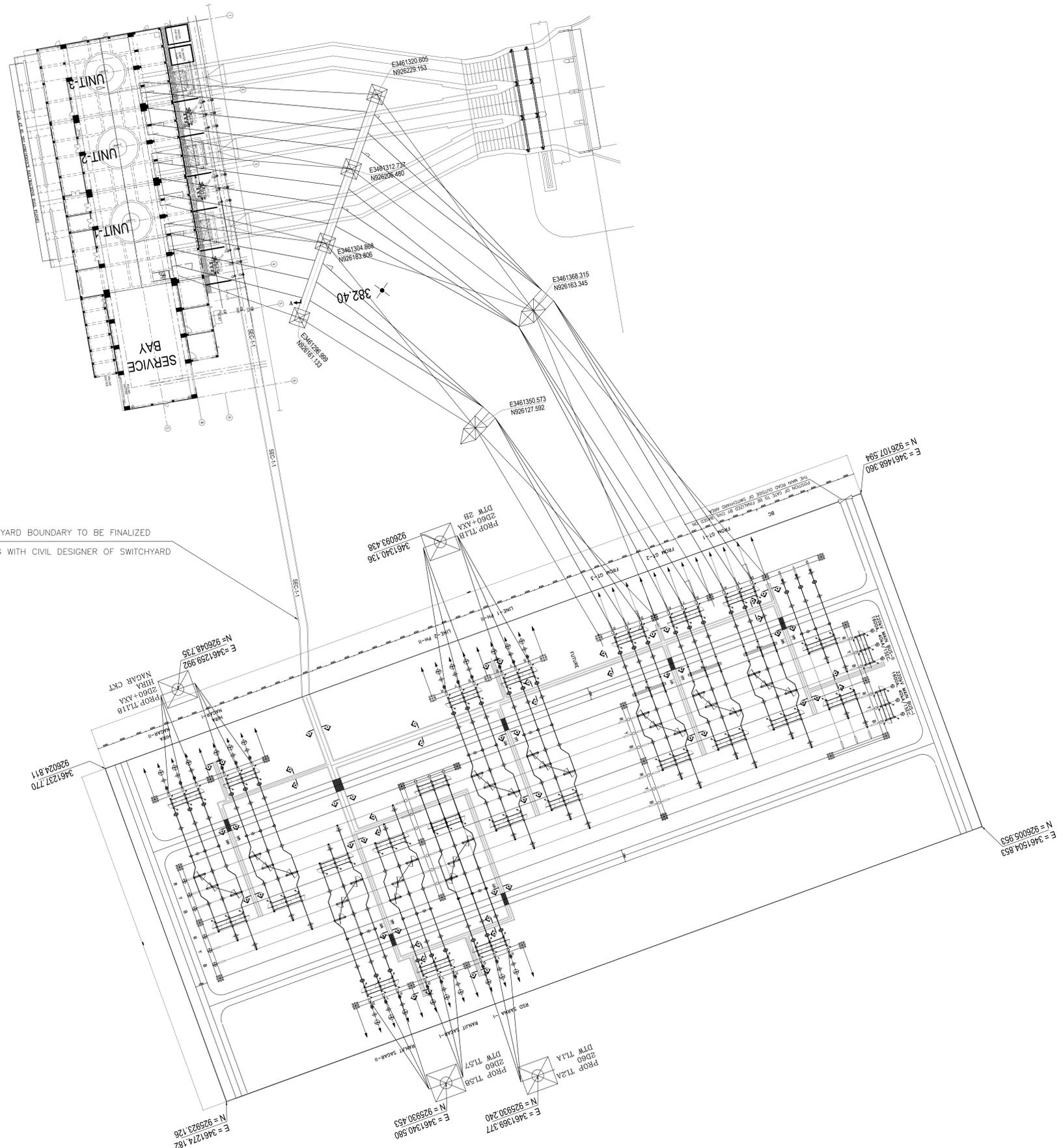
NOTE:-

1. ALL DIMENSIONS ARE IN mm.
2. THE LOCATION OF CABLE TRENCHES MARKED IN THIS DWG MAY BE SLIGHTLY MODIFIED TO SUIT SITE CONDITIONS.
3. CABLES FROM EQUIPMENTS TO CABLE TRENCHES SHALL BE LAID IN 50/110 DIA PVC PIPES.
4. OPENINGS FOR TAKING OUT PVC PIPES TO EQUIPMENTS TO BE PROVIDED IN CABLE TRENCHES. OPENING OF SIZE SUITABLE TO DIA. 50/110 PIPE TO BE PROVIDED BELOW TOP CABLE RACK. MAKING OF OPENING IN CABLE TRECHES ARE IN CIVIL SCOPE.
5. CABLES SHALL BE LAID IN CABLE TRAYS. CABLE TRAYS SHALL BE LAID ON GALVANISED CABLE RACKS. CABLE RACKS SHALL BE BOLTED TO RCC CONCRETE TRENCHES.
6. CABLE RACKS SHALL BE PROVIDED AT EVERY 1500MM INTERVAL.
7. 2500MM LONG 600 & 450MM WIDE PERFORATED AND 600, 300 & 150MM WIDE LADDER TYPE CABLE TRAYS SHALL BE SUPPLIED BY BHEL FOR LAYING OF CABLES.
8. AUXILIARY POWER CABLES SHALL BE LAID IN TOP TIERS AND CONTROL CABLES IN BOTTOM TIERS.
9. LADDER TYPE TRAYS SHALL BE USED FOR POWER CABLES AND PERFORATED TYPE TRAYS SHALL BE USED FOR CONTROL CABLES.
10. BURIED CABLES FOR LIGHTING PURPOSE SHALL BE AS PER LIGHTING LAYOUT.
11. EARTH CONDUCTOR 50x6 GI FLAT SHALL BE RUN ALONG THE TOP TIER AND TO BE WELDED ON THE CABLE TRAYS BEFORE INSTALLATION OF CABLES.
12. CABLES CROSSING ROAD/RAIL TRACK SHALL BE LAID IN BOX/PIPE CULVERT. THE SAME IS IN CIVIL SCOPE.
13. FOR POWER & CONTROL SEPARATE PVC PIPES SHALL BE USED CONSIDERING 60% VOID FOR EACH PIPE I.E., 40% FILLING CRITERIA. ACCORDINGLY, ADDITIONAL PIPES (IF REQUIRED) WILL BE PROVIDED AS PER SITE CONDITION.
14. ALL OTHER DETAILS PERTAINING TO CIVIL WORKS TO BE REFLECTED IN THE RESPECTIVE CIVIL DRAWINGS. THE SAME IS IN CUSTOMER SCOPE.
15. PVC PIPES SHALL BE SECURELY FIXED AT BOTH ENDS, EITHER EMBEDDED IN CONCRETE OR PROPERLY CLAMPED.
16. AFTER LAYING THE CABLES THE ENDS OF PIPES SHALL BE FULLY SEALED TO PREVENT INGRESS OF WATER INSIDE THE PIPE.
17. ELBOWS AND TEES SHALL HAVE AN INSIDE TURNING RADIUS OF 600MM.
18. THE PURPOSE OF TRENCH LAYOUT DRAWING IS FOR USE AS FOLLOWS: - TO BE USED AS CIVIL INPUT FOR CABLE TRENCHES. - FOR ERECTION OF CABLE RACKS AT SITE. - FOR CABLE LAYING AND ROUTING AT SITE.
19. SUITABLE PULL OUT BOX SHALL BE PROVIDED, IF REQUIRED, WHERE CABLE SHALL BE LAID IN PVC PIPE.
20. LONGITUDINAL SLOPE IN CABLE TRENCH SHALL BE AS PER CIVIL DRG.
21. ■■■■■ INDICATE PIPE/BOX CULVERT.
22. PROVISION FOR CONNECTING EARTH FLAT TO EXTERNAL EARTH GRID VIA RISER AT AN INTERVAL OF 30 METRE TO BE PROVIDED IN SWITCHYARD AREA.
23. ALL CABLE FROM CABLE TRENCH TO EQUIPMENTS AND ALL INTERPOLE CABLES (BOTH POWER & CONTROL) FOR ALL EQUIPMENT SHALL BE LAID IN 50/110 DIA PVC PIPE.
24. PVC PIPES SHALL BE BURIED IN GROUND AT A DEPTH OF 250MM BELOW FGL.
25. INVERT LEVELS FOR CABLE TRENCH UNDER PRESENT SCOPE TO BE MARKED IN CIVIL DWG.
26. CABLE TRENCHES FROM SWITCHYARD TO POWER HOUSE IS SHOWN IN SHEET-2.
27. MARSHALLING KIOSKS SHALL BE PLACED ALONG THE SIDE OF CABLE TRENCH.
28. FIBER OPTIC CABLE SHALL BE LAID IN 50MM DIA HDPE PIPES. THE SAME SHALL BE LAID IN THE CABLE TRAYS.
29. CABLES, CROSSING ROAD, SHALL BE LAID IN PIPE CULVERTS. PIPE CULVERTS ARE IN CIVIL SCOPE.
30. PROPER DRAINAGE ARRANGEMENT TO BE MADE TO DRAIN STROM/RAIN WATER FROM CABLE TRENCHES. THE SAME IS IN CIVIL SCOPE. NECESSARY ARRANGEMENT FOR EVACUATION OF WATER FROM CABLE TRENCHES IS IN CIVIL SCOPE.
31. RCC CONCRETE TRENCHES ARE IN CIVIL SCOPE.
32. 2 NOS. 50X6 GI FLAT, 1 NO. AT EACH SIDE, SHALL RUN ALONG THE CABLE TRENCH FROM SWITCHYARD TO POWER HOUSE.
33. FOLLOWING NOS. OF HUME PIPES TO BE PROVIDED FOR ROAD CROSSING OF CABLE TRENCHES. THE SAME ARE IN CIVIL SCOPE. INVERT LEVEL OF HUME PIPES SHALL BE SAME AS INVERT LEVEL OF CABLE TRENCHES.
8 NOS. OF 300MM DIA RCC HUME PIPES (4 NOS. IN EACH ROW) FOR SECTION-1 OF CABLE TRECH
4 NOS. OF 300MM DIA RCC HUME PIPES (2 NOS. IN EACH ROW) FOR SECTION-2 OF CABLE TRECH
2 NOS. OF 300MM DIA RCC HUME PIPES FOR SECTION-3 OF CABLE TRECH
34. MS CHEQUERED PLATES SHALL BE USED FOR COVERING THE TRENCHES. THE SAME IS IN CIVIL SCOPE.
35. CABLE TRENCH WILL BE ROUTED FROM POWER HOUSE BUILDING TO SWITCHYARD.

REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	

NAME OF CUSTOMER	PUNJAB STATE POWER CORPORATION LTD.													
NAME OF CONSULTANT	WAPCOS GURGAON													
ADDITIONAL INFORMATION (W.O.No.)	परियोजना का नाम 3X33MW SHAHPURKANDI PH-I													
STATUS OF DRAWING	NAME OF PROJECT													
DISTRIBUTION OF PRINTS	<table border="1"> <tr> <th>श्रेण / NAME</th> <th>हस्ताक्षर / SIGNATURE</th> <th>दिनांक / DATE</th> </tr> <tr> <td>SY</td> <td>SKS</td> <td>28.12.22</td> </tr> <tr> <td>NK</td> <td>SKS</td> <td>28.12.22</td> </tr> <tr> <td>SKS</td> <td>SKS</td> <td>28.12.22</td> </tr> </table>		श्रेण / NAME	हस्ताक्षर / SIGNATURE	दिनांक / DATE	SY	SKS	28.12.22	NK	SKS	28.12.22	SKS	SKS	28.12.22
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SY	SKS	28.12.22												
NK	SKS	28.12.22												
SKS	SKS	28.12.22												
DATE	28.03.23	DATE	28.03.23											
SCALE	1:1	SCALE	1:1											
TITLE	OUTDOOR CABLE TRENCH LAYOUT OF 220KV SWITCHYARD FOR PH-I													
DRAWING NO.	TB-1-371-316-005													
DATE	03													

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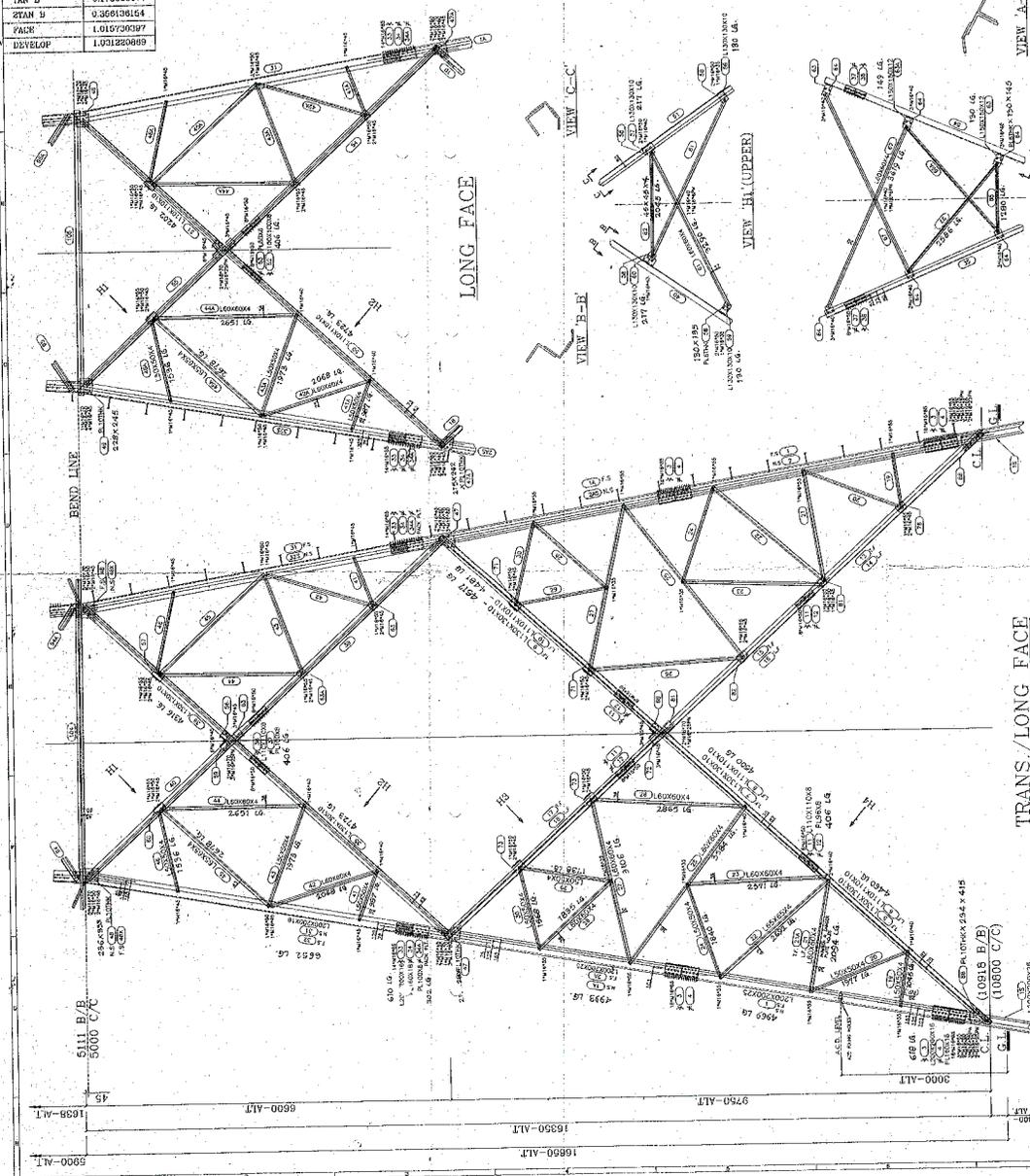
INVENTORY No. SIGN. & DATE REF. DRS. No. COMPUTER DRG. PATH NAME :
 COPY RIGHT AND CONFIDENTIAL. This drawing is the property of BHEL. It must not be used, copied or reproduced in any form without the written permission of the company.

REV.	DATE	ALTERED CHECKED APPROVED	JG	SS	SKS	SY	NK	SKS	SKS	DATE	ALTERED CHECKED APPROVED	SY	NK	SKS	SKS	DATE	ALTERED CHECKED APPROVED	SY	NK	SKS	SKS	DATE	
01	29.05.24										21.06.23						15.03.23						
02																							
03																							

REVISED AS PER CUSTOMER COMMENTS ON REV02	REVISED AS PER CUSTOMER EMAIL DATED 08.06.23	REVISED AS PER CUSTOMER EMAIL DATED 04.03.23
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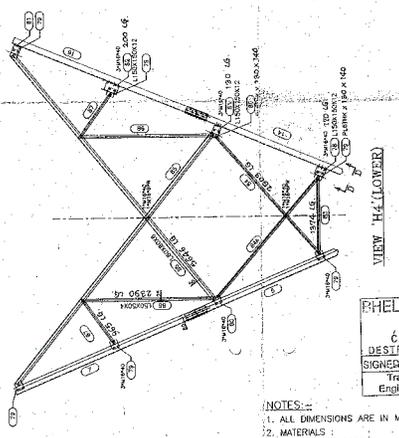
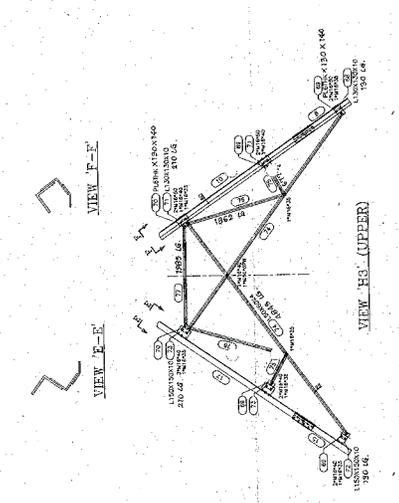
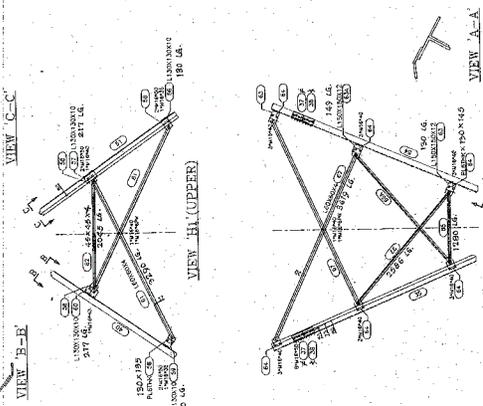
NAME OF CUSTOMER	PUNJAB STATE POWER CORPORATION LTD.
NAME OF CONSULTANT	WAPCOS GURGAON
ADDITIONAL INFORMATION W.O.No.	
STATUS OF DRAWING	परिचयना का नया
DISTRIBUTION OF PRINTS	3X33MW SHAHPURKANDI PH-I
PROJECT / SCALE	शुभचर / SCALE
DATE / SHEET No.	POWER HOUSE & SWITCHYARD INTERCONNECTING CABLE TRENCH LAYOUT
DATE / SHEET No.	TB-1-371-316-005
DATE / SHEET No.	02

TOWER SLOPE	
TAN θ	0.170569077
2TAN θ	0.366138154
PACK	1.016730997
DEVELOP	1.031260899



LONG FACE

TRANS./LONG FACE

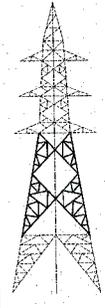


BOLTS / NUTS STATEMENT (FOR BASIC BODY)		
TYPE	SIZE (length in mm)	TOTAL QTY.
	M16 X 35 MM	62
	M16 X 40 MM	204
	M16 X 45 MM	272
	M16 X 60 MM	230
	M16 X 55 MM	82
	M16 X 60 MM	68
	M16 X 65 MM	56
	M16 X 70 MM	50
	M16 X 75 MM	18
	M16 X 80 MM	20
	M16 X 85 MM	283
SPRING WASHER	M16 X 3.5 THK	1459
PACK WASHER	M16 X 6 THK	8
PACK WASHER	M16 X 8 THK	24
PACK WASHER	M16 X 10 THK	6

STEP BOLTS / NUTS STATEMENT		
TYPE	SIZE (length in mm)	TOTAL QTY.
STEP BOLT	M16 X 175 MM	40
SPRING WASHER	M16 X 3.5 THK	66

BHEL CASE-1
APPROVED
 This Approval does not relieve the Signatory of his responsibility under the IS:8000.
 SIGNATURE: _____ DATE: 24/07/12
 Title: Engineering Manager

PHEL
 RELEASED FOR CONSTRUCTION
 DESTROY/EARLY REPRINT
 SIGNATURE: _____ DATE: 24/07/12
 Title: Engineering Manager



- NOTES:-
- ALL DIMENSIONS ARE IN MM.
 - MATERIALS - AS PER IS 2062
 - BOLTS & NUTS - 15% GRADE 5.6 AS PER IS 1357
 - BOLT SET, ONE BOLT+ONE NUT+ONE SPRING WASHER.
 - ALL MEMBERS TO BE FULLY GALVANISED.
 - THE PRECEDING LETTER WILL BE 'DD'.
 - ALL UNWIDED MEMBERS ARE LEX45K4.
 - STEP BOLTS ARE TO BE PROVIDED ON ONE LEG ONLY.

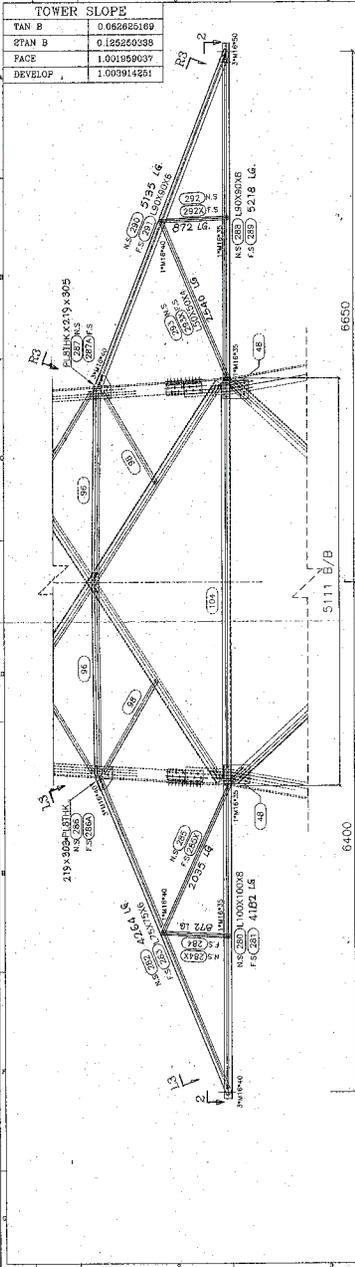
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MARK NOS. :- 1 - 88

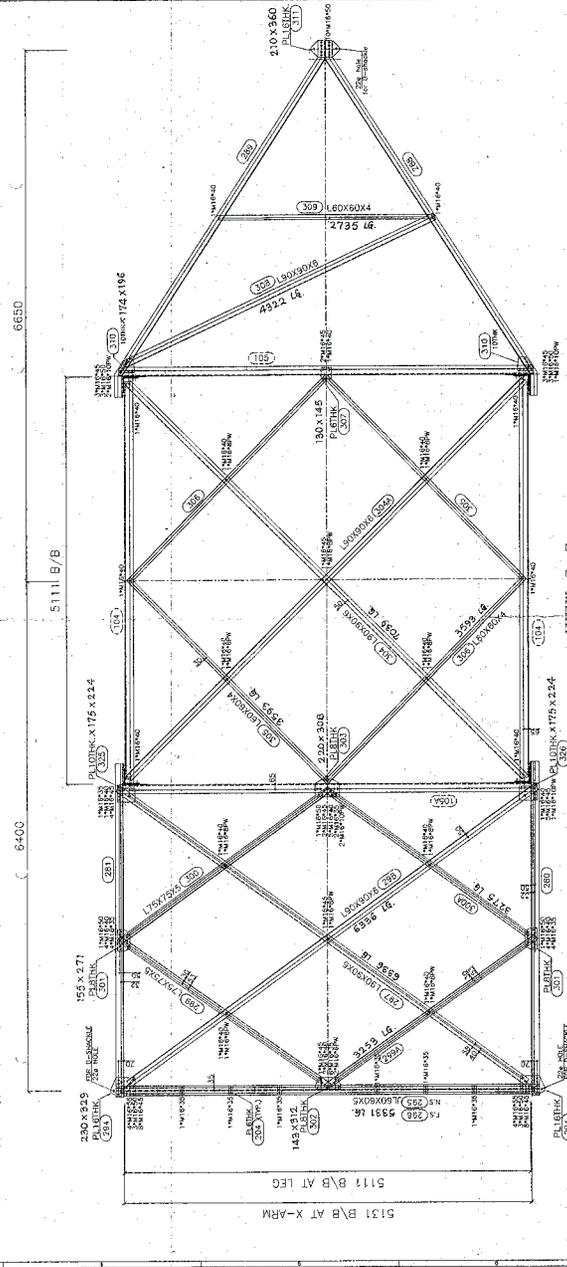
REV	DATE	REASON	BY	CHKD
1	12-03-2010	ISSUED FOR CONSTRUCTION		

RICHARDSON & CRUDDAS (1972) LTD (A Govt. of India undertaking) NAGPUR-16	
NAME OF THE CUSTOMER: DAMODAR VALLEY CORPORATION, KOLKATA PROJECT: CHANDRAPURA 7 & 8: 220KV D/C LEO DAY AUGMENTATION	W.A. NO. _____ P.D. NO. _____ CLIENT: BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECT: DAMODAR
DESIGNED BY: _____ CHECKED BY: _____ SCALE: _____ DATE: _____	DRAWING NO: 0008/04 SHEET NO: 1 OF 1

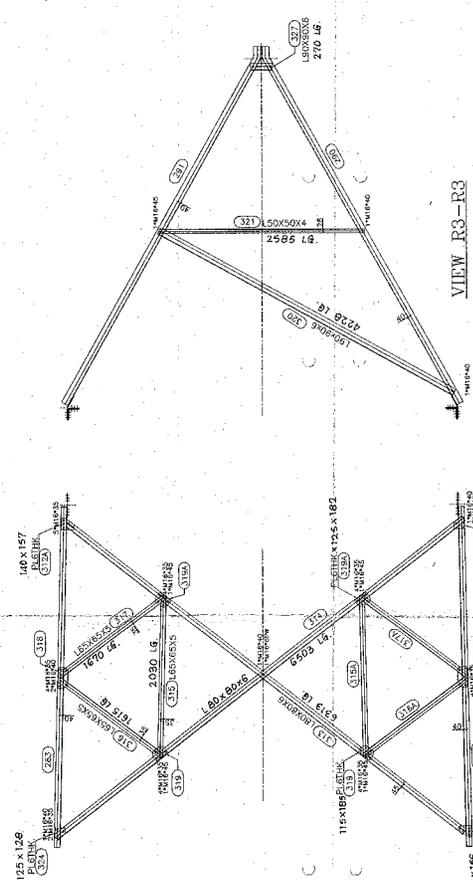
TOWER SLOPE	
TAN B	0.0626826169
2TAN B	0.125240338
FACE	1.001950037
DEVELOP	1.003914251



BOTTOM X-ARM ELEVATION



VIEW 2-2



BOLTS / NUTS STATEMENT (FOR BOTTOM X-ARM)		
TYPE	SIZE (Length in mm)	TOTAL QTY.
	M16 X 35 MM	69
	M16 X 40 MM	84
	M16 X 45 MM	34
	M16 X 50 MM	37
SPRING WASHER	M16 X 3.5 THK	284
PACK WASHER	M16 X 6 THK	3
PACK WASHER	M16 X 8 THK	10
PACK WASHER	M16 X 10 THK	5

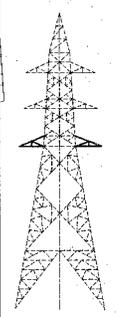
NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MATERIALS :
- AS PER IS 2062
- BOLTS & NUTS - 16# GRADE-5.8-AS-PER-IS-1367
- BOLT SET: ONE BOLT+ONE NUT+ONE SPRING WASHER
3. ALL MEMBERS TO BE FULLY GALVANISED.
4. THE PROCEEDING LETTER WILL BE "DD".
5. ALL UNNOTED MEMBERS ARE L45X45X4.

PROTO ASSEMBLY CHECKED
ON DT. 12-03-2010

AS BUILT

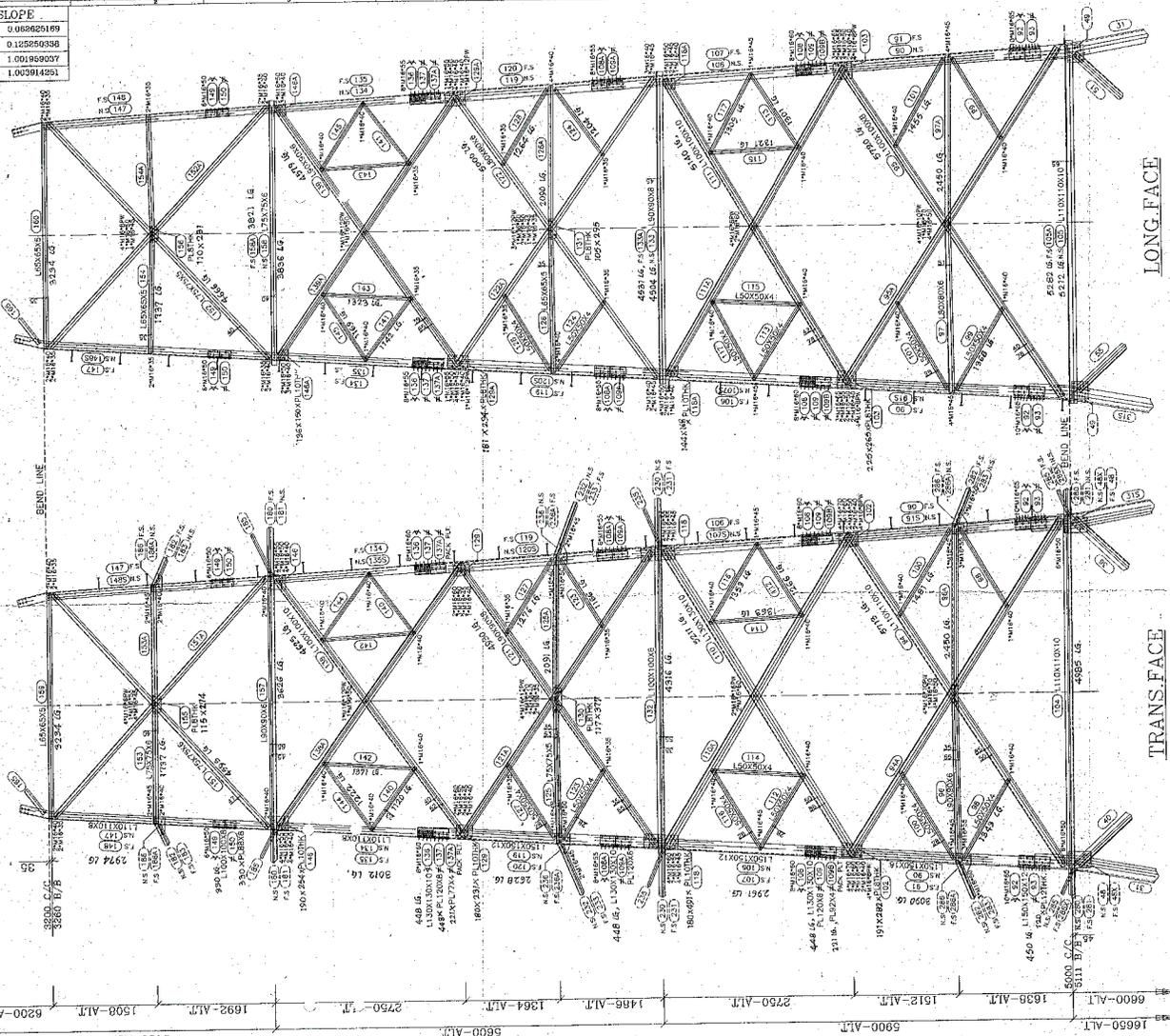
RELEASED FOR CONSTRUCTION
FOR DESTROY ALL PRINTS
SIGNATURE: [Signature]
DATE: 21/07/17
Transmission Projects
Engineering Manager
BHEL



OMITTED MARK NO. - 322
MARK NOS. :- 280 - 327

NAME OF THE CUSTOMER : DAMODAR VALLEY CORPORATION, KOLKATA		P.O. NO. : 106626	
PROJECT : CHANDRAPURA 7 & 8: 20KV D/C LILU BAY AUGMENTATION		CLIENT : BHARAT HEAVY ELECTRICALS LTD.	
REV	DATE	BY	DATE
1	14.03.2010	ASB	14.03.2010
STATUS OF DRAWING : CONTRACT		DISTRIBUTION OF PRINTS :	
NO. OF SETS : 1		SCALE : 1:1	
DRAWING REVISIONS : 1. DRAWING REVISIONS : OF DESIGN AS PER DWG'S COMMENTS		DRAWING NO. : 0608/04	
STRUCTURAL DRAWING FOR TOWER TYPE: "DD/DUE" BOTTOM X-ARM		SHEET NO. : 4 OF 6	

TOWER SLOPE	
TAN B	0.062826189
2TAN B	0.125652378
PACE	1.001950037
DEVELOP	1.003914251



BOLTS / NUTS STATEMENT (FOR CAGE)		
TYPE	SIZE (Length in mm)	TOTAL QTY.
	M16 X 36 MM	66
	M16 X 40 MM	188
	M16 X 45 MM	124
	M16 X 50 MM	214
	M16 X 55 MM	174
	M16 X 60 MM	190
	M16 X 65 MM	82
	M16 X 70 MM	22
	M16 X 3.5 THK	1002
	M16 X 4 THK	40
	M16 X 10 THK	16
	M16 X 18 THK	22

STEP BOLTS / NUTS STATEMENT		
TYPE	SIZE (Length in mm)	TOTAL QTY.
STEP BOLT	M16 X 175 MM	40
SPRING WASHER	M16 X 3.5 THK	60

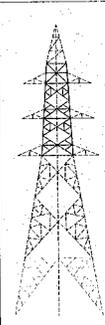
BHEL RELEASED FOR CONSTRUCTION DESTROYED PRINTS SIGNATURE DATE 25/11/10
Transmission Projects Engineering Management

PROTO ASSEMBLY CHECKED ON DT. 12-03-2010

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MATERIALS :-
- AS PER IS 2082
- BOLTS & NUTS - 16# GRADE 5.6 AS PER IS 1367
- BOLT SET: ONE BOLT+ONE NUT+ONE SPRING WASHER
3. ALL MEMBERS TO BE FULLY GALVANISED.
4. THE PRECEEDING LETTER WILL BE "DD"
5. ALL UNNOTED MEMBERS ARE L45X45X4.
6. STEP BOLTS ARE TO BE PROVIDED ON ONE LEG ONLY.

BHEL CAT-1 APPROVED
This Approval does not relieve the signatory of his responsibilities and is subject to the approval of the signatory.
SIGNED DATE 25/11/10
Transmission Projects Engineering Management



AS BUILT
RICHARDSON & CRUDDAS (1972) LTD
(A Govt. of India undertaking)
NAGPUR-18

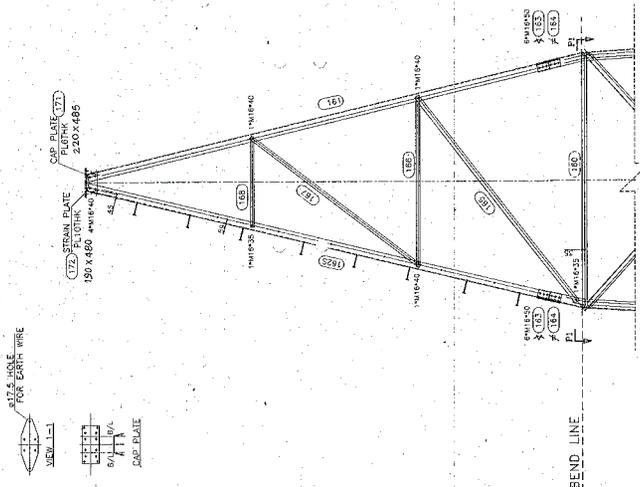
MARK NOS. - 90 - 160

REV	DATE	BY	CHKD	REASON FOR CHANGE
1	14/02/10	...	...	...

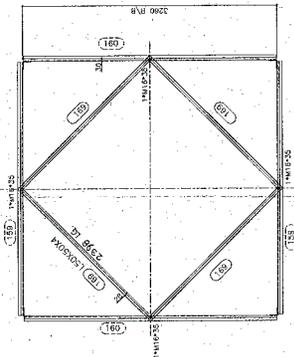
NO.	NAME	DESIGNATION	DATE
1

NAME OF THE CUSTOMER: CHANDRAN VALLEY CORPORATION, KOLKATA
PROJECT: CHANDRANPURA 7 & 8: 220KV D/D LLDI BAY AUGMENTATION
CLIENT: BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION PROJECT DIVISION
SCALE: 1:100
SHEET NO: 0508/04
REV: 1

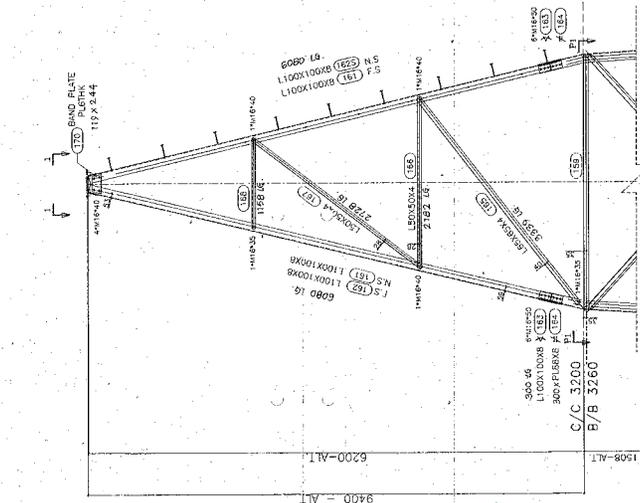
TOWER SLOPE	
TAN D	0.247994162
SLAN D	0.4547929334
FACE	1.003140283
DEVELOP	1.059423461



LONG FACE



VIEW P1-P1



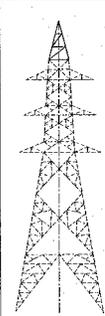
TRANS FACE

BOLTS / NUTS STATEMENT (FOR PEAK)		
TYPE	SIZE (Length in mm)	TOTAL QTY.
	M16 X 35 MM	12
	M16 X 40 MM	38
	M16 X 45 MM	—
	M16 X 50 MM	48
	M16 X 3.5 THK	92

STEP BOLTS / NUTS STATEMENT		
TYPE	SIZE (Length in mm)	TOTAL QTY.
STEP BOLT	M18 X 175 MM	17
SPRING WASHER	M18 X 3.6 THK	34

BHEL CAT-1
APPROVED
The Approver has the authority to sign on behalf of the responsible person for the design.
SIGNATURE: DATE: 12/03/2010
Transmission Projects Engineering Management

BHEL RELEASED FOR CONSTRUCTION DESTROY GABLERPRINTS
SIGNED: DATE: 12/03/2010
Transmission Projects Engineering Management



KEY DIAGRAM

- NOTES:-
1. ALL DIMENSIONS ARE IN MM.
 2. MATERIALS :
- AS PER IS 2062
- BOLTS & NUTS - 16# GRADE 5.6 AS PER IS 1367
- BOLT SET: ONE BOLT+ONE NUT+ONE SPRING WASHER
 3. ALL MEMBERS TO BE FULLY GALVANISED.
 4. THE PRECEDING LETTER WILL BE "DD".
 5. ALL UNNOTED MEMBERS ARE L45X45X4.
 6. STEP BOLTS ARE TO BE PROVIDED ON ONE LEG ONLY.

PROTO ASSEMBLY CHECKED ON DT. 12-03-2010

MARK NOS. :- 161 - 172

REV	DATE	REASON	STATUS OF DRAWING	CONTRACT	W.D. NO.	P.O. NO.	SCALE
1	12/03/2010	ISSUED FOR FABRICATION	ASSEMBLY CHECKED				

AS BUILT

RICHARDSON & CRUDDAS (1972) LTD
(A Govt of India undertaking)
NAGPUR-10

NAME OF THE CUSTOMER: DAMODAR VALLEY CORPORATION, KOLKATA
PROJECT: CHANDRAPURA 7 & 8: 220KV D/C LINE BAY AUGMENTATION

CLIENT: BHARATI HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECT DIVISION

NO.	NAME	DESIGN	DATE
1

SCALE: 1:100
DATE: 12/03/2010
DRAWING NO: 0568/04
PAGE NO: 2 OF 6

PROCEDURE FOR WELDING OF ALUMINIUM BUSES

A. Recommended welding procedures to insure a sound weld are as follows:

Pure aluminum melts at 660 Deg. C while aluminum alloy melts in the range of 519 Deg. C depending on the alloy content of the particular metal involved. When aluminum alloy are heated there is no change in color. This makes it difficult, if not impossible; to tell metal is near the welding temperature.

The ever present surface oxide films on aluminum have a melting point of 1982 Deg. C. The parent aluminum or aluminum alloy can therefore be melted without fusing the surface oxides. Unless this film is removed, cleanliness of the molten filler metal and the parent metal cannot be completed and both strength and conductivity may be sacrificed. Therefore, it is of prime importance that aluminum oxides be removed from the aluminum alloys before welding is started. In the shielded arc welding method the shielding gas has a tendency to clean the material as welding progresses.

B. CLEANING OF BUSES & FITTINGS:

It is very important to remove all greases and oxides from the surfaces to be welded. This can be accomplished by using a mild alkaline solution or standard degreasing solution. The preferred method is to use a stainless steel wire brush and vigorously scrub the surfaces to be welded. The stainless steel brushes are specified because the stainless steel has fewer tendencies to pick up particles of aluminum.

C. WELDING METHODS

The following types of welding methods for welding aluminum fittings and buses are recommended.

1. TUNGSTEN-ARC WELDING (TIG)

The inert-gas shielded tungsten arc process is widely used for welding aluminum bus fittings. In this process the arc is established between a non-consumable tungsten electrode and the section to be welded. Inert gas envelopes the arc to prevent oxidation during welding.

Hence no flux is required. A bare filler rod supplies filler metal to the weld area. To initiate the arc the tungsten electrode is placed in contact with the component and then withdrawn to establish an arc length of approximately 3/16". The arc is given a circular motion until the base metal liquefies and the weld puddle is established. Filler metal is added by hand as required. In this process, if more than one pass is required for a sufficient weld, the weld should be wire brushed between passes, to remove any surface dirt or oxides which have accumulated from the previous pass. Since no flux is used the finished weld does not require cleaning. In this process the heat of the tungsten arc is concentrated in a smaller area and is much faster than the conventional type of welding and distortion of the weld is negligible since the heat is concentrated in a small area. In this process, if thickness is greater than 0.5" arc to be welded, pre-heating of parts will increase the arc speed.

2. METALLIC ARC INERT GAS SHIELDED WELDING

MIG welding process combines the advantages of tungsten arc welding with the increased welding speed. Welding can be done from any position and the process can be either manual or automatic. Manual welding techniques are somewhat different from other methods. However, a welder can be trained to use the MIG process with only a few days concentrated training. In the MIG process the bare filler rod is supplied as a coil of bare wire. In the commercially available equipment this wire is added to the weld at predetermined rate by a motor driven feed that can be adjusted to the magnitude of the welding current. In this process as well as the tungsten arc process, gas forms a shield around the arc to prevent oxidation during welding.

Either helium, argon or a mixture of helium and argon are suitable shielding gases. Pure argon is most widely used on the gas arc usually mixed to combine the hotter arc argon. If exceptionally hot arc characteristics are required pure helium can be substituted for the gas mixture. Precaution should be exercised if this substitution is made in that it is very easy to burn through the items that are to be welded with a pure helium atmosphere.

As it is readily apparent, the basic difference between the two types of welding apparatus is the automatic feeding mechanism for the filler wire. In both types of apparatuses the electrode holder and the welding gun can or cannot be cooled by water. If welding currents of more than 125 Amps are required, both methods will have to have water cooling apparatuses to the electrode holder and the welding gun.

D.WELDERS QUALIFICATIONS

No welding should be done until the operator has had experience with welding aluminum alloys by the methods described above, Men with previous experience with in metal welding should be selected for training in welding aluminum for a period of training of not less than one week after which time the man can be considered to be proficient in the use of the equipment and in the welding of aluminum joints. After this period there should be no difficulty experienced in welding aluminum alloys. It is suggested, if practical, that welders should practice on actual fittings or buses before proceeding with the welding of the required job.

The following is the recommended specification for the current fittings wire feeds, gas flows etc. These specifications are of a general nature to the extent that many factors have to be considered such as:

1. Type of equipment used, whether water cooled or not.
2. The size and mass of the piece to be welded.
3. The position of the weld.
4. And most important of all, the operator's skill
5. All persons in the welding area would wear the proper shields. The arc is approximately twice as strong as the standard AC welding arc. Extreme caution should be exercised for the protection of eyes.

ACCEPTANCE STANDARDS FOR NON-DESTRUCTIVE TESTING **LIQUID PENETRANT EXAMINATION OF WELDED JOINTS**

- a) Evaluation of indications:
- Relevant indications are those which result from mechanical discontinuities.
 - Linear indications are those indications in which the length is more than three times with width.
 - Rounded indications or indication, which are circular or elliptical with the length less than three times, the width.
 - Any questionable or doubtful indications shall be re-tested to verify whether or not actual defects are present.
 - Localised surface imperfections, such as may occur from machining marks, surface conditions, may produce similar indications, which are not relevant to detection of unacceptable discontinuities.

b) **Acceptance standards:**

- Linear indications
- Four or more rounded defects with any dimensions more than 1.6 mm in a line separated by 1/16 inch (1.6 mm) or less (edge to edge)

c) **Defect removal and repair:**

Unacceptable imperfections shall be removed and reexamination made to assure the complete removal. Whenever a defect is removed and subsequent repair by welding is not required, the excavated area shall be blended into the surrounding surface so as to avoid sharp notches, crevices or corners. Where welding is required after removal of a defect, the area shall be cleaned and welding performed in accordance with a qualified welding procedure. Completed repairs shall be re-examined by the method originally used for detection of the deflection.

d) **Treatment of imperfections believed non-relevant.**

Any indication of an imperfection, which is believed to be non-relevant, shall be regarded as defect unless, on re-evaluation, it is shown by re-examination by the same method or by the use of other non-destructive methods and/ or by surface conditioning that no unacceptable defect is present.

e) **Examination of areas form which defects have been removed:**

After a defect is thought to have been removed and prior to making weld repairs, the area shall be examined by suitable methods to ensure the defect has been eliminated.

f) **Re-examination of repaired areas:**

After repairs are made, the repaired areas shall be blended.

ACCEOTANBCE STANDARDS FOR NON-DESTRUCTIVE TESTING
RADIOGRAPHIC EXAMINATION OF WELDED JOINTS

Radiographic examination shall cover minimum 10% of weld seam and acceptance standard for visual examination and Radiography shall be as follows:

Any of the following imperfections shall not be acceptable.

1. Cracks
2. Zone of incomplete fusion or penetration, which exceed 10% of the weld length of the joint in longitudinal or transverse butt weld, where full penetration is intended by the weld procedure, some lack of penetration acceptable. The total length of weld with lack of penetration shall not exceed 10% of the overall weld length. At no place, shall weld penetration be less than 90% of the thickness of the material. Continuous occurrence of lack of penetration is permitted, but shall not exceed 50 mm in any 500 mm length of weld.
3. Inadequate weld dimensions, root cavity (shrinkage) and incompletely filled groove greater than 10% effective throat thickness.

4. Excess penetration shall be permitted provided it does not exceed 25% of the wall thickness or 4 mm whichever is smaller.
5. Weld reinforcement: Build up in excess of 25% of the effective throat thickness shall be dressed. Any reinforcement shall be substantially symmetrical about the center line of the weld and shall be of smooth contour blending smoothly at the toes with the parent material.
6. Undercutting and overlapping, greater than 10% effective throat thickness.
7. Elongated cavities and/or worm holes exceeding 3 mm dia or equivalent area in length provided the limitations on porosity are met with.
8. Copper, tungsten or oxide inclusions greater than $t/1$ or 3 mm whichever is smaller.
9. Crater pipes exceeding 25% effective throat thickness or 3 mm whichever is smaller.
10. Porosity: Scattered porosity not exceeding 0.5% by volume is acceptable. In general, the size of the pores shall not exceed 0.8 mm dia, but occasional 1.6 mm dia pores may be acceptable, provided the following limits are not exceeded.
 - a) Where pore size is 0.4 mm or less, up to 150 pores may be permitted in 1000 mm sq. area of radiograph.
 - b) Where pore size is 0.8 mm or less, up to 19 pores may be permitted in 1000 mm. sq. area of radiograph.
 - c) Where pore sizes are generally 0.8 mm dia or less, but occasional 1.6 mm dia/pores are present, up to 9 pores of 0.8 mm dia may be permitted in 1000 sq. mm area of radiograph, provided the number of pores up to 1.6 mm in dia does not exceed it.
 - d) However, visible surface porosity > 1mm dia is not acceptable.

Note:

- i. In all cases, t thickness of the thinnest section of the weld under examination.
- ii. Unacceptable weld defects shall be repaired in accordance with the original welding procedure. All repairs shall be 100% inspected in accordance with original testing procedure.

		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECTS ENGINEERING MANAGEMENT NEW DELHI			
DOCUMENT No.	TB xxx 618 002a	Rev 04	Prepared	Checked	Appd
TYPE OF DOC.	TECHNICAL SPECIFICATION	NAME	BVG	PLK	RMS
G I HARDWARES		SIGN	-SD-	-SD-	-SD-
		DATE			
		GROUP	TBEM		
		W.O. No			
CUSTOMER/CONSULTANT					
PROJECT					
<p><u>Contents:</u></p>					
Section No.	Description				No of Pages
SECTION-1	SCOPE, SPECIFIC TECHNICAL REQUIREMENTS and QUANTITIES				01
SECTION-2	STANDARD SPECIFICATION				03
SECTION-3	PROJECT DETAILS AND GENERAL SPECIFICATION				01
SECTION-4	GUARANTEED TECHNICAL PARTICULARS (Not Applicable)				....
SECTION-5	MANUFACTURING QUALITY PLAN (Not Applicable)				....
SECTION-6	CHECK LIST				01
04	18.11.10	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	Unit wt of hardware added
02	13.4.06.	BVG	PLK	RMS	Eqpt mounting hardwares added.
Rev	Date	Altered	Checked	Approved	
Distribution				To	
				Copies	

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Bharat Heavy Electricals Ltd.
Doc. No. TB-xxx-618-002a R4
Technical Specification
GI HARDWARES

SECTION - 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENTS & QUANTITIES

1.1 SCOPE

The scope of this specification is to specify all details required by a supplier for supply of galvanized hardware for projects being executed by BHEL on turnkey basis for NTPC, PGCIL, SEBs and other Customers.

1.2 SPECIFIC TECHNICAL REQUIREMENTS

The specific technical requirements shall be as per Standard Technical Specification (Refer Section 2).

1.3 QUANTITIES

The quantities shall be as per attached BOQ.

SECTION - 2

2.0 GENERAL

This section covers the standard technical specification for GI Hardware.

2.1 BOLTS:

M16 bolts shall be used in all types of structures except equipment mounting/ earthing bolts which shall be as per equipment requirement.

All bolts for member connections in towers, beams & equipment support structures shall conform to IS: 12427 - 2001 and for step bolts shall conform to IS: 10238 - 1982.

The mechanical properties shall conform to property class 5.6 of IS:1367 (part 3) - 1991.

All bolt heads shall have hexagonal shape, the heads being forged out of the solid material truly concentric and square with the shank, which must be perfectly straight.

All bolts shall be threaded with metric standard thread to take the full depth of the nut and permit firm grip of the member.

All bolts shall be hot dip galvanized as per IS: 1367 (Part 13) - 1983.

2.2 NUTS:

All nuts shall conform to IS: 1363 (Part 3) -1992.

The mechanical properties shall conform to property class 5 of IS:1367 (part 6) - 1980.

The nuts shall be capable of being worked with fingers along the entire threaded portion of the bolt with a neat fit capable of developing the full strength of the bolt.

All nuts shall be hot dip galvanized as per IS: 1367 (Part 13) - 1983.

2.3 PLAIN WASHERS:

All plain washers shall be punched washers, A type conforming to IS: 2016-1967.

These shall be hot dip galvanized as per IS: 4759 - 1984.

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2.4 SPRING WASHER:

All spring washers shall be of spring steel, positive lock type and conforming to type B of IS: 3063-1972. The thickness of spring washer shall be as specified under:

<u>Bolt Diameter</u>	<u>Thickness of Spring washers</u>
16 mm	3.5 mm
12 mm	2.5 mm

These shall be electro-galvanized as per IS: 1573 – 1986.

2.5 UNIT WEIGHT OF BOLTS I/C NUT, PLAIN AND SPRING WASHERS:

For purpose of payment, following unit weights as indicated below shall be considered.

A.) STANDARD BOLTS I/C ONE NUT UNIT WEIGHTS

S. NO.	TYPE	SIZE OF BOLTS	TOTAL WT (KG)
1	M16	16 φ X 35 LG	0.117
2	M16	16 φ X 40 LG	0.125
3	M16	16 φ X 45 LG	0.133
4	M16	16 φ X 50 LG	0.141
5	M16	16 φ X 55 LG	0.149
6	M16	16 φ X 60 LG	0.157
7	M16	16 φ X 65 LG	0.164
8	M16	16 φ X 70 LG	0.172
9	M16	16 φ X 75 LG	0.180
10	M16	16 φ X 80 LG	0.188
11	M16	16 φ X 85 LG	0.196
12	M16	16 φ X 90 LG	0.204
13	M16	16 φ X 95 LG	0.212
14	M16	16 φ X 100 LG	0.220
15	M12	12 φ X 35 LG	0.0620
16	M12	12 φ X 40 LG	0.0664
17	M12	12 φ X 45 LG	0.0708
18	M12	12 φ X 50 LG	0.0753
19	M12	12 φ X 55 LG	0.0797
20	M12	12 φ X 60 LG	0.0842

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B.) SPRING WASHER

S. NO.	TYPE	TOTAL WT (KG)
1	3.5mm thk (M16 bolt)	0.00891
2	2.5mm thk (M12 bolt)	0.00382

C.) For supplies of bolts i/c nuts, plain washers and spring washer other than those listed above, payment shall be made based on unit weights worked out considering theoretical dimensions & density of steel as 7850kg/cum.

sts



BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

NEW DELHI

DOCUMENT No.	TB-XXX-316-040	Rev. No.	02	Prepared	Checked	App.
TYPE OF DOC.	STANDARD TECHNICAL SPECIFICATION			NAME	NK	DS
TITLE	GI PIPE & BENDS			SIGN	Sd/-	Sd/-
				DATE		
				GROUP	TBEM	W.O. No
CUSTOMER						
CONSULTANT						
PROJECT	RATE CONTRACT (ONE YEAR)					

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SCOPE AND SPECIFIC TECHNICAL REQUIREMENT

1.0 SCOPE

This technical specification covers design, manufacture, testing at works, packing and dispatch of 'GI pipe, its fittings and bends'. The material supplied shall fully comply with relevant Indian Standard given below and the product shall be BIS certified. The sizes and types of Pipes shall be as specified below. No Technical Deviations shall be acceptable in this regard.

1.1 SPECIFIC TECHNICAL REQUIREMENT

1.1.1 Galvanized Iron (GI) Pipe

The GI pipes shall be of nominal diameter 50 mm and/ or 100 mm, as per the indent. The pipe shall be of medium Grade as per IS 1239 and shall be of standard length of 6 meters. The pipe shall fully comply with specified standard and carry the BIS certification marking. The pipe shall have a socket at one end and threaded at both ends.

1.1.2 Sockets

The sockets shall fully comply with the requirements of IS 1239 (Part-2).

1.1.3 For Bends

The bends shall be of 90°, 112.5° and/ or Tee, as specified, for above mentioned pipes. The bends shall, in general, comply with the requirement of IS 1239 (part-2). The specific requirements and BIS certification marking of these bends shall be as per IS 1239 (Part-2). 90°, 112.5° and Tee bends shall have a socket at one end and threaded at all ends.

02	25.04.13	(A)	<i>[Signature]</i>	<i>[Signature]</i>	90° bends has been included.
01	30.11.10	Sd/-	Sd/-	Sd/-	Document revised.
Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS
Distribution				To	TBMM
				Copies	OFFICE COPY

Pre- commissioning Test of main Equipment but not limited to:

A. Circuit Breaker Tests:

The routine check during erection works are as follows:

- a) Closing and opening operation test
- b) Trip free operation test
- c) Manual operation test
- d) Missing phase protective operation
- e) Operation check of locking-out device
- f) Minimum operation pressure for main contact (*1)
- g) Measurement of storage reservoir capacity
- h) Leakage check of air system
- i) Measurement of insulation resistance
- j) Minimum coil operation voltage check
- k) Unintentional contact closing pressure measurement
- l) Measurement of operating coil resistance
- m) Calibration of pressure gauges
- n) Air compressor operation test, as applicable
- o) Contact resistance measurement
- p) High voltage test
- q) High voltage test between contacts
- r) Trip & closing coil resistance measurement
- s) Closing / opening operating time measurement
- t) Dielectric tests
- u) Electrical resistance of current path tests
- v) Clearance and mechanical adjustment check tests
- w) Timing tests
- x) Operation Tests.

B. Disconnecting Switch Tests:

The routine check during erection works are as follows:

- a) Manual operation test
- b) Check of interlock mechanism
- c) Minimum coil operation voltage check
- d) Measurement of insulation resistance
- e) Measurement of operating coil resistance

C. Current Transformer Tests:

The routine check during erection works are as follows:

- a) Polarity check
- b) Ratio check
- c) High voltage test
- d) Current injection test
- e) Insulation resistance measurement
- f) Measurement of capacitance
- g) Oil leakage test
- h) Measurement of tan delta at 0.3, 0.7, 1 and 1.1 $\mu\text{m sq. root } 3$
- i) DGA test of oil
- j) Contact resistance measurement (wherever possible)
- k) Magnetizing Characteristic test

D. Voltage Transformer Tests:

The routine check during erection works are as follows:

- a) Polarity check
- b) Ratio check
- c) High voltage test
- d) Voltage injection test
- e) Insulation resistance measurement

E. Surge/Lightning Arrestor Tests:

The routine check during erection works are as follows:

- a) Measurement of insulation resistance
- b) Surge counter operation check

F. Control, Automation & Protection System:

Following tests shall be part of tests during erection, commissioning and performance testing:

i. Tests during installation and pre-commissioning

At least following tests shall be performed by the Contractor:

- i) Ratio and polarity of CTs and PTs,
- ii) Correctness of interconnections between CTs and PTs as well as CT groups and associated relays,
- iii) Testing, calibration and adjustment of protection relays,
- iv) Check of functional characteristics of each of the electrical protections,
- v) Check of tripping sequence,
- vi) Check of orders issued by each of the protections with respect to the corresponding tripping sequence,

- vii) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations by test kit for which the system is to react,
- viii) The co-ordination of protection and relay setting,
- ix) Analysis of information consistency and of alarms supplied by protection system.

ii. Commissioning tests

At least following tests shall be performed by the Contractor:

- i) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations by creating real fault for which the system is to react,
- ii) The final co-ordination of protection and final relay setting,
- iii) The testing of the protection system behaviour in the event of failure of one of the connected systems to which it is connected,
- iv) Analysis of information consistency and of alarms supplied by protection system. The finalizing of the setting and the co-ordination of the various protections,
- v) The systematic testing of the operation of each chain forming the protection, the associated tripping sub-assembly, the links to the connected systems and all fault simulations for which the system is to react,
- vi) The co-ordination of protection between the unit with network, line and bus bar protection.

Checks shall be made after the protection systems have been commissioned to ensure that all connections and test links have been replaced and test leads removed and relay settings have been done, as well as to confirm the integrity of the current transformer circuits. Where necessary, voltage readings shall be taken at the terminals on each relay to ensure that loop connections between the relays are complete.

ANNEXURE-SPARES

SI No.	Item Description	PH-I
	Mandatory spares for 220 KV/420KV Circuit Breakers	
1	Closing coils	2 Nos
2	Tripping coils	4 Nos
3	Fix arcing contacts	2 Set
4	Moving arcing contacts	2 Set
5	Complete limb of curcuit breakers without operating mechanism	1 Nos
	Mandatory spares for LT Switchgear system	
1	SPARES- DISTRIBUTION BOARD : CONTROL SWITCH OF EACH TYPE FOR	1 SET
2	2024SPARES- DISTRIBUTION BOARD : BUS BARS OF EACH CAPACITY FOR DISTRIBUTION CENTERS	2 SET
3	SPARES- DISTRIBUTION BOARD : MOULDED CASE CIRCUIT BREAKERS ONE OF EACH TYPE	1 SET
	Mandatory spares for Cabling system	
1	LV power cable each type	500 METER
2	Control cable each type	500 METER
3	Cable glands of each size	400 NO
4	Junction boxes	10 NO
	Cable tray of each size	
1	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, 2MM THK, CABLE TRAY 2.5 M LONG, 600MM WIDE, 114 MM HIGH, HAVING SLOTTED RUNG SPACING OF 300 MM, ALONG WITH 2 NOS. SIDE PLATE AND 16 NOS. M8 BOLTS WITH NUTS AND WASHERS FOR COUPLING TWO TRAYS.	35
2	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, 2MM THK, CABLE TRAY 2.5 M LONG, 300MM WIDE, 114 MM HIGH, HAVING SLOTTED RUNG SPACING OF 300 MM, ALONG WITH 2 NOS. SIDE PLATE AND 16 NOS. M8 BOLTS WITH NUTS AND WASHERS FOR COUPLING TWO TRAYS.	10
3	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, 2MM THK, CABLE TRAY 2.5 M LONG, 150MM WIDE, 114 MM HIGH, HAVING SLOTTED RUNG SPACING OF 300 MM, ALONG WITH 2 NOS. SIDE PLATE AND 16 NOS. M8 BOLTS WITH NUTS AND WASHERS FOR COUPLING TWO TRAYS.	8
4	SPARES- TRENCH MATERIAL : PERFORATED TYPE TRAY, 2MM THK, GI CABLE TRAY 2.5 M LONG, 600MM WIDE, 114 MM HIGH, ALONG WITH 2 NOS. SIDE PLATE AND 16 NOS. M8 BOLTS WITH NUTS AND WASHERS FOR COUPLING TWO TRAYS	80
5	SPARES- TRENCH MATERIAL : PERFORATED TYPE TRAY, 2MM THK, GI CABLE TRAY 2.5 M LONG, 450MM WIDE, 114 MM HIGH, ALONG WITH 2 NOS. SIDE PLATE AND 16 NOS. M8 BOLTS WITH NUTS AND WASHERS FOR COUPLING TWO TRAYS	8
6	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, CABLE TRAYS, FITTINGS AND ACCESSORIES - 90° HORIZONTAL BEND FOR CABLE TRAY 600MM WIDE	3
7	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, CABLE TRAYS, FITTINGS AND ACCESSORIES - 90° HORIZONTAL BEND FOR CABLE TRAY 300MM WIDE	2

8	SPARES- TRENCH MATERIAL : LADDER TYPE TRAY, CABLE TRAYS, FITTINGS AND ACCESSORIES - 90° HORIZONTAL BEND FOR CABLE TRAY 150MM WIDE	2
9	SPARES- TRENCH MATERIAL : PERFORATED TYPE TRAY, 2MM THK, CABLE TRAYS, FITTINGS AND ACCESSORIES - 90° HORIZONTAL BEND FOR CABLE TRAY 600MM WIDE	5
10	SPARES- TRENCH MATERIAL : PERFORATED TYPE TRAY, 2MM THK, CABLE TRAYS, FITTINGS AND ACCESSORIES - 90° HORIZONTAL BEND FOR CABLE TRAY 450MM WIDE	2
	Cable support , harware etc.	
1	SPARES- TRENCH MATERIAL : PANHEAD SCREWS M6, M6 NUT WITH LONG SPRING FOR FIXING TRAYS ON SUPPORT RACKS	250 NO
2	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, CLAMP CC1 SUITABLE FOR SINGLE CHANNEL FOR FIXING VERTICAL SUPPORT CHANNEL C1 ALONGWITH NECESSARY ANCHOR / RAWL BOLTS/ SPRING NUTS/ WASHER ETC	400 NO
3	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, VERTICAL SUPPORT SINGLE CHANNEL (C1) OF LENGTH 750MM	100 NO
4	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, VERTICAL SUPPORT SINGLE CHANNEL (C1) OF LENGTH 450MM	40 NO
5	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, HORIZONTAL SUPPORT CANTILEVER ARM (CA1) OF LENGTH 750MM ALONGWITH NECESSARY BASE PLATE, BOLTS, NUTS WITH SPRINGS, WASHER ETC REQUIRED FOR FIXING ON VERTICAL SUPPORT CHANNEL	350 NO
6	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, HORIZONTAL SUPPORT CANTILEVER ARM (CA2) OF LENGTH 500MM ALONGWITH NECESSARY BASE PLATE, BOLTS, NUTS WITH SPRINGS, WASHER ETC REQUIRED FOR FIXING ON VERTICAL SUPPORT CHANNEL	12 NO
7	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, HORIZONTAL SUPPORT CANTILEVER ARM (CA3) OF LENGTH 350MM ALONGWITH NECESSARY BASE PLATE, BOLTS, NUTS WITH SPRINGS, WASHER ETC REQUIRED FOR FIXING ON VERTICAL SUPPORT CHANNEL	30 NO
8	SPARES- TRENCH MATERIAL : BOLTED ASSEMBLY, HORIZONTAL SUPPORT CANTILEVER ARM (CA4) OF LENGTH 200MM ALONGWITH NECESSARY BASE PLATE, BOLTS, NUTS WITH SPRINGS, WASHER ETC REQUIRED FOR FIXING ON VERTICAL SUPPORT CHANNEL	10 NO
	Mandatory spares for 220 KV switchyard equipment	
1	Current Transformer (of each type)	2 Nos
2	Potential Transformer(of each type)	2 Nos
3	Lighting Arrestors	2 Nos
4	Isolator Fixed plate contacts	2 Nos
5	Support insulator stack	2 Nos
6	STRING Insulators	6 Nos
7	P.G clamps Zebra -Zebra	5 Nos
	Illumination system	
1	Multiple plug power sockets suitable for 32A/16A	10 NO
2	LIGHTING FIXTURES-SF63 (LED)	15 NO
3	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURES-SF64 (LED)	15 NO
4	SUPPLY- ILLUMINATION EQUIPMENT : LIGHTING FIXTURES-SS62 (LED)	10 NO
5	SUPPLY- ILLUMINATION EQUIPMENT : GI CONDUIT OF 25MM SIZE	30 METER
6	SUPPLY- ILLUMINATION EQUIPMENT : GI CONDUIT OF 40 MM SIZE	30 METER

SECTION- 3

PROJECT DETAILS AND GENERAL SPECIFICATIONS

3.0 GENERAL

This section stipulates the General Technical Requirements under the Contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipment and services covered under other sections of tender documents and are not exclusive. However, in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under sections-1 and section-2 shall prevail.

In following clauses contractors stands for supplier/ vendor/ bidder and Employer/Customer stands for purchaser/ PSPCL/ BHEL.

3.1 PROJECT DETAILS

3.1.1 SITE INFORMATION

S.No.	Particular	Details
a)	Owner	<i>Punjab State Power Corporation Ltd (PSPCL)</i>
b)	Customer	<i>Punjab State Power Corporation Ltd (PSPCL)</i>
c)	Project Title	<i>3X33MW Shahpurkandi HEP-I & 3X33MW+1X8MW Shahpurkandi HEP-II</i>
d)	Location	<i>Near Shahpurkandi in District Pathankot (Pb.).</i>
e)	Transport Facilities	<i>Nearest Rail Head: Pathankot (Approx. distance from site: 15Kms) Nearest Highway: Delhi-Pathankot-Jammu Nearest Airport : Amritsar</i>
SITE CONDITIONS		
a)	Max. ambient air temp.	<i>50 °C</i>
b)	Min. ambient air temp.	<i>0 °C</i>
c)	Max. design ambient temp.	<i>50 °C</i>
d)	Design reference temp.	<i>50 °C</i>
e)	Average Humidity	<i>Max. 85%</i>
f)	Special corrosion condition	<i>No</i>
g)	Atmospheric radiation UV	<i>Very High</i>

h)	Altitude above sea level	<i>Less than 1000 meter above mean sea level (MSL)</i>
i)	Pollution Severity	<i>High Pollution level</i>
j)	Seismic Zone	<i>Zone-IV as per IS 1893 Seismic acceleration 0.3g</i>
WIND DATA		
	Wind Zone	<i>39m/sec</i>
Main Electrical Parameters:		
	Fault Levels:	<i>220kV: 40kA for 1 sec. 66kV : 31.5kA for 1 sec.</i>
	Creepage Distance	<i>25mm/kV for All Equipment and string insulators i.e BPI/Bushings, CB, Isolator, CT, CVT, LA, WT etc.</i>

3.1.2 SYSTEM PARAMETERS:

Sl.No.	Parameters	220 kV	66 kV
1	Highest system voltage	245 kV	72.5 kV
2	Lightning Impulse voltage		
	Phase to earth and between phases	1050kVp	325kVp
3	Switching impulse voltage	--	--
4	Power frequency withstand for 1 min (rms)		
	Phase to earth and between phases	460 kV(rms)	140 kV(rms)
5	Max. fault level (1 sec.)	40kA	31.5kA
6	Minimum creep age distance	6125mm	1813mm
7	Radio Interference Voltage	Not more than 1000 μ V at 156kVrms	--

3.1.3 AUXILIARY POWER:

Sl.No.	Nominal Connection Voltage	Variations in Voltage	Frequency	Phase	Neutral
1	415V	$\pm 10\%$	50 $\pm 5\%$	3Phase , 4 Wire	Solidly Earthed
2	240V	$\pm 10\%$	50 $\pm 5\%$	1 phase	Solidly Earthed

Combined variation of voltage and frequency shall be + 10%. Fault level of 415V system shall not be less than 20kA.

3.1.4 CLEARANCES:

Sl.No.	Nominal Voltage	Phase to Phase (mm)	Phase to Earth (mm)	Section Clearance (mm)	Ground Clearance (mm)
1	220kV	2100	2100	5000	2550
2	66kV	750	630	3100	2550

3.1.5 The various minimum **heights** of the switchyard shall be as given below from plinth level:

Voltage	Equipment /1st Level	2nd Level	3rd Level
220kV	5900mm	11700mm	16200mm/21200mm
66kV	4600mm	8000mm	16200mm/21200mm

The minimum vertical distance from the bottom of the lowest porcelain part of the bushing, porcelain enclosures or support insulators to the bottom of the equipment structure, where it rests on the foundation pad shall be 2440mm.

3.4 TECHNICAL DOCUMENTS

3.4.1 General

This clause specifies the general scope of the documents which, together with those listed in the equipment Specifications, shall be delivered by the Contractor to the Customer within the periods, and in a number and quality as specified.

The Customer reserves the right to request the Contractor for additional documents as may be required for proper understanding and definition of constructional, operational, co-ordination or other matters.

All documents shall be submitted in accordance with the agreed programme so that any comment and change requested by the Customer can be taken into account before starting of the manufacture in the workshop and / or erection at the site. The Contractor shall not be released of his responsibility and guarantee after drawings and computations have been approved by the Customer.

3.4.2 Drawings

The drawings of bought out items shall be preferred in AUTOCAD version, however, their scanned version will be allowed. Catalogue sheets, illustrations, printed specifications, etc., shall be checked and prepared by the Contractor in such a way that the figures, statements and data valid for the delivered sizes and types of the works concerned are clearly marked. These documents also shall be scanned and stored on CD.

Four sets of hard copies of the, drawings shall be submitted to the Customer for comments / approval. The comments shall be marked on one set of hard copy and returned to Contractor for necessary correction in original drawings. Corrected drawings replacing previously submitted drawings should be marked accordingly. The final approved drawings shall be submitted on CD with eight sets of hard copies in product wise folders.

If the Customer feels it necessary to give any comment on a drawing submitted "For Information Only", the same shall be entertained by the Contractor as "Drawing for Approval".

If any revision is required in the approved drawings by Contractor or the Customer, the same shall be got approved again and revised drawing shall bear revision number.

Drawings in respect of the following shall be supplied:

Foundation Drawings

If a piece of Works requires its own foundation or needs a special area for installation, the Contractor shall submit drawings indicating all pertinent dimensions, static and dynamic loads, etc. They shall include all essential details required for proper design and construction of the foundations and/or buildings.

In addition, they shall include openings, sleeves, and details of conduits, slopes and the arrangement of any supporting structure, i.e. baseframes or other steel constructions for permanent fixing or erection purposes.

All arrangement and layout drawings shall be drawn to scale.

Assembly and sub-Assembly Drawings

The assembly drawings shall show all elements and the main dimensions of individual components in plan view, cross-section, side and top views. The assembly drawings shall include erection drawings, piping diagrams and piping arrangement drawings, etc., showing the dimensions, design and data of all constructions, apparatus and Works to be furnished under this Contract.

These drawings shall show:

- Assembly of the Works in plan, elevation and detail views with main dimensions
- Sub-assembly of the principal components of the Works which shall require dismantling, assembly and adjustments at site for maintenance, giving overall dimensions, adjustment, clearances and fitting tolerances
- Sub-assemblies in which the Contractor proposes to ship the Works
- Instructions for heat treatment, pressure tests, surface preparation and anticorrosive protection
- Full details of parts for which adjustment is provided or which are subject to wear
- Method and sequence of installation, field joints, erection and lifting devices, jacks, grout plugs, anchoring details, etc., if not shown on foundation drawings.

Block Diagrams

The Block Diagrams shall be used to show in a simplified manner the main inter-relationships between the elements of a system by means of symbols, block symbols and pictures without necessarily showing all the connections. The symbols used for the individual kinds of components, e.g. servomotors, computing modules, etc., shall clearly be explained on the diagram or on an attached legend.

Logic Diagrams

The Logic or Functional Diagrams shall be used for representation of logic and sequence controls and inter locking by showing only binary logic elements and their effect on the various process equipment disregarding their electrical realization. Logic function elements (AND, OR, NOR, NAND, STORAGE, etc.) shall be used for processing and combining binary signals.

Terminal Diagrams

- Such diagrams shall be prepared for any type of terminal box, marshalling rack, control cubicle, switchboard, etc., and shall show the terminals (properly numbered) and the internal and/or external conductors (wires or cables) connected to them.

The terminal diagram of each individual switchboard, terminal box, panel, etc., shall contain, but not be limited to the following information:

Terminal number of terminal board with targets (terminal number and current path) of incoming and outgoing cables and wires

- - Cable designation
- - Type of cable
- - Number and cross-section of conductors

3.5 Lists and Schedules

Following lists and schedules shall be supplied:

i) Cable Lists / Interconnection Lists

- The Cable Lists shall include for each individual cable the following as a minimum:
 - Cable number, in accordance with Identification System. - - Cable type
 - Rated voltage
 - Number and size of conductors
 - Overall diameter
 - Cable termination at each end.
 - Connection point at each end with cubicle/Works identification and terminal numbers
 - Cable routing

In case interconnecting cubicles are used, the lists shall be prepared to show:

- Cable termination for incoming and out coming cables
- Interconnection wiring

ii) Alarm Lists

These lists shall indicate all alarms and shall contain at least:

- Description and denomination of alarm
- Data of alarm detector (contact) referring to applicable circuit diagram. - Data of alarm annunciator (location and clear text labelling)

List of Final Control Elements

This list shall indicate all control actuators and control valves and shall contain at least:

- Data of pipe and valve connections
- Data of valve layout
- Maximal required and rated power

3.6. Calculations

In addition to the drawings or whenever the contractual documents do so require, the Contractor shall submit to the Customer/BHEL for checking, the appropriate calculations for determining the main sizes, stress levels, dimensions and operational characteristics, safety factors, clearly indicating the principles on which the calculations were based. The calculations shall include the formulae, standards, test results, basic assumptions, etc. Submission of computer calculations without baseline information such as derivation of the calculation method, applied formulas, definition of variables and constants, explanation of abbreviations etc., will not be accepted.

3.7 Operation and Maintenance Manuals

The Operation and Maintenance Manuals shall be prepared in latest version of MS Word with enclosures in the form of computerized drawings and scanned figures. They shall be supplied on CD along with Ten (10) hard copies in properly bound form. The O& M manuals shall contain the following information in sufficient detail to enable the Owner to maintain, dismantle, reassemble, adjust and operate the Works with all its items of Works and installations:

- a) Table of Contents
- b) List of Illustrations
- c) Introduction
- d) Detailed Description
Detailed description shall contain a complete and accurate description of the Works, all components and ancillaries, their assembling and dismantling. An accurate list stating clearances, tolerances, temperatures, fits, etc. shall be included.
- e) Operating Principles and Characteristics - A brief summary of the technical operating principles of the Works, including diagrams, circuit diagrams, sequence diagrams, piping, etc.
- f) Operating Instructions
The instructions shall contain the sequence of individual manipulations required for operation. Tables, lists and graphic presentations should be used whenever possible for making the description readily understandable. An appropriate trouble-shooting list shall be included in this chapter.
- g) Testing and Adjustment
The entire testing and adjustment procedure required for the Works after overhauls and during operation shall be described.
- h) Maintenance Instructions
This section is divided into five paragraphs:

- h1) Preventive maintenance, indicating the inspections required at regular intervals, the routine cleaning and lubricating operations, the regular safety checks and similar steps.

The maintenance instructions shall include a tabular summary of the required activities sorted according to

- Daily
 - Weekly
 - Monthly
 - Quarterly
 - Yearly
- (Or other) cycles as applicable.

- h2) Repair and adjustment procedures including fault tracing

- h3) Spare part lists, containing all the necessary data for ordering spare parts. These lists shall include all spare parts, those to be supplied and those not to be supplied under the present Contract. *Detailed drawing for each item of spare parts shall be supplied.* The above list should include minimum and maximum quantities of spares to be maintained by the project.

- h4) Tool lists, containing all necessary data for identification of tools to be delivered under the present Contract.

- h5) List of Contractors of bought out items and their addresses.

- j) As-built drawings

3.8 Installation and Commissioning Manuals

The Manuals of Installation and Commissioning Procedures shall be prepared in latest version of MS Word with enclosures in the form of computerized drawings and scanned figures. They shall be supplied on CD along with 10 (Ten) hard copies in properly bound form. These manuals shall contain the installations procedures and Pre-commissioning tests and procedures.

3.9 Quality Assurance Plan for Manufacturing Works

Four copies of 'Quality Assurance Plan giving details of inspection, tests and customer witness / hold points shall be submitted with the bids. The quality plan shall contain the details of inspection and tests to be carried out' for each major component of each functional assembly.

The Contractor shall get the quality plans finalized and approved after the award of the Contract. The approved quality plan shall form the basis for inspection and acceptance of the equipment. The Customer shall have the right to ask for more relevant tests if the same could not be included in the quality assurance plan at the time of their approval due to non-availability of final design drawings.

3.10 Quality Assurance Plan for Site Installation & Commissioning

Four copies of Quality Assurance Plan giving details of stage inspection during installation, pre-commissioning and commissioning tests and customer witness / hold points shall be submitted for customer/BHEL approval.
The Contractor shall get the quality plans finalised and approved after the award of the Contract. The approved quality plan shall form the basis for inspection and acceptance of the equipment at site. The Customer shall have the right to ask for more relevant tests if the same could not be included in the quality assurance plan at the time of their approval due to oversight and/or non-availability of final design drawings.

3.11.1 SPARE PARTS, TOOLS AND SITE CONSUMABLES

3.11.1.1 Spare Parts

All spare parts to be supplied shall be interchangeable with the corresponding parts of all the Works supplied under these Specifications and shall be of the same material and workmanship. They shall be replaceable without cutting or destruction of adjacent components.

All spare parts shall be protected against corrosion and shall be marked with identification labels. The identification scheme for spares shall be sent for customer/BHEL approval before dispatch of any spare.

All spare parts, tools and materials shall be delivered in marked boxes of sufficient sturdy construction to withstand long term storage.

The Contractor shall provide 5%, but at least two pieces of all types of bolts, screws, nuts, washers, spanner rings and cotters.

3.11.1.2 Site Consumables, Lubricating Oil and Grease for First Filling

For all items under this Contract, the Contractor shall deliver 5 % of the quantity of painting material, but at least one litre, in new sealed containers.

Lubricating oils, insulating oils and greases etc. required for first filling in the plant and equipment supplied by the Contractor under this Contract shall be supplied in quantity 20% (twenty percent higher than the actual capacity for first filling).

3.12. DESIGN REQUIREMENTS

3.12.1 General

The equipment shall be designed and manufactured to provide most optimum functional value and neat appearance. All major assemblies or equipment shall be designed to facilitate easy and quick surveillance, maintenance and optimum operation. All control sequences shall be simple and rational.

All live, moving and rotating parts shall be adequately secured in order to avoid danger to the operating staff. All electrical components shall be electrically earthed.

Suitable lifting eyes and forcing off bolts shall be provided where required or where they will be useful for erection and dismantling.

3.12.2

3.12.4 Seismic Loads

The forces being caused by earthquake including hydraulic loads, which may occur additionally, shall be taken into account for the computations.

The project lies on the border of zone IV X- of Seismic Zoning map and the two zones correspond to seismic intensity VIII & IX respectively of modified Marcella Scale.

Stresses resulting after including these loads shall not exceed permissible stresses and following provisions, shall be made in the generator Turbine and all switchyard equipment structure.

3.12.5 Mechanical strength

Generator, turbine, switchyard equipment and structure be designed to safely withstand earthquake acceleration force 0.3g both in the vertical and horizontal direction.

3.12.6 Natural frequency

Natural frequency of the machine be kept well away (higher) from the magnetic frequency of 100 Hz (twice the generator frequency). The natural frequency must be much away from multiple of runner blades passing frequency.

3.12.7 Standardization of Works

Every effort shall be made to standardize parts, instruments and devices to minimize costs of the Works and facilitate keeping stocks, maintenance, replacement, interchangeability, etc.

3.12.8 Surface Finish

Surfaces to be machine-finished shall be indicated on the shop drawings by symbols. Compliance with the specified surface shall be determined by the sense of feel and by visual inspection of the work compared to applicable "Standard Roughness Specimens", or with roughness feeler gauge instruments.

Where the finish is not indicated or specified, the type of finish shall be that type which is most suitable for the surface to which it applies and shall be consistent with the class of fit required.

3.12.9 Fits and Tolerances

Fits and tolerances shall be given in accordance with ISO Standard. Tolerances on matching components shall be suitable for intended service and will ensure interchangeability. Fits shall be selected for the smooth functioning of the components for fairly long life.

3.12.10 Materials

In choosing materials and their finishes, due regard shall be given to the humid tropical conditions under which equipment is to work. Tropical grade material should

be used wherever possible. Material specifications, including grade or class shall be shown on drawings submitted to the Owner.

3.13 MANUFACTURING REQUIREMENTS

3.13.1 Workmanship

All works shall be performed and completed in highly professional manner and shall follow the best modern practices in the design and manufacturing of the equipment. All parts shall be made accurately and shall not deviate from drawing and quality requirements. Wherever, in process inspection is required, due notice shall be given to inspection agency and the inspection shall not be bypassed. The Contractor shall arrange all measuring instruments, gauges, templates, fixtures and devices required for the purpose. All special gauges, instruments and devices deemed necessary for the maintenance of the equipment, shall be offered and included in scope of supply under this contract.

3.13.2 Materials

All materials used, shall be new and of first class quality free from rust, defects and imperfections. Inspection documents of all materials shall be reviewed and compiled before actual use. The Customer shall review the inspection records of materials of major components. Materials of limited shelf life shall not be used after their expiry date.

3.13.3 WELDING AND HEAT TREATMENT

Welding

All welding (except welding of thin plates or piping of small sizes) shall be performed by the electric-arc method and where practical, with process controlled automatic machines.

Butt welds can be welded from one side only, shall be provided with back strips on the whole length of the seam to be welded.

After being deposited, welds shall be cleaned of slag and shall show uniform sections, smoothness of weld metal, feathered edges without overlap, and no porosity and clinker. Visual inspection of the ends of welds shall indicate good fusion with the base metal.

Where weld metal is deposited in successive layers, each layer shall be thoroughly peened before the next layer is applied.

All welds transverse to the direction of flow shall be ground flush with the plates on the inside. Welds shall be ground flush on both the inside and the outside wherever dynamic stress occurs.

Particular care shall be taken in aligning and separating the edges of the members to be joined by butt-welding so that complete penetration and fusion at the bottom of the joint will be ensured. Where fillet welds are used, the members shall fit closely and shall be held together during welding.

The cut surfaces of plates requiring weld joints shall be free of all visible defects, such as laminations, surface defects caused by shearing or flame cutting operations. The edges and surfaces to be welded shall be free of rust, mill scale, grease, oil, paint or any other foreign matter. Welding over painted surface shall be prohibited - all painting materials next to the joint to be welded shall be removed well beyond the heat-affected zone.

Where possible, welding shall be carried out in the workshop. Welding which has to be performed in the field shall be clearly indicated on drawings.

The Contractor shall maintain Weld Procedure Specifications (WPS) for the type of welds to be performed in shop. These WPS shall conform to the recommendations of material Contractors, electrode Contractors and approved standards. The WPS shall be got approved from Customer. However, approval of the welding process shall not relieve the Contractor of his responsibility for correct welding, the use of correct electrodes and for minimizing distortion in the finished structure.

Additional copies of all records of all welding procedures, including preheating and stress relieving, chemical analysis and physical properties, shall be made available to the Customer upon request.

Welding Qualifications

For welding of principal stress carrying parts, the standard of welding procedures, welders and welding operators shall conform to standards equivalent to the requirements of the ASME Boiler and Pressure Vessel Code, Sections VIII and IX, or DIN 8560, DIN 8563, EN 287.

For welding of less important parts, the standards and qualifications shall conform either to the AWS Standard Qualification Procedure or equivalent standards.

All welders and welding operators assigned to the work shall have passed a performance qualification test. If more than one year has elapsed since the welder or welding operator passed his last test, then he shall again be tested. Welders' and welding operators' test certificates shall be submitted to the Customer.

Quality and Procedure Control

Quality control methods, e.g., radiography, ultrasonic crack detection, etc., shall be done in accordance with the appropriate manufacturing code. However, the Bidder shall indicate clearly in the Technical Data Sheets the extent to which these methods shall be used.

All welded joints, which have to be tight, shall be inspected or tested by dye penetration tests.

All major welds carried out on parts under hydraulic pressure shall be at least 10 radiographically and 100% ultrasonic examined. All welds on the skin-plates shall be additional dye penetration tested as directed by the Customer.

The Contractor shall indicate in the corresponding drawings the type of non-destructive testing to be carried out during manufacture and at Site.

Defects and Repairs

Plates with laminations discovered after cutting shall be rejected unless the laminated portion is only local and can easily be repaired; such repairs shall require the consent of the Customer.

Defects in welds, which are to be repaired, shall be chipped out to sound metal and the areas to be DP or ultrasonically tested to ensure that the defective material has been completely removed before repair of welding is carried out. Repairs shall be carried out in accordance with the relevant Standards and to the approval of the Customer. The Contractor shall be fully responsible for the in-service performance of all welding work.

The Work shall be 100% inspected again by the method used first to determine such faulty work.

Heat Treatment

Heat treatment shall be performed on all fabricated parts which are stressed during service and are to be finish machined as per the approved heat treatment / weld procedure.

Heat treatment of field erection welding seams shall be performed according to the specifications for the welding procedure for the corresponding parts, which shall be submitted to the Customer for approval.

3.14 PROTECTION OF MACHINED SURFACES

3.14.1 General

Machine-finished surfaces shall be thoroughly cleaned of foreign matter. Finished surfaces of large parts and other surfaces shall be protected with wooden pads or other suitable means. Unassembled pins or bolts shall be oiled or greased and wrapped with moisture-resistant paper or protected by other approved means.

3.14.2 Corrosion Protection

All ferrous metal work shall be provided with an effective painted or galvanized finish, applied in accordance with the best trade practice to protect from corrosion.

The Contractor's services shall cover the procurement of all materials, and the preparation and application of the painting and other protective coats as specified. All costs of painting or galvanizing shall be included in the Tender Price.

The Contractor shall submit for the Customer's approval full details of the preparation, type of materials, methods and sequences he proposes to use to comply with the requirements for the protection of the Works.

Painting

Surface Preparation

All surfaces to be painted shall be thoroughly cleaned by suitable means before application of paint. After cleaning the surfaces shall be rinsed in a manner that no residues will remain.

For removing rust and mill scale on structural steel, piping and other steel surfaces, particularly parts which will be in contact with water, exposed to heavy condensation and humidity or subjected to high temperature shall be sandblasted. Parts, which cannot be sandblasted, shall be cleaned of rust by power tool cleaning to the highest degree possible.

The sandblasted clean surfaces shall receive a shop coat with a quick drying highly pigmented 2-pack zinc-rich primer, unless otherwise specified.

Primed surfaces contaminated with oil or grease shall be de-greased in a manner not affecting the quality of the primer. 2-component coatings older than six (6) months shall be roughened prior to the application of the next coat.

Application Procedure

The most commonly used methods of application are painting by brush, roller, pressure and airless spraying equipment. Selection of the application method depends on the surface to be painted. The quality of the paint shall in no way be negatively influenced.

For all paints the surface temperature of the metal shall not be higher than +50°C during the painting. Concerning special paints, the requirements set by the paint manufacturer shall be followed. All painting shall be free of cracks and blisters and all runs shall be brushed out immediately. After application of the last coat the paint system shall be free of pores.

Parts, which are embedded in concrete, shall be painted with cement base paints.

COATING

General

Unless otherwise specified, and insofar as possible, supply shall be shop painted according to the following specifications. Only touch-ups shall be done on site. The paint manufacturer's recommendations shall be followed for film thickness, drying time, application method moisture, temperature and other parameters. These recommendations shall be transmitted to Customer for approval, before the start of the application of coating.

After painting, surfaces shall be protected from cold, moisture, dirt or new paint until they are completely dry.

For every planned field weld, an area 50 mm on either side of the weld shall not be painted. After the weld, the surface to be painted shall be considered a touch-up.

Unless otherwise specified, surface preparation shall be SSPC-SP6 "Commercial blast cleaning". Every surface preparation shall be inspected before painting and an inspection report shall be given to the Owner. SSPC Standards are published by the Society for Protective Coatings.

All surfaces destined to be embedded in concrete shall not be surface prepared or painted.

There are no particular paint requirements for mass-produced standard components such as instruments, panels, cubicles, etc. However, exposed plain steel surfaces of these parts shall be supplied painted by the manufacturer, at the very least.

The protective coating shall be guaranteed with respect to materials and workmanship. This guarantee covers, among other things, the separation between the base and the coating.

Care shall be taken to protect workers against fumes and irritants, with the use of proper ventilation, masks, protective clothing, as specified in the respective MSDS instructions. The personnel assigned to the preparation of surfaces and application of paint shall be qualified for and experienced in this type of work, and be directed by an experienced supervisor.

Approximately 5% extra paint shall be provided to the Owner in sealed containers once the work is completed, for additional touch-ups at later times.

3.14.3 Requirements for Specific Components

- Piping:
Carbon steel piping, including any interface with stainless steel, shall be painted with two coats of alkyd paint.
- Steel surfaces designed for permanent contact with water:
Unless otherwise specified, two coats of polyamine epoxy paint shall be applied within four hours of SSPC-SP10 near white blast cleaning.
- Machined surfaces designed for contact (i.e. flanges or seal surfaces):
No surface preparation and no paint shall be applied. However, surfaces shall be cleaned according to SSPC-SP1 "Solvent cleaning" and protected for shipping using an appropriate surface protector such as Cosmoline or Rustveto.
- Other steel surfaces, except for embedded surfaces:
One coat of zinc rich primer and one coat of alkyd paint.

3.14.4 Touch-up Paint

Contractor shall touch-up all surfaces that have been burned, dented, welded, deeply scratched or have been damaged in any other way during site installation.

The surface preparation for the touch-ups shall be done according to SSPCSP3 "Power Tool Cleaning". All touch-ups shall be done with the original paint system and thicknesses shall be as specified by the paint manufacturer. The paint shall be inspected after any touch-ups and touched-up again if necessary

3.14.5 Colors

Unless otherwise specified, colors of the finishing coat shall be as below:

Control panels	:	Grey (as per manufacturer's standard)
Oil components	:	Orange
Water piping	:	Sky Blue
Fire protection	:	Red
Compressed air	:	Yellow/Green

Galvanising

Unless otherwise specified, all fasteners and steel structures including ladders, platforms, hand rails and the like and all exterior and interior steel surfaces of outdoor Works shall be hot-dip galvanized or electrolytically galvanized.

For galvanizing, only original blast furnace raw zinc shall be applied, which shall have a purity of 98.5%.

The thickness of the zinc coat shall be:

For bolts and nuts of sizes above M36 approx. 60 micrometer and for sizes below M36, 25 micrometer.

- For all other parts, except for hydraulic steel structures or parts intermittently or permanently submerged in water, approx. 50 micrometer
- For hydraulic steel structures or parts intermittently or permanently submerged in water, approx. 100 micrometer.
- Cleaning: All material to be galvanized shall be cleaned carefully of rust, loose scale, dirt, oil, grease, and other foreign matters. Particular care shall be taken to clean slag from welded areas.
- Galvanising of hardware: Bolts, nuts, washers, locknuts and similar hardware shall be galvanised in accordance with the relevant standards.
- Straightening after galvanising: All plates and shapes, which have been warped by the galvanising process, shall be straightened by being re-rolled or pressed without injury to the protective coating. Materials that have been harmfully bent or warped in the process of fabrication or galvanising shall be rejected.

3.15 MANUFACTURER'S NAMEPLATES

- Each important part to be delivered under this Contract shall be equipped with permanent nameplate in readily visible locations. The nameplates shall be protected during erection and especially during painting.
- The following data shall be shown in accordance with the relevant standards:
 - Manufacturer's name
 - Work's serial number and year of manufacture - Main design data.As a general rule, standardised components, such as small or medium-sized electric motors, transformers, instruments, etc., may be delivered with the original manufacturer's standard nameplate.
- Items such as valves, which are subject to handling, shall be provided with an engraved chromium plated brass name plate or label with engraving filled with enamel.
- Nameplates or labels for outdoor equipment are to be of non-corrodible non-hygroscope material with lettering of a contrasting colour. Labels for indoor equipments shall be engraved with black letters on white traffolyte.
- The wording of all labels shall be to the approval of the Customer prior to the shipment of the plant or equipment.

3.16 TECHNICAL WORKS AND STEEL STRUCTURES

General:

All mechanical Works and steel structures of any mechanical or electrical installation shall comply with this General Technical Specification.

3.16.1 Bolts, Screws, Nuts, etc.

- All bolts, studs, screws, nuts, and washers shall be to the ISO metric system. Mild steel bolts and nuts shall be of the precision cold forged or hot forged type with machined faces parallel to one another.
- All parts, other than structural steel work, bolted together, shall be spot faced on the back to ensure that nuts and bolt heads bed down satisfactorily. Mild steel nuts and bolts shall be zinc or cadmium plated. Stainless steel bolts, nuts, washers and screws shall be used for holding renewable parts in water or when exposed to high humidity.
- All bolts or studs which will be subject to high stress and/or temperature shall be of approved high tensile material with nuts of approved material. All bolts and studs larger than M60 shall be drilled for heaters or shall have an extension for pretensioning by hydraulic tools.
- Fitted bolts shall be a driving fit in the reamed holes they occupy, shall have the screwed portion of a diameter such that it will not be damaged in driving and shall be marked in a conspicuous position to ensure correct assembly at Site.
- The Contractor shall supply the net quantities plus 5 percent of all permanent bolts, screws and other similar items and materials required for installation at the Site. Any such rivets, bolts, screws, etc., which are surplus after the installation of the Works has been completed shall become spare parts and shall be wrapped, marked and handed over to the Owner.

3.16.2 Seals

- Rubber Seals: Seals shall be designed and mounted in such a manner that they are adjustable, water tight and shall be readily removed and replaced. Seals shall be moulded type and not extruded.
- All adjusting screws and bolts for securing the seals and seal assembly in place shall be of stainless steel.
- Seals shall be made of synthetic rubber suitable for conditions at the Site and shall be of a material that has proven successful in similar applications. Joints shall be water/oil tight.

3.16.3 Drives

- All moving parts of machinery including shafts, couplings, collars, projecting key heads, rope/belt-drives shall be completely guarded to provide full protection. All setscrews on revolving shafts shall be countersunk or suitably protected. All guards shall be arranged so that they can be removed without disturbing the main parts, which they protect.
- All bearings shall be mounted in dust-proof housings. Base of bearing supports shall be machined, and shall rest on machined-surfaces.

3.16.4 Oils and Lubricants

Efficient means of lubrication, suitable for use under Site conditions, shall be provided for all moving parts.

- All different types of oils, lubricants, etc., shall be subject to the written approval of the Customer.

- Unless otherwise stated in the Particular Technical Specifications, the first oil or grease filling for bearings, pressure oil systems, transformers, etc., including the necessary quantity for flushing and for the first oil change shall be included in the Tender Price.

3.17 Miscellaneous Metal work

- Except where otherwise indicated elsewhere in the Particular Technical Specifications, the Contractor shall supply the following:
 - All platforms, ladders, guards, handrails of tubular construction and hatch covers necessary for easy and safe access to Works
 - Safety guards at each point where normal access provision would permit personnel to come within reach of any moving equipment to be provided under the Contract.
- All covers for pipe, cable trenches and access hatches, required for completing the floors around and over the equipment supplied under the Contract will be supplied and installed. Unless otherwise approved, floor plates shall be of an angular pattern.

3.18 ELECTRICAL WORKS

3.18.1 General

- The electrical items of Works of any electrical or mechanical installation to be provided under this Contract according to the Particular Technical Specifications shall - if not stated otherwise therein-fulfill the requirements of this Section.
- All components shall be of an approved and reliable design. The highest extent of uniformity and interchangeability shall be reached. The design shall facilitate maintenance and repair of the components.
- The Works shall be pre-assembled to the highest possible extent in the Contractor or Sub-Contractor's workshop, complete with all devices and wired up to common terminal blocks.
- The power supply and control cables shall be laid up to these common terminal blocks. The required control and protection devices, instruments, etc., within the different scopes of work shall be supplied and connected by the relevant Contractor.
- Unless otherwise agreed, ratings of main electrical Works (in feeds, bus-ties) as selected or proposed by the Contractor, whether originally specified or not, shall generally include a safety margin of 10% under consideration of the worst case to be met in service. Prior to approval of such basic characteristics, the Contractor shall submit all relevant information such as consumer lists, short circuit calculations, de-rating factors, etc.
- Short-circuit calculations shall be evaluated giving full evidence that every electrical component can withstand the maximum stresses under fault conditions, for fault levels and durations obtained under the worst conditions, e.g., upon failure of the corresponding main protection device and time delayed fault clearing by the backup protection device.

- All Works shall be suitable for the prevailing climatic conditions.
- The Contractor shall ensure that all the supplied Works is insensitive to any signals emitted by wireless communication equipment.

3.18.2 Clearances

The layout of the Equipment on the site shall provide for ready access for operation and maintenance whilst the remaining sections of Equipment are alive. Working clearance provided between isolated Equipment and nearest live metal work shall be as per Indian Electricity rules & Standards.

3.18.3 Electrical Supplies for Auxiliary Equipment

The electricity supplies available for auxiliary Equipment will be:

- 415 V, 3-phase 50Hz, 4-wire for power
- 220 V, single phase, 50 Hz for lighting, indication, and anti-condensation heaters.
- 220 V D.C. for essential indication, controls, protection, alarms and circuit breaker closing and tripping supplies.
- 48 V D.C for PLCC and 24 V D.C for SCADA System.

3.18.4 Alternating Current Supply Practice

- All mains supplies shall be switched and fuse in accordance with the requirements stated in the appropriate Section. Double-pole switches shall be used to break single-phase A.C. mains supplies.
- For multi-phase supplies, each phase shall be switched simultaneously and the neutral should preferably not be switched. If it is switched, it shall be opened after and closed before the phase-lines.
- All mains circuits shall be protected only in the phase-lines by fuses of suitable rating or by other suitably protective devices. The neutral shall be connected by a removable link located near the protective devices.
- All mains transformers shall have an electrostatic screen which shall be earthed.
- Except where the prior approval of the Customer is obtained, wires external to the equipment shall be coloured in accordance with the current IEC or relevant IS recommendation.

3.18.5 Direct Current Supply Practice

- It shall be possible to remove/replace cards from / to electronic equipment without damage and without interfering with the operation of the rest of the equipment or system; if necessary consideration should be given to switching off the supplies locally to a card to prevent inadvertent interference to the equipment or system during removing/replacing a card.
- Application of battery or earth via a test lamp to any external interface point or test point shall not lead to any component damage.

- Power supply bus bars in cubicles shall be carefully routed and each bus bar shall be shrouded. It shall not be possible to inadvertently short bus bars either between themselves or to earth.

3.18.6 Electric Motors

General

- All motors shall be of approved manufacture high starting torque and shall comply - as far as applicable - with ISI standard motor dimensions.
- The general construction shall be stiff and rigid; no light metal alloy casings will be accepted. All precautions shall be taken to avoid any type of corrosion.
- All motors shall be fitted with approved types of lifting hooks or eyebolts as suitable.
- AC motors shall have squirrel cage type rotors. Motor Voltages and Power Ratings
- The service voltages and corresponding power ratings for electric motors to be used in the Project shall be as follows:
 - - Motors up to 100 kW
 Service voltage: 3-phase AC 415/240 V, 50 HZ
 Mode of starting : direct-on-line up
 - - Motors up to 0.75 kW
 Service voltage : single-phase AC 240 V, 50 HZ
 Mode of starting : condenser
 - - Motors intended to work on the DC System - Service voltage: 220 V D.C.
 Mode of starting: resistor

Rating

- The rating of the motors shall be adequate to meet the requirements of its associated equipment. The service factor, being the ratio of the installed motor output to the required power at the shaft of the driven machine at its expected maximum power demand, shall be applied as follows:

<u>Power Demand of Driven Machine</u>	<u>Service Factor</u>
Up to 5 kW	1.2
More than 5 kW	1.1

- A.C. motors shall be capable of operating continuously under rated output conditions at any frequency between 95% and 105% of the rated frequency and/or with any voltage variation between 90% and 110% of the nominal voltage. A transient over voltage of 130% of the nominal voltage shall as well be sustained.
- Further, the motors shall be capable of maintaining stable operation when running at 70% nominal voltage for a period of 10 seconds. The pullout torque for continuously loaded motors shall be at least 160% of the rated torque and for intermittently loaded motors 200% of the rated torque.

- D.C. motors shall be capable of operating continuously under rated output conditions at any voltage between 90% and 110% of the nominal voltage with a fixed brush setting for all loads. Unless otherwise approved, the speed drop between no-load and full-load shall not exceed 10% of no-load speed.

Starting

- A.C. motors shall be designed for direct on-line starting. They shall be capable of being switched on without damage to an infinite bus bar at 110% of the nominal voltage with an inherent residual voltage of 100% even in phase opposition. For starting the motors from the individual main and auxiliary bus bars, a momentary voltage drop of 20% referred to nominal voltage should be taken into consideration. With 85% of the nominal voltage applied to the motor terminals, each motor shall be capable of accelerating its associated load to full speed with a minimum accelerating torque of 5% of full load torque.
- The maximum starting currents (without any tolerance) shall not exceed the following values:
 - 5 times of rated current for L.V. motors rated 100 kW or above
 - 2 times of rated current for D.C. motors (by means of starting resistors)
- Generally, all motors shall be able to withstand five cold starts per hour, equally spaced. In addition, each M.V. motor shall be capable of enduring two successive starts with the motor initially at operating temperature. Each L.V. motor shall be capable of withstanding three successive starts under the same conditions or once every fifteen minutes without detrimental heating.
- Motors for frequent automatic starting shall have an adequate rating. In the motor list the Contractor shall state the frequency of starts permitted in compliance with the motor design.

Insulation Class

- The insulation of all motors shall be of class F but maintain in operation the temperature limits of class B materials. It shall be suitable for operation in damp locations, for occasional contact with corrosive gases and vapours and for considerable fluctuations in temperature.

Ventilation and Type of Enclosure

- All motors shall be of the totally enclosed fan-cooled type, protection class IP 54 according to IEC Recommendation 141. Cable termination points shall be of class IP55.
- They shall have a closed internal cooling air circuit re-cooled by an external cooling air circuit drawn from the opposite side of the driving end.
- Vertical motors shall be provided with a top cover to prevent the ingress of dirt, etc.

Bearings

- As far as possible, the motors shall have sealed ball or roller bearings lubricated for life. All other motors with ratings of about 1 kW and above shall be equipped with lubricators permitting greasing while the motor is running and preventing over lubrication. Additionally, the bearings shall be fitted with: grease nipples permitting the use of a universal grease gun.
- Vertical motors shall have approved thrust bearings.

Terminal Boxes and Earthing

- The terminal leads, terminals, terminal boxes and associated equipment shall be suitable for terminating the respective type of cables as specified in these General Technical Specifications and in the Particular Technical Specifications.
- The terminal boxes shall be of ample size to enable connections to be made in a satisfactory manner. Supports shall be provided at terminal boxes as required for proper guidance and fixing of the incoming cable.
- The terminal boxes with the cables installed shall be suitable for connection to supply systems with the short-circuit current and the fault clearance time determined by the motor protective devices.
- A permanently attached connection diagram shall be mounted inside the terminal box cover. If motors are provided for only one direction of rotation, this shall be clearly indicated.
- For earthing purposes, each motor shall have adequately sized bolts with washers at the lower part of the frame. In addition, each terminal box shall contain one earthing screw. Each equipment/panel shall be earthed by at least two separate earthing strips.

Noise-Level and Vibrations

- Under all operating conditions, the noise level of motors shall not exceed 85 dB (A).
- In order to prevent undue and harmful vibrations, all motors shall be statically and dynamically balanced.

Tests

- Each motor shall be factory tested and shall undergo a test at site. The following tests shall be performed under full responsibility of the Contractor.

Workshop Tests:

- Measurement of winding resistances
- No-load and short-circuit measurements
- Measurement of starting current and torque - Efficiency measurement (type test) - Heat test run
- Dielectric test
- Measurement of insulating resistance

3.18.7 Starters and Contactors

- Motor starters and contactors shall be equipped with short circuit protection and local disconnecting devices. Preferably, all starters shall be from one manufacturer. The control circuit voltage shall be obtained from a 415/240 V isolating transformer with primary circuit breaker and secondary fuse. The secondary winding of this transformer shall be grounded. The operating coils of the contactor shall be connected between the grounded side of the transformer and the control contacts.
- Starters and contactors shall comply with IEC 292.1 or NEMA IC 1 or relevant IS and be suitable for direct on-line starting, uninterrupted electrical duty, and capable of 30 operations per hour. They shall be installed in ventilated enclosures for indoor installation and weatherproof enclosures for outdoor installation, unless otherwise approved by the Customer. The enclosures shall be complete with locks, cable sealing boxes, conduit entries, cable gland plates, bus bars, internal wiring, terminal boards, etc as required by the duty of the starter or contactor.
- Starters and contactors shall be of minimum size compatible with motor size and capable of satisfactory operation, without damage, for a period of 5 minutes at a voltage 25 percent below nominal, at nominal frequency.
- Thermal type overload and phase failure relays shall be supplied with starters for motors of 7.5 kW or greater. For motors of less than 7.5 kW, suitable rated 3-phase thermal overloads will be acceptable. Ammeters to read current in one phase shall be provided for motors above 7.5 kW.
- Each starter shall have sufficient number of auxiliary contacts required for interlocking and indication purposes plus two spare convertible contacts for Owner's use.

3.18.8 Moulded Case Circuit Breakers

- All moulded case circuit breakers shall be of 2 or 3-pole type as required, having thermal time delay and instantaneous trips with "OnTrip-Off", indicating/operating mechanism. Circuit breakers used in combination type motor starters or contactors shall have the operating mechanisms interlocked with the starter or contactor cover so that the cover cannot be opened unless the circuit breaker is open. The breakers shall comply with applicable section of IEC 15 7/1 or relevant Indian Standards.

3.18.9 Control Relays

- Relays used as auxiliary control devices in conjunction with motor starters and magnetic contactors shall be of the type designed for machine tool application featuring contact convertibility. All contacts shall have a minimum thermal current rating of 10A over a range of 6 to 600 V AC.

3.18.10 Terminal Blocks

- All terminal blocks shall be mounted in an accessible position with the spacing between adjacent blocks not less than 100 mm and space between the bottom blocks and the cable gland plate being a minimum of 200 mm. sufficient terminals shall be provided to allow for the connection of all incoming and outgoing cables, including

spare conductors and drain wires. In addition, 20 percent spare terminals shall be provided. In enclosed cubicles, the terminal blocks shall be inclined toward the door for facilitating terminations.

- Terminals shall be of the channel mounting type and shall comprise a system of individual terminals so that terminal blocks can be formed for easy and convenient cabling consistent with the high reliability required of the circuits.
- Terminal blocks shall be provided with shorting links and paralleling links where applicable and mounting identification numbers and/or letters.
- Terminal blocks shall conform to the applicable standards. The smallest size to be used shall be designated for 2.5 Sq mm FRLS wire and not more than two conductors shall be connected under one terminal clamp.
- Terminal identification shall be provided corresponding to wire number of connected leads.
- Circuit terminals for 415 V AC shall be segregated from other terminals and shall be equipped with non-inflammable, transparent covers to prevent contact with live parts. Warning labels with red lettering shall be mounted thereon in a conspicuous position.

3.18.11 Equipment Wiring

- All wiring connections shall be readily accessible and removable for test or other purposes. Wiring between terminals of the various devices shall be point to point.
- Multi-conductor cables shall be connected to the terminal blocks in such a manner as to minimise crossovers. Approved claw washers of crimp type connector shall be used to terminate all small wiring. Each conductor shall be individually identified at both ends through a system providing ready and permanent identification, utilizing slip-on ferrules approved by the Customer.
- Markers may be typed individually or made up from sets of numbers and letters firmly held in place. Open markers will not be accepted.
- Markers must withstand a tropical environment and high humidity and only fungus proof materials will be accepted. Ferrules of adhesive type are not acceptable.
- All trip circuits shall employ markers having a red background.

3.18.12 Cubicles and Control Panels

Cubicles and control panel enclosures shall be of sheet steel with minimum thickness of 2.5 mm, of rigid, self-supporting construction and supplied with channel bases.

- Cubicles shall be fitted with close fitting, gasketed, hinged, lift-off doors capable of being opened through 180 deg. The doors shall be provided with integral lock and master key.

- Cubicles and panels shall be vermin proof. Removable gland plates shall be supplied and located to provide adequate working clearance for the termination of cables. The cables and wiring shall enter from bottom or top as approved or directed by the Customer.
- The cubicles and panels shall be adequately ventilated, if required, by vents or louvers. All ventilating openings shall be provided with corrosion-resistant metal screens or a suitable filter to prevent entrance of insects or vermin. Space heating elements with thermostatic control shall be included in each panel.
- Where cubicles are split between panels for shipping, terminal blocks shall be provided on each side of the split with all necessary cable extensions across the splits. These cable extensions shall be confined within the panels with suitable internal cable ducts.
- Unless stated otherwise, all cubicles and panels shall be provided with a ground bus with 40mm copper bar extending throughout the length. Each end of this bus shall be drilled and provided with lugs for connecting ground cables ranging from 70 to 120mm².
- All instruments, control knobs and indicating lamps shall be flush mounted on the panels. Relays and other devices sensitive to vibration shall not be installed on doors or hinged panels, and no equipment shall be installed on rear access doors.
- The instrument and control wiring, including all electrical interlocks and all interconnecting wiring between sections, shall be completely installed and connected to terminal blocks by the manufacturer.
- The arrangement of control and protection devices on the panels and the exterior finish of the panels shall be subject to the approval of the Customer. The interior of all cubicles and panels shall have a mat white finish unless specified otherwise.
- Switched interior light and socket outlets shall be provided for all cubicles and control panels.
- All cubicles and control panels shall be provided with nameplates, identifying the purpose of the panel and all of its components.

3.18.13 Earthing

- Provision shall be made for earthing all equipment intended for connection in an A.C. mains supply. All structural metal work and metal chassis shall be connected to earth. Connection between circuits and metal work shall only be made for reasons of safety and/or reduction of interference. Where such connections are made, they shall not be used as normal current-carrying earth returns.
- Earthing conductors shall be at least equal in cross-sectional area to the supply conductors and shall be capable of carrying the fault current.

3.18.14 Labels and Plates

- Labels and data plates shall be provided in accordance with applicable standards and as detailed hereunder.
- The proposed material of the labels, size, exact label lettering and proposals for the arrangement of the labels shall be submitted to the Customer for approval.
- Labels written in the Contract language shall be provided for all instruments, relays, control switches, push buttons, indication lights, breakers, etc. In case of instruments, instrument switches and control switches, where the function is indicated on the device, no label is required. The label shall be fixed close to the devices in such a way that easy identification is possible.
- Each separate construction unit (cubicle, panel, desk, box, etc.) shall be identified. Cubicles and similar units shall also bear this identification number on the rear side if rear access is possible. The overall designation of each unit shall be given in the Contract language and - if required - also in a selected local language. These labels shall be made of anodised aluminium with black engraved inscriptions, arranged at the top section of the units. Manufacturer's trade labels shall - if desired - appear in the bottom section of the units.
- All Works inside cubicles, panels, boxes, etc., shall be properly labelled with their item number. This number shall be the same as indicated in the pertaining documents (wiring diagrams, Works list, etc.).
- Instruction plates in the Contract and selected local language, the sequence diagrams or instructions for maintenance shall be fitted on the inside of the front door of the electrical switchboards.

3.18.15 Warning Labels

- Warning labels shall be made of synthetic resin with letters engraved in the Contract and selected local language, where required in particular cases.
- For indoor circuit breakers, starters, etc., transparent plastic material with suitably contrasting colours and engraved lettering would be acceptable.

3.18.16 Labels For Cables

- Each cable when completely installed shall have permanently attached to each end and at intermediate positions as may be considered necessary by the Customer, noncorrosive labels detailing identification number of the cable, voltage, and conductor size.
- The cable identification numbers shall comply with those of the cable list.
- All cables in cable pits and at the entry to buildings shall be labelled utilising the aforementioned type of label.

3.18.17 Single-Line Diagrams

- Each switchgear room shall be furnished with a copy of the final as built single-line diagram detailing all electrical data and denominations, separate for each individual switchgear / distribution board / MCC, placed under glass and frame/wall mounted at an approved location.
- The same applies to the Station Single-Line Diagram one copy of which shall be arranged in the control room(s).

3.18.18 Key System for Electric Boards

- Key interlocked switches shall be provided with approved locks for locking in the neutral position. Similar locks shall be provided for selector switches for locking the switches in any of the positions.
- The locks or padlocks shall be co-ordinated for the different applications and shall be supplied with three keys. The cabinet door keys shall be similar and shall be six (6) in number.

3.19 INSTRUMENTATION AND CONTROL EQUIPMENT DESIGN CRITERIA

- All components shall be of an approved and reliable design. The highest extent of uniformity and interchangeability shall be reached. The design shall facilitate maintenance and repair of the components.
- The Works shall be pre-assembled to the highest extent in the Contractor's or SubContractor's workshop, e.g., shop welding of thermometer wells and other connections, wiring of boards, desks, etc., including internal wiring and installation of devices shall be carried out. Fragile instruments shall be removed for transportation to site.
- All components shall be suitable for continuous operation under site conditions.
- Materials for instrumentation and control equipment, including piping material, which are exposed to the measured media, shall be selected accordingly.
- All components shall be compatible with other electrical, electronic and mechanical Works.
- All instrumentation and control functions shall be shown on the piping and instrumentation diagrams. The symbols to be used shall be in accordance with ISO standard. The identification system (tag numbers) shall be in accordance with the Works identification system and is subject to approval by the Customer. All measurements and alarms shall be listed in a measuring list of a standard form subject to Approval by the Customer. For remote controls, a schedule of interlocks shall be provided. The features of automatic controls shall be shown in block diagrams.
- Shielded cables shall be provided for the control and supervisory equipment where required.

Sizes of Indicators, Recorders, Etc.

- The meters, instruments and recorders shall be of standard size, to be selected to guarantee unique appearance of switchgears, control panels, control desks, etc. The front glasses shall be of the anti-glare type. The scales shall be 90 degrees' type for local control panels but must be 240 degrees' type for control room instrumentation.

Tests

- The single components and pre-erected assemblies shall undergo functional and routine tests in the Contractor or Sub-Contractor's workshop. The ready mounted control and supervisory system shall undergo functional tests on Site prior to commissioning of the power Works.
- Calibration tests shall be made on all-important pressure gauges and other instruments as required by the Customer.

Measuring Systems

- Electric measuring signals of 4-20 mA shall be transmitted to the control room for essential or regulating circuits. In this case the absence of live zero signal shall lead to a warning signal. Measuring signals for indicating purposes will be 4-20 mA.
- The components shall quickly respond to any changes of the measured magnitudes. Measuring ranges of indicators, transducers, etc. shall be selected in such a way that the rated value of the measured magnitude covers approx. 75% of the range.
- All local instruments shall, as far as practicable, be mounted vibration free to allow good reading. Wherever required, damping elements shall be used.
- Corresponding systems shall be grouped together in local panels.
- The binary sensors shall be fused separately and supplied with 24 V D.C.

3.19.1 Temperature Measurement

- Resistance thermometers and thermocouples shall be equipped with waterproof connection heads. The temperature sensors shall be selected in such a way to minimise the number of different spare inserts.
- Resistance thermometers shall be used as far as possible and shall generally be of type Pt 100.
- The use of dial-type contact thermometers shall be restricted to bearing metal and oil temperature measuring.

3.19.2 Pressure Measurements

- Pressure gauges shall be shock and vibration-proof (preferably by filling with glycerine) and shall be equipped with toothed wheels and toothed segments of the machined type. They shall completely be made of stainless steel.
- The error for pressure transmitters shall be limited to $\pm 0.5\%$.
- Each gauge, pressure switch and transmitter for absolute or differential pressure shall be equipped with a pressure gauge isolating valve including a test connection of the screwed type M20 x 1.7 mm so that such device can be removed without any disturbance of the plant operation.
- If the pressure is pulsating, the devices concerned shall be connected via flexible tubes or other pulse-absorbing means.
- The adjustment of the pointer shall be possible by means of an adjustment device without removing the pointer from its axle.
- All casings shall be dust and watertight and be made of stainless steel.

3.19.3 Level Measurements

The liquid level measurements in reservoirs and tanks with atmospheric pressure shall be made by means of displacement-type transmitters, float-disc-transmitters or capacitance measurement type. The errors shall not exceed $\pm 1.0\%$ of the total measuring range. Level switches shall be of the externally mounted float or displacement operated type.

3.19.4 Electrical Measurements

- All Electrical instruments shall be of flush mounted design, dust and moisture-proof. A.C. ammeters and voltmeters shall have digital type system of not less than 1.7 accuracy class for connection to the secondary side of instrument transformers. D.C. measuring instruments shall have digital type systems of the same accuracy. The energy meters shall be digital /load analyser type. Wattmeters/energy meters shall have electro-dynamic measuring mechanisms if fed by transmitters. Wattmeters shall be suitable for unbalanced systems and accuracy of energy meters should be of 0.2 % accuracy class.
- All indicating instruments shall generally withstand without damage a continuous overload of 20% referred to the rated output value of the corresponding instrument transformers. Ammeters shall not be damaged by fault-currents within the rating and fault duration time of the associated switchgear via the primaries of their corresponding instrument transformers.
- All instruments and apparatus shall be capable of carrying their full load currents without undue heating. All instruments and apparatus shall be rear connected, and the enclosures shall be earthed. Means shall be provided for zero adjustment of instruments without dismantling.

- When more than one measured value is indicated on the same instrument, a measuring point selector switch shall be provided next to the instrument and shall be engraved with a legend specifying each selected measuring point.
- Scales shall be arranged in such a way that the normal working indication is between 50-75% of full scale reading permitting an accurate reading. CT connected Ammeters provided for indication of motor currents shall be provided with suppressed overload scales of 2 times full scale. The dials of such ammeters shall include a red mark to indicate the full load current of the motor.
- All instruments mounted on the same panel shall be of same style and appearance.
- All metering circuits shall be terminated in marked terminal blocks for remote metering purposes.

3.19.5 Position Measurements

Position transmitters for continuous position indication and measuring transducers shall have an output current of 4-20 mA and aux. supply voltage (if required) 48 V D.C.

3.19.6 Limit Switches

- Limit switches shall be mounted suitable for easy adjustment and for rigidly locking in position after being adjusted. They shall be of heavy-duty rating and have two changeover contacts suitable for 220 V D.C. operations.
- Switch fixings shall be positive and shall be unaffected by vibration. At the same time, they should be capable of easy adjustment to suit changing parameters of the associated plant.
- Particular attention shall be paid to potentially harmful environmental conditions, including water, oil, dust, dirt, temperature variations and differential expansions.

3.19.7 Contact Devices

Contacts of level switches, pressure switches, temperature switches, limit switches, and of all other devices shall be of the snap action type (SPDT). Contact devices for interlocking systems shall be separate, i.e., contact devices serving commonly for interlocking and other purposes will not be accepted.

3.19.8 Protection Systems

- Electrical/Mechanical Protection and Interlocking Systems shall be provided for all works components and individual systems to ensure a safe and reliable operation and to limit harm and damage to personnel and works to an utmost extent.
- The primary functions of these facilities shall be to disconnect selectively faulty sections of the systems prior to influence or damage to other works and to maintain operative systems as far as possible.

- Moreover, these devices shall facilitate the duty of the operation staff and prevent maloperation.

3.20 INSPECTIONS AND TESTS

3.20.1 General

- Approval of assemblies, tests, inspections, related procedures etc. and acceptance of pertinent test and inspection certificates, or waiving of inspections or tests, shall in no way relieve the Contractor of his contractual obligations for finishing the Works in accordance with the provisions of the Specifications.
- Three (3) sets of all test records, test certificates, performance curves, tables etc. of all inspections and tests, whether or not attended by the Customer shall be supplied after each inspection or test. After completion of all testing two (2) sets of the above mentioned documents shall be supplied properly bound in books:
- All test certificates shall be endorsed with sufficient information for identification of the equipment and material to which the certificates refer.
- In addition, the following references shall be entered in the top righthand corner:
 - Owner's name
 - Project title
 - Plant's (stage's) name
 - Number of Contractor's drawing
 - Date

3.20.2 Workshop Inspections And Test

- As far as practicable, quality of materials, workmanship and performance of all items of the Works to be furnished under this Contract shall be inspected at the places of manufacture.
- Where the Contractor desires to use stock material, not manufactured specifically for the Works, satisfactory evidence that such material conforms to the requirements of the Contract shall be submitted.
- Free and unrestricted access to the Contractor's factory and shops (including those of his Subcontractors) shall be granted to the Customer also and upon reasonable notice by the Customer if deemed necessary by the same for additional witnessing of assembly work or inspections and tests.

3.20.3 Material Tests

Unless otherwise specified, the quality of materials shall be verified generally by: -

- Chemical analysis
- Mechanical tests (yield point, tensile strength, elongation, and notch impact.)

- Welding tests (welding procedure, welding material, welding tensile strength, welding bend test, welding reversed bend test, etc.)
- Non-destructive x-rays, ultrasonic, magnetic particle, liquid tests, penetration inspection, etc.).
- Electrical tests (voltage, losses, tan delta, insulation, magnetic properties etc.)
- Certified mill test reports of plates will be acceptable when these comply with the requirement of specifications. Test specimen and samples for analysis shall be plainly marked to indicate the materials they represent.
- Castings and forgings shall be tested in the rough state in order to detect flaws in good time thus avoiding delays. Magnetic particle inspection of important castings shall cover the whole surface of the casting. After partial machining further tests can be conducted.
- Load tests on crane hooks, steel wire ropes, chains and other lifting devices, etc. shall be considered as material tests.

3.20.4 Checking Of Dimensions

- The dimensions, especially clearances and fits, (ISO 286) which are essential for operation and efficiency shall be carefully checked in an approved manner, as for example:
 - run out and roundness tolerances of shafts, pistons, etc., to be measured on single parts,
 - fits and clearances of bearings, servomotor pistons, valves, guiding, distributing and actual actuating elements, etc., - Accuracy, surface roughness and shape of sliding and guiding surfaces of seals, bearings, water passages in hydraulic machinery, valves, etc.,
 - Dimensions of couplings or connections for assembly with other deliveries from the Contractor, Sub-contractors or other contractors.

3.20.5 Workshop Assembly

- In addition to the quality and production control tests, the following shop assembly work and tests shall be made to check measurements, fitting and functioning.
- Works to be furnished shall be shop assembled to a status sufficient to prove that the design and workmanship have been executed in accordance with the Specifications, that the delivery is complete, and that no work remains to be done at Site, which reasonably can or should be done in the shop.
- Where applicable, each item of the Works shall be assembled completely prior to painting.
- Field joints shall be temporarily connected. All parts shall be properly matched marked, identified and doweled where practicable, to facilitate correct and quick field assembly and alignment. Where necessary, suitable dowels shall be provided for insertion after field assembly and drilling. The holes for any fitted bolt shall be accurately reamed.

- During workshop assembly all instruments, control devices and piping shall be fitted. If the assembly shows defects in the design or manufacture or unforeseen difficulties in assembling and dismantling, these shall be eliminated. If required, design alterations or corrective measures can be executed provided that reliability of operation or interchangeability are not reduced and provided that the agreement of the Customer has been obtained.
- If the corrections cannot be carried out in accordance with the terms mentioned above, the components concerned will be rejected. The decision on possible subsequent corrections is reserved exclusively to the Customer. Faulty parts or Works shall by no means be delivered. The assembled parts shall subsequently be subject to tests as per applicable standards or required by the Customer.

3.20.6 Pressure And Leakage Tests

- All parts subject to internal or external pressure or containing any liquids or gases temporarily or permanently during operation shall be tested prior to painting.
- In addition to the Specifications, the applicable and approved standards and official regulations shall be observed. If any liquid is used for the test that may cause corrosion, all Works and piping shall be thoroughly cleaned immediately after the test.
- Leaks and defects can be repaired if permitted by the applicable standards and approved by the Customer. If defects are found, the Customer may reject the defective parts, or permit welding repairs with stress relieving, radiographic examination and additional pressure tests.

3.20.7 Parts Exposed To Hydraulic Pressure

- Unless otherwise specified or required, the following shall apply: the hydraulic pressure tests shall be carried out using the liquid to be used during operation or a liquid with less viscosity.
- The hydraulic test pressure shall be 1.7 times the maximum operating pressure and shall be maintained for a period of 30 minutes Afterwards the test pressure shall be reduced to the operating pressure.

3.20.8 Functional Tests

Functional tests shall be defined as tests of the function of assemblies, sub-assemblies or parts of the Works under no load conditions. Functional tests shall be performed on all Works prior to the execution of operational tests.

3.20.9 Operational Tests

- As far as practicable operational test shall be carried out on all Works, simulating operating conditions.

- Parts to be delivered by sub-Contractors shall be tested either at the premises of the sub-Contractor or of the Contractor, as agreed by the Customer.
- Testing of the electrical Works shall be performed in accordance with applicable Standards; they shall include but not be limited to tests of heating, loading, overloading, and losses.
- Operational tests of lifting equipment and other machinery shall include tests under nominal load and 125 % of nominal load unless otherwise specified.

3.20.10 Electric Tests

Electrical Works shall be tested in accordance with applicable Standards and agreed test programs and procedures.

3.20.11 Type Tests

Type tests for certain parts of the work or Works shall be carried out as specified or agreed between Contractor and Customer.

3.21 LIST OF APPLICABLE STANDARDS

The design, manufacture and performance of equipment covered by this specification shall conform to the relevant Indian Standards and Codes. Where Indian Standards are not available they shall conform to relevant IEC and ANSI/IEEE Standards.

S.No.	DESCRIPTION		INDIAN
1.	Electrical and instrumentation		
2.	Rotating electrical machines	IEC 34	IS:47221968
3.	Direct action indicating electrical measuring instruments	IEC 51	
4.	Paper-insulated metal-sheathed cables for rated voltages up to 18/30 kV	IEC 55	
5.	High voltage alternating current circuit breakers IEC 56	IS:25161980	
6.	Basic environmental testing procedures	IEC 68	
7.	Insulation co-ordination	IEC 71	
8.	Dimensions and output ratings for rotating electrical machines '	IEC 72	
9.	Colours for indicator lights and push buttons	IEC 73	
10.	Power Transformers	IEC 76	IS:2026
11.	Classification of materials for the insulation of electrical machinery	IEC 85	
12.	Primary Batteries	IEC 86 -	
13.	Lead Acid Starter Batteries	IEC 95	
14.	lightening Arrestors recommended graphic symbols	IEC 99	
15.	Alternating current disconnectors (isolator) and earthing switches	IEC 129	

16.	Bushings for alternating voltages above 1000 V.	IEC 137	
17.	Degrees of protection for low voltage switch gear and control gear	IEC 144	
18.	Low voltage switchgear and control gear	IEC 157	
19.	Low voltage control gear tests on indoor and outdoor post insulators for voltages greater than 1000 V.	IEC 168	
20.	Current transformers	IEC 185	IS:2705
21.	Voltage transformers	IEC 186	IS:3156
22.	Low frequency cables and wires with P.V.C. insulation and PVC sheath	IEC 189	
23.	On-load tap changers	IEC 214	
24.	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V.	IEC 227	
25.	Conductors for insulated cables	IEC 228	
26.	Impulse tests on cables and their accessories	IEC 230	
27.	Electrical relays	IEC 255	IS:32311965
28.	Low voltage fuses calculation of the continuous current rating of cables (100% load factor)	IEC 287	
29.	Low voltage motor starter	IEC 292	
30.	Specification for new insulating oil for transformers and switchgear	IEC 296	
31.	AC metal-enclosed switchgear and control gear for rated voltages above 1 kV up to and including 72.5 kV	IEC 298	
32.	Standard colours for insulation for low frequency cables and wires	IEC 304	
33.	Guide to the calculation of resistance of plain and coated copper conductors of low-frequency cables and wires.	IEC 344	
34.	Loading Guide for oil immersed transformers	IEC 354	
35.	Marking of insulated conductors	IEC 391	
36.	Report on synthetic testing of high voltage alternating current breakers.	IEC 427	
37.	Factory-build assemblies of low voltage Switchgear and control. gear	IEC 439	
38.	Identification of insulated and bare conductors by Colours	IEC 446	
39.	Standard directions of movement for actuators	IEC 447	
40.	which control the operation of electrical apparatus		
41.	Methods off measurement of radio equipment used in their mobile services	IEC 489	
42.	Extruded solid dielectric insulated power cables for rated voltages from 1 kV upto 30 kV	IEC 502	
43.	Class 0.5, 1 and 2 alternating current Watt-hour Meter	IEC 521	

44.	Test methods for insulations and sheaths of electric cables and cords	IEC 540	
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INDIAN STANDARDS

Sr.No.	IS:CODE	DESCRIPTION
1.	IS:4722-1968	Rotating electrical machines.
2.	IS:325-1978	Three phase induction motors
3.	IS:8789-19'18	Values of performance for three-phase induction motors
1.	IS:3156	Voltage transformers
5.	IS:L3156(Pt.I)-1978	General requirements
6.	IS:3156(Pt.II)-1978	Measuring voltage transformers
7.	IS:3156(Pt.III)-1978	Protective voltage transformers
8.	IS:3156(Pt.IV)-1978	Capacitor voltage transformers
9.	IS:2705	Current transformers
10.	IS:2705(Pt.I)-1981	General requirements
11.	IS:2705(Pt.II)-1981	Measuring current transformers
12.	IS:2705(Pt.III)-1981	Protective current transformer
13	IS:2704(Pt.N)-1981	Protective current transformers for special purpose applications
11.	IS:2026	Power transformers
15.	IS:2026(Pt.I)-1977	General
16.	IS:2026(Pt.II)-1977	Temperature-rise of Power transformers.
17.	IS:2026(Pt.III)-1981	insulation level-, and dielectric tests
18.	IS:2026(Pt.IV)-1977	Terminal markings, tappings and connection
19.	IS:335-1983	New insulating oils
20.	IS:3231-1965	Electrical relays for power system protections
21.	IS:3043-1966	Code of practice for earthing
22.	IS:1651-1979	Stationary cells and batteries lead-acid type with tubular positive plates)
23.	IS:2516-1980	Circuit-breakers
24	IS:2147-1980	Degree of protection provided by enclosures for low voltage switchgear and control gear
25.	IS:L1554(Pt.II)1976	For working voltages upto and including 1100 V
26.	IS:5613(Pt.U.Sec.I) 1978	Lines upto and including 11 kV, section 1 Design.

ANNEXURE-A

CORONA AND RADIO INTERFERENCE VOLTAGE (RIV) TEST

1. General

Unless otherwise stipulated, all equipment together with its associated connectors, where applicable, shall be tested for external corona (for 400kV & above) both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV) for 132kV and above.

2. Test Levels:

The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.

3. Test Methods for RIV:

- 3.1 RIV tests shall be made according to measuring circuit as per International Special Committee on Radio Interference (CISPR) Publication 16-1(1993) Part - 1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 MHz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.
- 3.2 Alternatively, RIV tests shall be carried out in accordance with relevant IEC of respective equipment or NEMA standard Publication No. 107-1964.
- 3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.
- 3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, and 110% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 765kV, 400 kV, 220 KV is listed in the detailed specification together with maximum permissible RIV level in microvolts.
- 3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.
- 3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise meter.

4. Test Methods for Visible Corona

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test

described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 110% of specified corona extinction voltage and maintained there for five minutes. In case corona inception does not take place at 110%, test shall be stopped, otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 3 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the three values at which visible corona (negative or positive polarity) disappears.

The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.

However, both test shall be carried out with the same test set up and as little time duration between tests as possible. No modification on treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of Employer's inspector if, in his opinion, it will not prejudice other test.

5. Test Records:

In addition to the information previously mentioned and the requirements specified as per CISPR or NEMA 107-1964 the following data shall be included in test report:

- a) Background noise before and after test.
- b) Detailed procedure of application of test voltage.
- c) Measurements of RIV levels expressed in micro volts at each level.
- d) Results and observations with regard to location and type of interference sources detected at each step.
- e) Test voltage shall be recorded when measured RIV passes through 100 microvolts in each direction.
- f) Onset and extinction of visual corona for each of the four tests required shall be recorded.

ANNEXURE-B

SEISMIC WITHSTAND TEST PROCEDURE

The seismic withstanding test on the complete equipment (for 66kV and above) shall be carried out along with supporting structure. Seismic Withstand Test carried out using either lattice or pipe structure is acceptable. **Seismic Calculations certified by NABL Labs shall also be acceptable.**

The Bidder shall arrange to transport the structure from his premises/ PSPCL site for the purpose of seismic withstand test only.

The seismic level specified shall be applied at the base of the structure. The accelerometers shall be provided at the Terminal Pad of the equipment and any other point as agreed by the Employer. The seismic test shall be carried out in all possible combinations of the equipment. The seismic test procedure shall be furnished for approval of the Employer.

The frequency range for the earthquake spectra shall be as per IEC-62271-300.