BIDDING DOCUMENT

FOR

"Design, Engineering and Supply, Erection, Testing and Commissioning of 33kV Control relay panel along with all the required accessories and integration with the existing SAS for 33 kV Gunjung Feeder Bay at 132 kV Haflong GSS"

FUND: "Deposit"

(E-Tender)

ASSAM ELECTRICITY GRID CORPORATION LIMITED

BID IDENTIFICATION NO:

AEGCL/MD/TECH-628/Deposit/33 kV Line (Gunjung Bay) Haflong/Pt-I/Bid

Section -1
Instructions to Bidders

This section specifies the procedures to be followed by Bidders in the preparation and submission of their Bids. Information is also provided on the submission, opening, and evaluation of bids and on the award of contract.

Table of Clauses

Section 1
Instructions to Bidders

1.1.0 General

1.1.1. Scope of Bid

1.1.1.1. In support of the Invitation for Bids indicated in the Bid Data Sheet (BDS), the ***CGM (PP&D)*** on behalf of ***Assam Electricity Grid Corporation Limited (AEGCL)*** (hereinafter referred to as "the Purchaser" or "AEGCL"), issues this Bidding Document for the supply of Goods and Related Services incidental thereto as specified in **Section 3 (Employer's Requirements)**. The name and identification nos. of this Competitive Bidding are provided in the Bid Data Sheet (BDS) attached as Appendix to ITB-1 of this Section.

1.1.1.2. ***Period of Completion***

06 (Six) **months** from the date of acceptance of the purchase order or LOA/ Techo-Commercially clear order. Bidders should note that time is the essence of this bid. The bidders who cannot commit to complete the work within the stipulated time may refrain themselves.

1.1.1.3. Unless otherwise stated, throughout this Bidding Document definitions of terms shall be as prescribed in **Section 6** (Special Conditions of Contract).

1.1.2. Eligible Bidders

1.1.2.1. Subject to meeting the Qualifying Requirements, a Bidder may be a firm or company. When the bidder is a firm, the names and address of the partners should be indicated and a copy of the certificate of registration with the concerned Registrar of firms should be enclosed with the Bid.

1.1.2.2. When the bidder is a Company, the company registration document along with Memorandum of Association should be submitted.

1.1.2.3. When the bidder is an individual carrying on business in a firm's name, the tender should be submitted by the owner of the firm, who may describe himself as carrying on business in the firm's name.

1.1.2.4. When the bidder is a **Joint Venture (JV)** of two or more firms as partners, all partners shall comply with the following requirements:

(a) The Bid, and, in case of successful Bid, the Form of Agreement shall be signed by all the Partners so as to be legally binding on all partners.

(b) One of the partners shall be authorized to be as the Lead Partner and submitting a Power of Attorney signed by legally authorized signatories of all the partners shall evidence this authorization.

(c) The Lead partner shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract;

(d) All the partners of the Joint Venture shall be jointly and severally liable for the execution of the contract in accordance with the contract terms and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Bid Form and the Form of Agreement (in case successful bidder).

(e) A copy of the registered agreement entered into by the Joint Venture partners shall be submitted with the Bid.

(f) Joint Venture Agreement must be registered in the Court of Law. Notarized Joint venture agreement shall not be acceptable. Original copy of registered Joint Venture Agreement & Notarized Power of Attorney (if any) shall be submitted prior to one hour of the opening of technical bid.

1.2.0 Contents of Bidding Document

1.2.1. Sections of Bidding Document

1.2.1.1. The Bidding Document consists of following six Sections, and should be read in conjunction with any Addenda issued in accordance with ITB ***Clause*** 1.2.3.

Section 1 - Instructions to Bidders (ITB) with Appendix-1 and Appendix-2
Section 2 - Bidding Forms (BDF)
Section 3 - Purchaser's Requirements (PRQ)
Section 4 - Technical Specification
Section 5 - "General Conditions of Supply and Erection of AEGCL"
(This *section is supplied separately)*
Section 6- Special Conditions of Contract (SCC)
Section 7 - Contract Forms (COF)

1.2.1.2. *The completed Section 7 shall constitute "the Contract".*

1.2.1.3. The Invitation for Bids issued by the Purchaser is not part of the Bidding Document.

1.2.1.4. The Purchaser is not responsible for the completeness of the Bidding Document and its addenda, if they were not obtained directly from the source stated by the Purchaser in the Invitation for Bids.

1.2.1.5. The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.

1.2.2. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting

1.2.2.1. A prospective Bidder requiring any clarification of the Bidding Document shall contact the Purchaser in writing at the Purchaser's address indicated in the ***BDS*** or raise his enquirers during the pre-bid meeting if provided for in accordance with ***ITB Clause*** 1.2.2.4. The Purchaser will respond to any request for clarification, provided that such request is received no later than seven (7) days prior to the deadline for submission of bids. The Purchaser's response shall be in writing with copies to all Bidders who have acquired the Bidding Document in accordance with ***ITB Clause*** 1.2.1.4, including a description of the inquiry but without identifying its source. Should the Purchaser deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ***ITB Clause*** 1.2.3 and ***ITB Clause*** 1.4.2.2.

1.2.2.2. The Bidder is advised to visit and examine the sites where the works are to be carried out and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the provision of plant and services. The costs of visiting the sites shall be at the Bidder's own expense.

1.2.2.3. The Bidder and any of its personnel or agents will be granted permission by the Purchaser to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Purchaser and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

1.2.2.4. The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the ***BDS***. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

1.2.2.5. The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Purchaser not later than **one week** before the pre-bid meeting.

1.2.2.6. Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ***ITB Clause*** 1.2.1.4. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Purchaser exclusively through the issue of an Addendum pursuant to ***ITB Clause*** 1.2.3 and not through the minutes of the pre-bid meeting.

1.2.2.7. Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

1.2.3. Amendment of Bidding Document

1.2.3.1. At any time prior to the deadline for submission of bids, the Purchaser may amend the Bidding Document by issuing addenda.

1.2.3.2. Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Purchaser in accordance with ***ITB Clause*** 1.2.1.4.

1.2.3.3. To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Purchaser may, at its discretion, extend the deadline for the submission of bids, pursuant to ***ITB Clause*** 1.4.2.2.

1.3.0 Preparation of Bids

1.3.1. Cost of Bidding

1.3.1.1. The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

1.3.2. Language of Bid

1.3.2.1. The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, shall be written in the English language. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages into the English language, in which case, for purposes of interpretation of the Bid, such translation shall govern.

1.3.3. Documents Comprising the Bid

1.3.3.1. The Bid shall comprise two envelopes submitted simultaneously, one called the '**Technical Bid'** containing the documents listed in ***ITB Clause 1.3.3.2*** and the other the '**Price Bid'** containing the documents listed in ***ITB Clause 1.3.3.3***, both envelopes must be submitted online through e-tendering portal http://assamtenders.gov.in.

1.3.3.2. The Technical Bid submitted by the Bidder shall comprise the following:

(a) Letter of Technical Bid;

(b) Bid Security, in accordance with ***ITB Clause*** 1.3.10;

(c) Tender Fee.

(d) Registered Joint venture agreement, if applicable.

(e) Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ***ITB Clause*** 1.3.11.1; (i.e., Notarized Power of Attorney)

(f) Documentary evidence establishing the Bidder's eligibility and qualifications to perform the contract if its Bid is accepted;

(g) Documentary evidence establishing in accordance with ***ITB Clause*** 1.3.6 that the plant and services offered by the Bidder conform to the Bidding Document;

(h) Documents as called for in ***ITB Clauses***1.1.2.1***,*** 1.1.2.2***,*** and1.1.2.3;

(i) Any other document required in the ***BDS***.

1.3.3.3. The Price Bid submitted by the Bidder shall comprise the following:

(a) Letter of Price Bid;

(b) completed schedules as required, including Price Schedules, in accordance with ***ITB Clauses***1.3.4 and 1.3.7; and

(c) any other document required in the ***BDS***

1.3.4. Letter of Bid and Schedules

1.3.4.1. The Letters of Technical Bid and Price Bid, and the Schedules, and all documents listed under ***ITB Clause***1.3.3, shall be prepared using the relevant forms furnished in Section 2 (Bidding Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.

1.3.5. Documents Establishing the Eligibility and Qualifications of the Bidder

1.3.5.1. To establish its eligibility and qualifications to perform the Contract in accordance with Appendix 2 of ITB (Evaluation and Qualification Criteria), the Bidder shall provide the information requested in the corresponding information sheets included in Section 2 (Bidding Forms).

1.3.6. Documents Establishing Conformity of the Goods and Services

1.3.6.1. The documentary evidence of the conformity of the goods and services to the Bidding Document may be in the form of literature, drawings and data, and shall furnish:

(a) A detailed description of the essential technical and performance characteristics of the goods and services, including the functional guarantees of the Goods, in response to the Specification;

1.3.7. A commentary on the Purchaser's Specification and adequate evidence demonstrating the substantial responsiveness of the plant and services to those specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Purchaser in the Bidding Document are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalog numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Specification.

1.3.8. Bid Prices

1.3.8.1. Unless otherwise specified in the **BDS** and/or Section 3 (Purchaser's Requirements), bidders shall quote for the entire scope of supply and services on a "single responsibility" basis such that the total bid price covers all the Supplier's obligations mentioned in or to be reasonably inferred from the bidding document in respect of the design, manufacture, including procurement, delivery, and completion of the entire scope.

1.3.8.2. Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the bidding document. No deviation in this regard normally, shall be accepted.

1.3.8.3. Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules included in Section 2 (Bidding Forms). Separate numbered Schedules included in Section 2 (Bidding Forms) shall be used for each of the following elements. The total amount from each Schedule (1, 2 & 3) shall be summarized in a Grand Summary giving the total bid price(s) to be entered in the Bid Form. In case of e-tender, the bidder shall fill up the Price schedules as provided in the online tender.

Schedule No. 1: Supply of Goods
Schedule No. 2: Freight & Insurance against Supply
Schedule No. 3: Erection, Testing and Commissioning schedule

1.3.8.4. In the Schedules, bidders shall give the required details and a breakdown of their prices as called for in these Schedules.

1.3.8.5. The prices shall be fixed.

(a) The prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price quotation will be treated ***as non-responsive and rejected***.

1.3.9. Period of Validity of Bids

1.3.9.1. Bids shall remain valid for the period of **180 days** after the bid submission deadline date prescribed by the Purchaser. A bid valid for a shorter period ***shall be rejected*** by the Purchaser as non-responsive.

1.3.9.2. In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may request Bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ***ITB Clause***1.3.10, it shall also be extended for a corresponding period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid.

1.3.10. Bid Security

1.3.10.1. The Bidder shall furnish as part of its bid, in original form, a Bid Security as specified in the ***BDS***. The amount of Bid Security shall be as specified in the **BDS**.

1.3.10.2. The bid security shall be paid via online mode in the e-tendering portal of Govt. Of Assam, https://assamtenders.gov.in.

1.3.10.3. Bids not complying with ***ITB Clause***1.3.10.1 and ***ITB Clause***1.3.10.2, ***shall be rejected*** by the Purchaser as ***non-responsive***.

1.3.10.4. The bid security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.

1.3.10.5. The bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ***ITB Clause***1.6.4.

1.3.10.6. The bid security may be forfeited:

(a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid Form, except as provided in ***ITB Clause***1.3.9.2or

(b) if the successful Bidder fails to:
1. Sign the Contract in accordance with ***ITB Clause***1.6.1; or
2. Furnish a performance security in accordance with ***ITB Clause***1.6.2.

1.3.11. Format and Signing of Bid

1.3.11.1. The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid comprising the Bid as described in ***ITB Clause***1.3.3

1.3.11.2. The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the ***BDS*** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialised by the person signing the bid.

1.3.11.3. A bid submitted by a JV shall be signed so as to be legally binding on all partners.

1.3.11.4. Any interrelations, erasures, or overwriting shall be valid only if they are signed or initialised by the person signing the bid.

1.4.0 Submission and Opening of Bids

1.4.1. On-line submission of Bids

1.4.1.1. The Technical as well as Price Bid should be submitted through online portal only.

1.4.1.2. For Technical bid, all forms and supporting documents as required by ITB Clause 1.3.2 and duly signed and stamped as per ITB Clause 1.3.10 are to be uploaded to the e-tendering portal. The documents are to be uploaded in pdf format and each file should not exceed 5 MB is size. In case a document is more that 5 MB in size, the same may be split to make the size below 5 MB

1.4.1.3. The Price Bid must be submitted in the Price Schedule provided on the e-tendering portal as per the online format.

1.4.2. Deadline for Submission of Bids

1.4.2.1. Bids shall be received ***ONLINE*** only on or before the date and time indicated in the ***BDS***.

1.4.2.2. The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ***ITB Clause***1.2.3, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

1.4.3. Late Bids

1.4.3.1. The e-tendering portal shall allow the bidders to submit bids up to the date and time specified in ITB Clause 1.4.2 as per Server Clock. Bidders are advised to submit their bids well in advance of the deadline for submission of bids to avoid any last minute difficulties.

1.4.4. Withdrawal, Substitution, and Modification of Bids

1.4.4.1. E-tendering portal shall allow modification of bids any time before the deadline for Bid Submission. A bidder may withdraw its bid, by sending a written notice duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ***ITB Clause***1.3.11.1, Notices must be received by the purchaser prior to the deadline prescribed for submission of bids, in accordance with ***ITB Clause*** 1.4.2.

1.4.4.2. No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Technical Bid or any extension thereof.

1.4.5. Bid Opening

1.4.5.1. The Purchaser shall conduct the opening of Technical Bids through online process at the address, date and time specified in the BDS. The Bid Opening Committee shall open the bids received online in the presence of Bidders` designated representatives who choose to attend. The Price Bids will remain unopened until the specified time of their opening.

1.4.5.2. First, physical envelopes marked "WITHDRAWAL" shall be opened and read out and the corresponding bid shall not be considered/ rejected with comments. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal duly signed by an authorized representative and is read out at bid opening.

1.4.5.3. All the Technical Bids shall be opened one at a time, and the following read out and recorded

a. the name of the Bidder;

b. the presence of a Bid Security, if required; and

c. any other details as the Purchaser may consider appropriate.

Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. No bid shall be rejected at the opening of Technical Bids except for withdrawn bids.

1.4.5.4. The Purchaser shall prepare a record of the opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal and alternate proposals and the presence or absence of a bid security or a bid securing declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record

1.4.5.5. At the end of the evaluation of the Technical Bids, the Purchaser will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Purchaser. Bidders shall be given reasonable notice of the opening of Price Bids.

1.4.5.6. The Purchaser shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders` representatives who choose to attend at the address, date and time specified by the Purchaser. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

1.4.5.7. All the Price Bids shall be opened one at a time and the following read out and recorded:

a) the name of the Bidder;

b) the Bid Prices, including any discounts and alternative offers; and

c) any other details as the Purchaser may consider appropriate.

Only Bid Prices and discounts read out and recorded during the opening of Price Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Price Bids.

1.4.5.8. The Purchaser shall prepare a record of the opening of Price Bids that shall include, as a minimum: the name of the Bidder, the Bid Price (per lot if applicable), any discounts. The Bidders' representatives who

are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record

1.5.0 Evaluation and Comparison of Bids

1.5.1. Confidentiality

Information relating to the evaluation of bids and recommendation of contract award shall not be disclosed to Bidders or any other persons not officially concerned with such process.

1.5.1.1. Any attempt by a Bidder to influence the Purchaser in the evaluation of the bids or Contract award decisions may result in the rejection of its bid.

1.5.1.2. Notwithstanding ***ITB Clause***1.5.1.1, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing duly signed by an authorized representative.

1.5.2. Clarification of Bids

1.5.2.1. To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its bid or submission of any shortfall documents. However, the following may be noted in this regard:

- Any clarification submitted by a Bidder that is not in response to a request by the Purchaser shall not be considered.
- The ***clarification or shortfall documents shall be submitted through the e-tendering portal only***. No other means of communication shall be considered unless specified otherwise.
- No change in the substance of the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the bids, in accordance with ***ITB Clause***1.5.9.

1.5.2.2. If a Bidder does not provide clarifications/shortfall documents of its bid by the date and time set in the Purchaser's request, its bid may be rejected. Bidders are requested to constantly monitor and visit the e-tendering portal for any update or amendment relating to the bid.

1.5.3. Deviations, Reservations, and Omissions

1.5.3.1. During the evaluation of bids, the following definitions apply:

a) "Deviation" is a departure from the requirements specified in the Bidding Document;

b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and

c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.

1.5.4. Preliminary Examination of Technical Bids

1.5.4.1. The Purchaser shall examine the Technical Bid to confirm that all documents and technical documentation requested in ***ITB Sub-Clause*** 1.3.3.2 have been provided, and to determine the completeness of each document submitted. If any of these documents or information is missing, ***the Bid may be rejected***.

1.5.4.2. The Purchaser shall confirm that the following documents and information have been provided both as hard copies and along with Technical Bid in the e-tendering portal. If ***hard copies*** of any of these documents are not submitted within the specified time, the offer ***may be rejected***.

a) Letter of Technical Bid;

b) written confirmation of authorization to commit the Bidder (i.e., Notarized Power of Attorney)

c) Registered JV agreement, if bidder is a JV.

1.5.4.3. Preliminary Requirement of Opening of Technical BIDS

The bidder should submit hard copies of documents mentioned in clause 1.5.4.2 (a), (b), (c) & (d) in separate physical envelope 2(two) hours prior to bid submission deadline.

1.5.5. Responsiveness of Technical Bid

1.5.5.1. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ***ITB Clause***1.3.3.

1.5.5.2. A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

a) If accepted, would:

(i). affect in any substantial way the scope, quality, or performance of the plant and services specified in the Contract; or

(ii). limit in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or

b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.

1.5.5.3. The Purchaser shall examine the technical aspects of the Bid submitted in accordance with ***ITB Clause***1.3.6, Technical Proposal, in particular to confirm that all requirements of Section 3 (Purchaser's Requirements) have been met without any material deviation or reservation.

1.5.5.4. If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

1.5.6. Non material Nonconformity

1.5.6.1. Provided that a Bid is substantially responsive, the Purchaser may waive any nonconformity in the bid that does not constitute a material deviation, reservation or omission.

1.5.6.2. Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial non conformity in the Bid related to documentation requirements. Requesting information or documentation on such non conformity shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

1.5.6.3. Provided that a Bid is substantially responsive, the Purchaser shall rectify nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in ***Appendix-2 of ITB (Evaluation and Qualification Criteria)***.

1.5.7. Detailed Evaluation of Technical Bids

1.5.7.1. The Purchaser will carry out a detailed technical evaluation of the bids not previously rejected as being substantially non-responsive, in order to determine whether the technical aspects are in compliance with the Bidding Document. In order to reach such a determination, the Purchaser will examine and compare the technical aspects of the bids on the basis of the information supplied by the bidders, taking into account the following:

a) overall completeness and compliance with the Purchaser's Requirements; deviations from the Purchaser's Requirements; conformity of the goods and services offered with specified performance criteria; suitability of the goods and services offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the bid. The bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected for non-responsiveness;

b) type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services; and

c) other relevant factors, if any, listed in ***Appendix to ITB-2 (Evaluation and Qualification Criteria)***.

1.5.8. Eligibility and Qualification of the Bidder

1.5.8.1. The Purchaser shall determine to its satisfaction during the evaluation of Technical Bids whether a Bidder meets the eligibility and qualifying criteria specified in ***Appendix to ITB-2*** **(Evaluation and Qualification Criteria).**

1.5.8.2. The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to relevant ***ITB Clause.***

1.5.8.3. ***An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. A negative determination shall result into the disqualification of the Bid, in which event the Purchaser shall not open the Price Bid of the Bidder.***

1.5.9. Correction of Arithmetical Errors

1.5.9.1. During the evaluation of Price Bids, the Purchaser shall correct arithmetical errors on the following basis:

a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the former shall prevail and the latter will be corrected accordingly;

b) where there are errors between the total of the amounts of Schedule Nos. 1 & 2, and the amount given in Schedule No. 3 (Grand Summary), the former shall prevail and the latter will be corrected accordingly; and

c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetical error, in which case the amount in figures shall prevail subject to (a) and (b) above.

1.5.9.2. If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be ***disqualified and its bid security may be forfeited***.

1.5.10. Evaluation of Price Bids

1.5.10.1. The Purchaser shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be used.

1.5.10.2. To evaluate a Price Bid, the Purchaser shall consider the following:

a) the bid price, after including taxes, as quoted in the Price Schedules;

b) price adjustment for correction of arithmetical errors in accordance with ***ITB Clause***1.5.9.1; and

c) the evaluation factors if any indicated in Appendix 2 (Evaluation and Qualification Criteria).

1.5.11. Comparison of Bids

1.5.11.1. The Purchaser shall compare all substantially responsive Bids to determine the lowest evaluated bid, in accordance with ***ITB Clause*** 1.5.10.2.

1.5.12. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids

1.5.12.1. The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

1.6.0 Award of Contract

1.6.1. Award Criteria

1.6.1.1. The Purchaser shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily.

1.6.2. Notification of Award

1.6.2.1. Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the sum that the Purchaser will pay the Contractor in consideration of the execution and completion of the plant and services (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price").

1.6.2.2. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

1.6.3. Signing of Contract

1.6.3.1. Within ***fifteen (15) days*** of receipt of the Letter of Acceptance, the successful Bidder shall be required to sign the Contract Agreement.

1.6.3.2. The contract signing shall take place at the premises of the Purchaser.

1.6.4. Performance Security

1.6.4.1. Within ***fifteen (15) days*** of the receipt of notification of award from the Purchaser, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, using for that purpose the Performance Security Form included in ***Appendix – 4, Section-7 (Contract Forms)***, or another form acceptable to the Purchaser.

1.6.4.2. Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.

APPENDIX TO ITB – 1

Bid Data Sheet (BDS)

A. Introduction

ITB 1.1.1.1	The number of the **IFB** is: AEGCL/MD/TECH-628/Deposit/33 kV Line (Gunjung Bay) Haflong/Pt-I/47
	The Purchaser is: ***Assam Electricity Grid Corporation Limited.***
	The name of the Bid is: **"Design, Engineering and Supply, Erection, Testing and Commissioning of 33kV Control relay panel along with all the required accessories and integration with the existing SAS for 33 kV Gunjung Feeder Bay at 132 kV Haflong GSS"** ***The Bid ID NO:*** **AEGCL/MD/TECH-**628/Deposit/33 kV Line (Gunjung Bay) Haflong/Pt-I/Bid
ITB 1.2.2.1	For **clarification purposes** only, the Purchaser's address is: Attention: **CGM (PP&D)** **O/O The Managing Director, AEGCL** Street Address: **Bijulee Bhawan, Paltanbazar** Floor/Room number: **First Floor** City: **Guwahati** PIN Code: **781001** Country: **India** Telephone: +91 361 2739520 Facsimile number: +91 361 2739513 **Electronic mail address:** cgm.ppd@aegcl.co.in **(Subject: "Design, Engineering and Supply, Erection, Testing and Commissioning of 33kV Control relay panel along with all the required accessories and integration with the existing SAS for 33 kV Gunjung Feeder Bay at 132 kV Haflong GSS"**
ITB 1.2.2.4	**Purchaser may invite intending Bidders to a pre-bid meeting**, if Purchaser feels it is necessary. The date and time of such pre-bid meeting shall be intimated to intending bidders in due course of time.
ITB 1.3.3.2(i)	The Bidder shall submit with its Technical Bid the following additional documents: 1. Guaranteed and other Technical Particulars as required. 2. Type Test Reports as required 3. Notarized Manufacturer's Authorization (if applicable).
ITB 1.3.8.1	Unless otherwise specifically indicated, bidders shall quote for the entire plant and services on 'single responsibility basis'.
ITB 1.3.8.5	The prices quoted by the Bidder shall be **FIXED for entire period of the Contract.**
ITB 1.3.9.1	The bid validity period shall be **180 (one hundred eighty)** days.
ITB 1.3.10.1	**The Bidder shall furnish a bid security amounting to Rs. 50,000.00**

ITB 1.3.11.1	The bidding is through E-tendering portal and received online, a bidder has to submit hard copies as specified by the Purchaser.
ITB 1.3.11.1	The written confirmation of authorization to sign on behalf of the Bidder shall consist of a written confirmation of Authorization to sign on behalf of the Bidder shall consist of a ***Notarized Power of Attorney*** or a ***Company board resolution*** *as applicable depending upon the firm****.***
ITB 1.4.2.1	For **bid submission purposes** only, **(E-tenders shall be accepted through online portal http://assamtenders.gov.in only)** The purchaser's address is: **O/o The Managing Director, AEGCL** Street Address: **BijuleeBhawan, Paltanbazar** Floor/Room number: **First Floor** City: **Guwahati** PIN Code: **781001** **The deadline for bid submission is** Date: **12.09.2022** Time: -**12.00 Hours**
ITB 1.4.5.1	The bid opening of Technical Bids shall take place at **Office of The Managing Director, AEGCL** Street Address: **Bijulee Bhawan, Paltanbazar** Floor/Room number: **First Floor** City: **Guwahati (Assam)** PIN Code: **781001** Country: **India** Date: **13.08.2022** Time: **14:00 Hours**

APPENDIX TO ITB - 2

Evaluation and Qualification Criteria (ECQ)

This Appendix contains all the criteria that the Purchaser shall use to evaluate bids and qualify Bidders. In accordance with ITB 1.5.7 and ITB 1.5.8, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section 2 (Bidding Forms).

Table of Criteria

2.1.1 Performance in earlier contracts in AEGCL.

The performance of the bidders/JV Partners in similar contracts executed earlier in AEGCL will be considered during Technical Evaluation Stage. The bidder may be disqualified if their performance is found to be unsatisfactory in previous works (i.e., within last 5 years) undertaken in AEGCL.

The following will be considered as unsatisfactory performance:

1. If the bidder/JV Partner has failed to complete a contract within scheduled completion time. However, this will not apply in case the bidder has been awarded time extension without any deduction of LD.

2. If there is any evidence of poor workmanship by the bidder/JV Partner during execution of the contract. Execution of contract not in compliance with the approved specifications/drawings will be considered as poor workmanship.

1. Evaluation

1.1 Technical Evaluation

In addition to the criteria listed in ITB 1.5.7.1 (a) – (c), no other factor shall apply.

1.2 Economic Evaluation

Any adjustments in price that result from the procedures outlined below shall be added, for purposes of comparative evaluation only, to arrive at an "Evaluated Bid Price." Bid prices quoted by bidders shall remain unaltered.

1.2.1 Quantifiable Deviations and Omissions

Quantifiable Deviations and Omissions from the contractual obligations: No financial assessment shall be made by the Purchaser for deviations and omissions from the requirements of the Bidding Document. All such deviations, omissions or reservations s[hall be dealt with in accordance with ITB Clauses 1.5.5.2, 1.5.5.3, 1.5.5.4, 1.5.6.1, 1.5.6.2,1.5.6.3,1.5.7.1(a)and1.5.9.

1.3 Time Schedule

Time to complete Works from the Commencement Date specified in **Article 3** of the Contract Agreement for determining time for completion of the works is **06 months.** Bids not meeting the above time schedule shall be rejected. However, no credit will be given for earlier completion.

1.4 Specific additional criteria

In addition to the above, no additional criteria shall be considered for evaluation of Bids.

2.0 Qualification

Qualification of bidder will be based on meeting the minimum pass / fail criteria specified below

2.2 General

The Bidder must satisfy the requirement of ITB Sub-Clause 1.1.2 and shall submit necessary document as per the said Clause.

2.2.1 Performance in earlier contracts in AEGCL.

The performance of the bidders/JV Partners in similar contracts executed earlier in AEGCL will be considered during Technical Evaluation Stage. The bidder may be disqualified if their performance is found to be unsatisfactory in previous works (i.e., within last 5 years) undertaken in AEGCL.

The following will be considered as unsatisfactory performance:

3. If the bidder/JV Partner has failed to complete a contract within scheduled completion time. However, this will not apply in case the bidder has been awarded time extension without any deduction of LD.

4. If there is any evidence of poor workmanship by the bidder/JV Partner during execution of the contract. Execution of contract not in compliance with the approved specifications/drawings will be considered as poor workmanship.

2.2.2 The Bidder who is not a manufacturer of equipment(s) as required for in this bid for execution of the works shall submit ***an undertaking using 'Form-MA' (Manufacturer's Authorisation - Notarized), Section-2 (Bidding Form).***

2.3 Pending Litigation:

Using the 'Form-LIT' (Section 2, Bidding Form), bidder shall list all Pending Litigation.
All pending litigation shall be treated as resolved against the Bidder and so shall in total not represent more than **50% percent** of the Bidder's net worth.

2.4 Financial Situation

Criteria	**Compliance Requirements**				**Documents**
Requirement	Single Entity	Joint Venture			
		All Partners Combined	Each partner	One partner	Submission Requirements

2.4.1 Historical Financial Performance

Submission of audited balance sheets or other financial statements acceptable to the Purchaser, for the last **3 (three)** years to demonstrate the current soundness of the Bidders financial position and its prospective long-term profitability. As a minimum, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive	Must Meet Requirement	Not Applicable	Must Meet Requirement	Not Applicable	Form **'FIN-1'** With attachments

2.4.2 Average Annual Turnover.

Minimum **average annual turnover** of **Rs.7,50,000.00** calculated as total certified payments received for contracts in progress or completed, within the **last 3 years**.	Must Meet Requirement	Must Meet Requirement	25% Minimum	Must meet 40% of the requirement (lead partner)	Form **'FIN-2'**

2.4.3 Financial Resources/Cash Flow

Using Forms **FIN – 3** Section 4 (Bidding Forms) the Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet the **cash-flow requirement**, of **Rs.4,20,000.00**	Must Meet Requirement	Must Meet Requirement	25% Minimum	Must meet 40% of the requirement (lead partner)	Form **'FIN-3'**

2.4.4 Performance in earlier contracts in AEGCL.

The performance of the bidders/JV Partners in similar contracts executed earlier in AEGCL will be considered during Technical Evaluation Stage. The bidder may be disqualified if their performance is found to be unsatisfactory in previous works (i.e., within last 5 years) undertaken in AEGCL.

The following will be considered as unsatisfactory performance:

5. If the bidder/JV Partner has failed to complete a contract within scheduled completion time. However, this will not apply in case the bidder has been awarded time extension without any deduction of LD.

6. If there is any evidence of poor workmanship by the bidder/JV Partner during execution of the contract. Execution of contract not in compliance with the approved specifications/drawings will be considered as poor workmanship.

2.5 Experience

2.5.1 General Experience

Criteria	**Compliance Requirements**				**Documents**
Requirement	Single Entity	Joint Venture			
		All Partners Combined	Each partner	One partner	Submission Requirements
Experience as a contractor/ Partner in a JV/ sub contractor for work(s)/ contract(s) in last 5 (five) years as on bid submission deadline.	Must meet requirement	Not applicable	Must meet requirement	Not applicable	Form EXP- 1

2.5.2 Specific Experience

(a) Contracts of Similar Size and Nature

Criteria	**Compliance Requirements**	**Documents**

Requirement	Single Entity	Joint Venture			
		All Partners Combined	Each partner	One partner	Submission Requirements
Participation as contractor (partner in a JV or as subcontractor) in at least **1(one)** contract within the last 5 (five) years that have been successfully completed where the contract consists of following works: "Construction of at least 1(one) transformer bay or line bay of 33kV voltage class or above with SAS integration"	Must meet requirement	Must meet requirement	Not applicable	Must meet requirement	Form EXP – 2

***** For establishing the experiences stated in clause 2.4.1 & 2.4.2, the bidder must submit the work Order/LOA/Agreement along with BoQ and completion certificate.***

2.5 Manufacturers

Manufacturers for **C&R panels and CT** must meet the minimum criteria, herein listed.

2.6.1 If the bidder proposes to supply the major equipments from the following manufacturers he must submit with his bid only the notarized manufacturer's authorization, using the form provided in Section 2 (Bidding Forms) and GTP, showing that the Bidder has been duly authorized by the manufacturer or producer of the related plant and equipment or component to supply and install that item in the Employer's establishment.

The Bidder is responsible for ensuring that the manufacturer or producer complies with the requirements of bidding document.

SL No.	Description of Item	Name of Manufacturers
1	Manufacture of Current Transformers of 33 kV class.	ABB/CGL/BHEL/AREVA/SIEMENS/MEHRU
2	Manufacture of Numeric Protective Relays.	Siemens/ABB/ALSTOM/AREVA/ GE MULTILIN/SEL
3	Manufacture of BCU and Substation Automation System equipment	Siemens/ABB/ALSTOM/AREVA GE MULTILIN/SEL
4	Manufacture of relay & control panel and integration & configuration of Protection & Substation Automation System equipment	Siemens

2.6.2 **I**f the bidder proposes to supply the major equipment of manufacturers other than listed in clause 2.5.1, the proposed manufacturer must meet the following minimum criteria herein listed for that item.
Failure to comply with this requirement will result in rejection of the subcontractor/manufacturer.

Item No.	Description of Item	Minimum Criteria to be met
1	Manufacture of Current Transformers of 33 kV class.	The manufacturer of listed items must have designed, manufactured; type tested, supplied listed equipment, which are in successful operation for at least **three (3)** years as on the date of bid opening. The bidder should list such works executed by the manufacturer to substantiate the requirement of this Clause using **Form EXP-2**.
2	Manufacture of Numeric Protective Relays.	
3	Manufacture of BCU and Substation Automation System equipment	
4	Manufacture of relay & control panel and integration & configuration of Protection & Substation Automation System equipment	

NOTE: The bidder complying requirements of clause 2.5.2 must submit with his bid the following documents to substantiate the requirements:

(i) Manufacturer must have production facility in India.
(ii) Notarized Manufacturer's authorization, using the form provided in Section 2 (Bidding Forms). The Bidder is responsible for ensuring that the manufacturer or producer complies with the requirements of bidding document and meets the minimum criteria listed above for that item.
(iii) Full type test certificates.
(iv) Manufacturer's experience list (form EXP-2).
(v) GTP of the equipment to be supplied.
(vi) Recent performance certificate from past clients along with supporting documents **(**e.g., copy of contracts & completion certificate) in support of this clause. Performance & Completion certificates should not be older than 5 (three) years on the date of opening of the technical bid and shall be in proper official letter pad with issue No and Date. It shall also contain the detail of work or supplies made along with the Work/Supply order No. and Date

2.5.3 Bidders are free to list more than one Subcontractor against each item of the plant and services. However, necessary documents as mentioned in clause 2.5.1 and 2.5.2 must be furnished with the bid against each such manufacturer. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.

Section - 2

BIDDING FORMS

This Section contains the forms that are to be completed by the Bidder and submitted as part of his Bid.

1 Letter of Technical Bid

[Bidder's Letterhead]

Date: .....

Bid Identification No (s): .....

: .....

: .....

: .....

Invitation for Bid No.: .....

To:.....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 1.2.3;

(b) We offer to design, manufacture, test and deliver, in conformity with the Bidding Document the following Goods and Related Services: . . . . . .

(c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of 180 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period

Name .....

In the capacity of .....

Signed .....

.....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

.....

2 Letter of Price Bid

(***TO BE FURNISHED FOR EACH PACKAGE SEPARATELY)***

(NOT REQUIRED FOR E-TENDERING)

[Bidder's Letterhead]

Date: .....

Bid Identification No: .....

Invitation for Bid No.: .....

To:.....

We, the undersigned, declare that:

(i). We have examined and have no reservations to the Bidding Document, including Addenda issued in accordance with Instructions to Bidders (ITB) 1.2.3;

(ii). We offer to design, manufacture, test and deliver in conformity with the Bidding Document the following Goods and Related Services: . . . . . ;

(iii). The total price of our Bid is the sum of: ……,

(iv). Discount offered (if any) for (i) Supply (Schedule 1) ……%, and (ii) Related Services (Schedule 2, F& I,)……...%

(v). Our bid shall be valid for a period of ..... days from the date fixed for the submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(vi). If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;

(vii). We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and

(viii). We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name .....

In the capacity of .....

Signed .....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

3 Price Schedules

PREAMBLE

General

1. The Price Schedules are divided into separate Schedules as follows:

   Schedule No. 1: Supply of Goods.
   Schedule No. 2: Freight & Insurance
   Schedule No. 3: Erection, Testing and Commissioning schedule

2. The entered rates and prices shall be deemed to cover the full scope as specified in the bidding document, including overheads and profit.
3. If bidders are unclear or uncertain as to the scope of any item, they shall seek clarification in accordance with ***ITB*** 1.2.2 prior to submitting their bid.

Pricing

4. Prices shall be filled in indelible ink/ on-line and any alterations necessary due to errors, etc., shall be initialed by the Bidder if asked for hardcopy.
5. Bid prices shall be quoted on-line in the manner indicated in Schedules.

   As specified in the Bid Data Sheet and Special Conditions of Contract, prices shall be fixed and firm for the duration of the Contract.

   Prices given in the Schedules against each item shall be for the scope covered by that item as detailed in Section 3 (Purchaser's Requirements) or elsewhere in the Bidding Document.

PRICE SCHEDULE 1: Supply

Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	13	53	55
2	**Supply of 33kV feeder Control & Relay Panel (with BCU) ethernet switch and all accessories as required for SAS integration**					
2.1	Simplex Type, capable of integration into SIEMENS SAS	1.00	Nos			
2.2	Managed Ethernet Switch with OF Patch	1.00	Nos			
3	**Supply of feeder Current Transformer(1-Phase, 0.2 Class Live Tank Type) including all accessories and terminal connectors as required**					
3.1	33kV 400-200-1-1 (2Core) CT	3.00	Nos			
3.2	Marshalling Box (complete with all accessories) for CT	1.00	Nos			
4	**Supply of Samast compliant ABT compliant 3ph, 4 wire Energy meter (Class-0.2) as per specification**	1.00	Nos			

5	**Mandatoty Spares**					
5.1	Numerical back up relay	1.00	Nos			
5.2	Bay Control unit	1.00	Nos			
5.3	OFC Patch Cord					
5.31	a) ST-LC	10.00	Nos			
5.32	b) ST-ST	10.00	Nos			
5.33	33kV 400-200-1-1 (2Core) CT	1.00	Nos			
5.4	Master Trip Relay	1.00	Nos			
Total in Figures						
Quoted Rate in Words						

PRICE SCHEDULE 2: F&I against Supply

Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	13	53	55
2	**Supply of 33kV feeder Control & Relay Panel (with BCU) ethernet switch and all accessories as required for SAS integration**					
2.1	Simplex Type, capable of integration into SIEMENS SAS	1.00	Nos			
2.2	Managed Ethernet Switch with OF Patch	1.00	Nos			
3	**Supply of feeder Current Transformer(1-Phase, 0.2 Class Live Tank Type) including all accessories and terminal connectors as required**					
3.1	33kV 400-200-1-1 (2Core) CT	3.00	Nos			
3.2	Marshalling Box (complete with all accessories) for CT	1.00	Nos			
4	**Supply of Samast compliant ABT compliant 3ph, 4 wire Energy meter (Class-0.2) as per specification**	1.00	Nos			
5	**Mandatoty Spares**					
5.1	Numerical back up relay	1.00	Nos			
5.2	Bay Control unit	1.00	Nos			
5.3	OFC Patch Cord					
5.31	a) ST-LC	10.00	Nos			
5.32	b) ST-ST	10.00	Nos			
5.33	33kV 400-200-1-1 (2Core) CT	1.00	Nos			
5.4	Master Trip Relay	1.00	Nos			
Total in Figures						
Quoted Rate in Words						

PRICE SCHEDULE 3: Erection, Testing and Commissioning schedule

Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	13	53	55
1	**Installation and Commissioning of C&R Panel**					
1.1	Installation of KIOSK, including Testing and commissioning of CRP	1.00	LS			
1.2	Installation and testing of 3Ph, 4 wire energy meter in control panel	1.00	Nos			
1.3	Integration of C&R Panel into existing SAS of Haflong GSS including testing and commissioning	1.00	LS			
2	**33kV 400-200/ 1-1 A ,2 Core feeder CT including marshalling box (Retrofitting on existing structure)**	3.00	Nos			
Total in Figures						
Quoted Rate in Words						

NOTE: For E-Tendering please fill in the price details in the BoQ (Price Schedule) provided in the e – tendering portal.

*********The rates entered should be excluding GST**********

4 Format of Bid Security

Bank Guarantee

(To be stamped in accordance with Stamp Act)
(The non-Judicial Stamp Paper should be in the name of issuing Bank)

..... ***Bank's Name and Address of Issuing Branch or Office .....***

Beneficiary: ***..... Name and Address of Purchaser .....***

Date:.....

Bid Security No.:.....

We have been informed that . . . . . ***name of the Bidder***. . . . . (Hereinafter called "the Bidder") has submitted to you its bid dated . . . . . (Hereinafter called "the Bid") for the execution of . . . .***Name & Identification No of Bid*** . . . . . under Invitation for Bids No. . . . . ("The IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we . . . . . ***name of Bank***. . . . . hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . . . . . .***amount in figures*** . . . . . (. . . . . .***amount in words*** . . . . .) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Form of Bid; or
(b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
(c) having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the Performance Security, in accordance with the ITB.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; and (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy your notification to the Bidder of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

. . . . . ***.Bank's seal and authorized signature(s)*** . . . . . .

Note: All italicized text is for use in preparing this form and shall be deleted from the final document

5 Contract Execution Schedule

The Bidder shall indicate here his proposed Contract Execution Schedule if the contract is awarded to him. The Schedule shall match with the time for completion specified.

6 Bidders Qualification

To establish its qualifications to perform the contract in accordance with Appendix 2 of ITB (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

6.1 Form ELI - 1: Bidder's Information Sheet

Bidder's legal name	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents. ❑ 1. In case of single entity/firm, documents, in accordance with ITB 1.1.2.1. ❑ 2. In case of single Company, documents, in accordance with ITB 1.1.2.2.	

6.2 Form LIT - Pending Litigation

Each Bidder must fill in this form

Pending Litigation			
❑ No pending litigation in accordance with Criteria 2.1.3 of Appendix 2 of ITB (Evaluation and Qualification Criteria)			
❑ Pending litigation in accordance with Criteria 2.1.3 of Appendix 2 of ITB (Evaluation and Qualification Criteria)			
Year	**Matter in Dispute**	**Value of Pending Claim in Rupees**	**Value of Pending Claim as a Percentage of Net Worth**

6.3 Form FIN - 1: Financial Situation

Each Bidder must fill in this form

Financial Data for Previous 3 Years [Rupees]		
Year 1:	**Year 2:**	**Year 3:**

Information from Balance Sheet

Total Assets			
Total Liabilities			
Net Worth			
Current Assets			
Current Liabilities			

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

❑ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three years, as indicated above, complying with the following conditions.

- All such documents reflect the financial situation of the Bidder or partner to a JV, and not sister or parent companies.
- Historic financial statements must be audited by a certified accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

6.4 Form FIN - 2: Average Annual Turnover

Each Bidder must fill in this form

Annual Turnover Data for Last 3 Years	
Year	**Amount (Rupees)**
Average Annual Turnover	

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for contracts in progress or completed.

6.5 Form FIN – 3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total cash flow demands of the subject contract or contracts as indicated in **Appendix 2 of ITB** (Evaluation and Qualification Criteria) with necessary supporting documents.

Financial Resources		
No.	**Source of financing**	**Amount (Rupees)**
1		
2		
3		

6.6 Form EXP – 1: General Experience

Each Bidder must fill in this form

General Experience				
Starting Month Year	**Ending Month Year**	**Years**	**Contract Identification and Name Name and Address of Purchaser Brief Description of the Works Executed by the Bidder**	**Role of Bidder**

6.7 Form EXP – 2: Specific Experience

Fill up one (1) form per contract.

Contract of Similar Size and Nature			
Contract No. . . . . .**of**.	**Contract Identification**		
Award Date		**Completion Date**	
Role in Contract	❑ **Contractor**		❑ **Subcontractor**
Total Contract Amount	**(Rupees)**		
Purchaser's Name **Address** **Telephone/Fax Number** **E-mail**			
[illegible]			
1. Brief Specification of Goods supplied **2. Date of commissioning.**			

7 Manufacturer's Authorization

[***The Bidder, in pursuant to ECQ Clause 2.1.2 (if applicable) shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. Please refer to notes at bottom]***

(Manufacturer's Letterhead)

Date: [***insert date (as day, month and year) of Bid Submission***]

Bid No.: [***insert number of bidding process***]

To: [Insert: full name of Purchaser]

WE *[insert: **name of Manufacturer**]* who are established and reputable manufacturers of *[insert: **name and/or description of the Goods**]* having production facilities at *[insert: **address of factory**]* do hereby authorize *[insert: **name & address of Bidder**]* (hereinafter, the "Bidder") to submit a bid the purpose of which is to provide the following goods, manufactured by us, and to subsequently negotiate and sign the Contract:

1. ----------
2. ----------

We hereby extend our full guarantee and warranty in accordance with ***Clause 6.10.0*** of the Special Conditions of Contract, for the above specified Goods supporting the Supply of specified Goods and fulfilling the Related Services by the Bidder against this Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations. We also hereby declare that, we will furnish the Performance Guarantee in accordance with ***SCC Clause.*** Further, we also hereby declare that we and ……, *[insert: **name of the Bidder**]* have entered into a formal relationship in which, during the duration of the Contract (**including related services and warranty / defects liability**) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Signed: _____

Date: _____

In the capacity of *[insert: **title of position or other appropriate designation**]* (***and this should be signed by a person having the power of attorney to legally bind the manufacturer).***

Date:.....

Place:.....

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

Notes:

1. The letter of Undertaking should be on the letterhead of the Manufacturer and should be signed by a person competent and having ***Power of Attorney to sign on behalf of the Manufacturer*** *(to be attached with this MA) to legally bind the Manufacturer. It shall be included by the bidder in its bid.*

2. ***Above undertaking shall be registered or notarized so as to be legally enforceable***

Section - 3

Employer's Requirements

(This Section contains the Technical Requirements and supplementary information that describe the Goods and Related Services)

Section 3
Employer's Requirements

3.1.0 Scope of Works

3.1.1. The scope of works covers - "Design, Engineering and Supply Erection, Testing and Commissioning of 33kV Control relay panel along with all the required accessories and integration with the existing SAS for 33 kV Gunjung Feeder Bay at 132 kV Haflong GSS"

The brief description of the scope covered under this bidding document is furnished below:

- Design, engineering, manufacture, assembly, supply, erection, testing and commissioning of 33kV Control relay panel along with all required accessories and integration with the existing SAS.

All SAS integration work should be carried out in presence of existing SAS OEM authorized personnel, arrangement of SAS OEM authorized personnel under the scope of the contractor.

Any upgradation of hardware and software for above integration shall be in the scope of contractor including license upgradation (if any). The validity of the license upgraded should be minimum for 10years.

- Design, engineering, manufacture, assembly, supply, erection, testing and commissioning of 33kV CT along with all accessories.

- Loading at manufacturer's works, transportation and delivery at respective substation sites, including unloading at destination sites.

3.1.2. The Bill of Quantities for indicative purposes is furnished in Price Schedules of Section-2 of this bidding document. The BOQ is as per BOQ Schedules attached in the online e-tender document.

3.1.3. The quantities in the above Annexure are provisional in nature and for bid comparison purpose only. Quantities may vary to the extent of (+) 20 % to (-) 20% in terms of Contract Price.

3.1.4. The bidder on its own responsibility may visit and examine the Site of Works and its surroundings and obtain information that may be necessary for preparing the bid. Any permits or licenses that may be required to execute the works should also be obtained by the contractor.

3.1.5. **The items mentioned in these Annexures shall only be used while quoting the bid prices. Any other items not specifically mentioned in the specification but which are required for installation, testing, commissioning and satisfactory operation of the cable as per Indian Standards/IE Rules/IE Act and concerned authority regulations are deemed to be included in the scope of the specification and no deviation in this regard shall be accepted**

No modifications/additions/ deletions shall be made by the bidder to the items and quantities given in these schedules.

3.2.0 Contractor to Inform Himself Fully

3.2.1. The contractor should ensure that he has examined the Specifications and Schedules as brought out in this Section as well as other Sections of The Bidding document and has satisfied himself as to all the conditions and circumstances affecting the contract price and fixed his price according to his own views on these matters and acknowledge that no additional allowances except as otherwise provided therein will be levied.

3.2.2. The Employer shall not be responsible for any misunderstanding or incorrect information obtained by the contractor other than information given to the contractor in writing by the Employer.

3.3.0 Service Conditions

3.3.1. The plant and materials supplied shall be suitable for operation under the following climatic and other conditions:

a.	Peak ambient day temperature in still air	: 45°C
b.	Minimum night temperatures	: 0°C
c.	Reference ambient day temperature : 45°C	
d.	Relative Humidity a) Maximum	: 100 %
	b) Minimum	: 10 %
e.	Altitude	: Below 1000 M above MSL
f.	Maximum wind pressure	: As per IS: 802 latest code.
g.	Seismic Intensity	: ZONE-V as per IS 1893.

3.4.0 Conformity with Indian Electricity Rules & Other Local Regulations

3.4.1. The Contractor shall note that all substation works shall comply with the latest provisions of Indian Electricity Rules and with any other regulations. Local authorities concerned in the administration of the rules and regulation relating to such works shall be consulted, if necessary, about the rules and regulations that may be applicable.

3.4.2. The Contractor shall also comply with the Minimum Wages Act 1948 and the payment of Wages Act (both. of the Government of India and State of Assam) and the rules made there under in respect of any employee or workman employed or engaged by him or his Sub-Contractor.

3.4.3. 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.

3.6.0 Standards

3.6.1. The equipment covered under this bidding document shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities.

3.6.2. In case of any conflict between the standards and this specification, this specification shall govern.

3.6.3. Equipment conforming to other international or authoritative Standards which ensure equivalent or better performance than that specified under Clause 3.6.0 above shall also be accepted. In that case relevant extracts of the same shall be forwarded with the bid.

3.7.0 Engineering Data

3.7.1. The furnishing of engineering data by the Contractor shall be in. accordance with the Bidding Document. The review of these data by the Employer will cover only general conformance of the data to the specifications and not a thorough review of all dimensions, quantities and details of the materials, or items indicated or the accuracy of the information submitted. This review by the Employer shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications.

3.7.2. All engineering data submitted by the Contractor after review by the Employer shall or part of the contract document.

3.8.0 Drawings and Documents for Approval

3.8.1. All necessary drawings and documents required for completion of the project is to be submitted by the contractor for approval. The drawings provided with bid (if any) are for indicative purpose only and fresh drawings are to be prepared by the contractor as per actual site condition after survey. The drawings and documents are to be approved by AEGCL.

3.8.2 All drawings submitted by the Contractor including those submitted at the time of Bid shall be with sufficient detail to indicate the type, size, arrangement, dimensions, material description, Bill of Materials, weight of each component break-up for packing and shipment, fixing arrangement required, the dimensions required for installation and any other information specifically requested in these specifications.

3.8.3. Each drawing submitted by the Contractor shall be clearly marked with the name of the Employer, the specification title, the specification number and the name of the Project. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be to the scale and in S.I. units.

3.8.4. **The drawings submitted for approval to the Employer shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections.

3.8.5. The Contractor shall perform the work strictly in accordance with these drawings and no deviation shall be permitted without the written approval of the Employer, if so required.

3.8.6. All manufacturing, fabrication and erection work under the scope of Contractor prior to the approval of the drawings shall be at the Contractor's risk. The contractor may make any changes in the design which are necessary to conform to the provisions and intent of the contractor and such changes will again be subject to approval by the Employer.

3.8.7. The approval of the documents and drawings by the Employer shall mean that the Employer is satisfied that:

(a) The Contractor has completed the part of the Works covered by the subject document (i.e., confirmation of progress of work).
(b) The Works appear to comply with requirements of Specifications. In no case the approval by the Employer of any document does imply compliance with neither all technical requirements nor the absence of errors in such documents. If errors are discovered any time during the validity of the contract, then the Contractor shall be responsible of their consequences.

3.8.8. All drawings shall be prepared using AutoCAD software version 2000 or later only. Drawings, which are not compatible to AutoCAD software version 2000 or later, shall not be acceptable. After final approval all the drawings shall be submitted to the Employer in readable CD's

3.8.9. The following is the general list of the documents and drawings that are to be approved by the Employer:
(i) General arrangement drawing with full dimensions.
(ii) Electrical schematic diagram, where applicable.
(iii) Wiring diagram, where applicable.

3.8.10. All Designs/Drawings/Calculations/Data submitted by the contractor, from time to time shall become the property of the Employer and Employer has the right to use or replicate such designs for future contracts / works without the permission of the Contractor. The Employer has all rights to use/ offer above designs/drawings/data sheets to any other authority without prior Permission of the Contractor.

3.9.0 Final Drawings and Documents

3.9.1. The successful Contractor shall require to provide following drawings and documents for each bay constructed in printed form:

(a) All approved drawings (AS BUILD) of equipment and works related to a particular bayin three (3) copies.

(b) Instruction manuals of all equipment related to a particular bay in three (3) copies.

These instruction manuals shall generally consist of-

(i) Operation Manuals,

(ii) Maintenance Manuals and

(iii) Spare Parts Bulletins.

(c) Copies of routine test reports (in triplicate) of relevant equipment.

(d) Final Guaranteed and Other technical particulars of relevant equipment.

3.9.2. In addition to the above the Contractor shall provide five (5) sets of all the drawings and documents to Employer in printed form for his reference and record.

3.10.0 Application System Software

3.10.1. Contractor shall provide copies of licensed copies of application software / configuration & system software in the form of CD (in duplicate) for all IEDs, meters, SAS etc.

3.11.0 Quality Assurance, Inspection & Testing

3.11.1. To ensure that the supply and services under the scope of this Contract whether manufactured or performed within the Contractor's works or at his Sub Contractor's premises or at site or at any other place of work are in, accordance with the specifications, the Contractor shall adopt suitable quality assurance programme to control such activities at all points necessary. Such programme shall be outlined by the Contractor and shall be finally accepted by the Employer after discussions before the award of Contract. A quality assurance programme of the Contractor shall generally cover but not limited to the following:

a) His organization structure for the management and implementation of the proposed quality assurance programme
b) Documentation control System.
c) Qualification data for Contractors key personnel.
d) The procedure for purchases of materials, parts components and selection of sub-Contractors services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
e) System for shop manufacturing including process controls and fabrication and assembly controls.
f) Control of non-conforming items and system for corrective action.
g) Control of calibration and testing of measuring and testing equipment.
h) Inspection and test procedure for manufacture.
i) System for indication and appraisal of inspection status.
j) System for quality audits.
k) System for authorizing release of manufactured product to the Employer.

l) System for maintenance of records.
m) System for handling storage and delivery and
n) A quality plan detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of supply.

The Quality plan shall be mutually discussed and approved by the Employer after incorporating necessary corrections by the Contractor as may be required.

3.11.2. **Quality Assurance Documents**

The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Employers inspection of equipment/material. The Employer or his duly authorized representatives reserves the right to carry out Quality Audit and quality surveillance of the systems and procedures of the Contractors/his vendors Quality Management and Control Activities.

3.12.0 Employer's Supervision

3.12.1. To eliminate delays and avoid disputes and litigation it is agreed between the parties to the Contract that all matters and questions shall be resolved in accordance with the provisions of this document.

3.12.2. The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Employer, pursuant to the contract, will include but not be limited to the following.

a. Interpretation of all the terms and conditions of these Documents and Specifications.
b. Review and interpretation of all the Contractors drawings, engineering data etc.
c. Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the contract.
d. Inspect, accept or reject any equipment, material and work under the Contract, in accordance with the Specifications.
e. Issue certificate of acceptance and/or progressive payment and final payment certificate.
f. Review and suggest modification and improvement in completion schedules from time to time, and
g. Supervise the Quality Assurance Programme implementation at all stages of the works.

3.12.3. **Inspection and Inspection Certificate**

3.12.4. The Employer, his duly authorized representative and/or outside inspection agency acting on behalf of the Employer shall have, at all reasonable times, access to the premises and works of the Contractor and their sub-contractor(s)/sub-vendors and shall have the right, at the reasonable times, to inspect and examine the materials and workmanship of the product during its manufacture.

3.12.5. All routine and acceptance tests whether at the premises or works of, the Contractor or of any Sub Contractor, the Contractor except where otherwise specified shall carry out such tests free of charge. Items such as labour, materials, electricity, fuel, water, stores apparatus and instruments as may be reasonably demanded by the Employer/inspector or his authorized representative to carry out effectively such tests in accordance with the Contract shall be provided by the Contractor free of charge.

3.12.6. If desired by the Employer, the Contractor shall also carry out type tests as per applicable Standards for which Employer shall bear the expenses except in cases where such tests have to be carried out in pursuance to ***Clause 3.13.3***. The Contractor is required to quote unit rates of type test charges in a separate

Schedule (if such schedule is provided in the Bidding Document) in pursuance to this Clause. However, these type test charges shall not be taken into account in comparing Price Bid.

3.12.7. The inspection by Employer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Programme forming a part of the Contract.

3.12.8. **Tests**

The type, acceptance and routine tests and tests during manufacture to be carried-out on the material and equipment shall mean as follows:

i) Type Tests shall mean those tests, which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification. These tests shall be carried out on samples prior to commencement of commercial production against the order. The Bidder shall indicate his schedule for carrying out these tests.

ii) Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.

iii) Routine Tests shall mean those tests, which are to be carried out on the material to check requirements, which are likely to vary during production.

iv) Tests during Manufacture shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him.

v) The norms and procedure of sampling for these tests will be as per the Quality Assurance Programme to be mutually agreed to by the Contractor and the Employer.

3.12.9. The standards and norms to which these tests will be carried out are specified in subsequent Sections of this Specification. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified or as mutually agreed to between the Contractor and the Employer in the Quality Assurance Programme.

3.12.10. For all type and acceptance tests, the acceptance values shall be the values specified in this Specification or guaranteed by the Bidder or applicable Standards, as applicable.

3.13.0 Type Test Reports

3.13.1. Materials, which have never been tested for critical performance, shall not be accepted. In such cases, a promise or agreement by a bidder to have the equipment tested after award of a contract is not acceptable.

3.13.2. All Bids must be accompanied by the Type Test Certificates of materials offered (refer Clause 3.13.5below). Such type test certificates shall be acceptable only if:

(a) Tests are conducted in an independent **testing laboratory with NABL accreditation**, or

(b) Tests are conducted in manufacturer's own laboratory.

In this case (i) the laboratory must have **NABL accreditation**; and

(ii) tests have been witnessed by technically qualified representatives of earlier clients or purchaser.

3.13.3. **Test reports to be acceptable must be related directly to the equipment offered i.e., it is fully identical in design, rating and construction with the equipment for which the type test certificates have been submitted. Test reports for higher class (by capacity/voltage etc.) of equipment are acceptable with**

commitment to perform the type tests free of any charge on the particular equipment after the award of contract.

3.13.4. **Type Test Reports older than five (5) years on the date of Technical bid opening shall not be accepted.**

3.14.0 Guaranteed Technical Particulars

3.14.1. The Guaranteed Technical Particulars of the various items shall be furnished by the Bidders with the Technical Bid in the prescribed Schedules attached in Section-4 of the bidding document. The Bidder shall also furnish any other information's as in their opinion is needed to give full description and details to judge the item(s) offered by them.

3.14.2. The data furnished in Guaranteed Technical Particulars should be the minimum or maximum value (as per the requirement of the specification) required. A Bidder may guarantee a value more stringent than the specification requirement. However, for testing purpose or from performance point of view, the material shall be considered performed successfully if it achieves the minimum/maximum value required as per the technical specification. No preference what so ever shall be given to the bidder offering better/more stringent values than those required as per specification except where stated otherwise.

3.15.0 Construction Tools, Equipment Etc.

3.15.1. The Contractor shall provide all the construction equipment, tools, tackle and scaffoldings required for construction, erection, testing and commissioning of the works covered under the Contract. He shall submit a list of all such materials to the Employer before the commencement of work at site. These tools and tackle shall not be removed from the site without the written permission of the Employer.

3.16.0 Materials Handling and Storage

3.16.1. All the supplies under the Contract as well as Employer supplied items (if any) arriving at site shall be promptly received, unloaded and transported and stored in the stores by the Contractor.

3.16.2. Contractor shall be responsible for examining all the shipment and notify the Employer immediately of any damage, shortage, discrepancy etc. for the purpose of Employer's information only. The Contractor shall submit to the Employer every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection at site. Any demurrage, and other such charges claimed by the transporters, railways etc., shall be to the account of the Contractor.

3.16.3. The Contractor shall maintain an accurate and exhaustive record-detailing out the list of all items received by him for the purpose of erection and keep such record open for the inspection of the Employer.

3.16.4. All items shall be handled very carefully to prevent any damage or loss. The materials stored shall be properly protected to prevent damage. The materials from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such materials at Site.

3.16.5. All the materials stored in the open or dusty location must be covered with suitable weather-proof and flameproof covering material wherever applicable.

3.16.6. The Contractor shall be responsible for making suitable indoor storage facilities, to store all items/materials, which require indoor storage.

3.16.7. The Contractor shall have total responsibility for all equipment and 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, equipment and works from theft, fire, pilferage and any other damages and loss.

3.17.0 Contractor's Materials brought on to Site

3.17.1. The Contractor shall bring to Site all equipment, components, parts, materials, including construction equipment, tools and tackles for the purpose of the work under intimation to the Engineer. All such goods shall, from the time of their being brought vest in the Employer, 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 Engineer. The Contractor shall nevertheless be solely liable and responsible for any loss or destruction thereof and damage thereto.

3.17.2. The Employers shall have a lien on such goods for any sum or sums, which may at any time, be due or owing to him by the Contractor, under in respect of or by reasons of the Contract. After giving a fifteen (15) days' notice in writing of his intention to do so, the Employer shall be at liberty to sell and dispose of any such goods, in such manner, as he shall think fit including public auction or private treaty.

3.17.3. After the completion of the Works, the Contractor shall remove from the Site under the direction of the Employer's site representative, the materials such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of the Employer's site representative. If the Contractor fails to remove such materials within fifteen (15) days of issue of a notice by the Employer's site representative, the Employer's site representative shall have the liberty to dispose of such materials as detailed under clause **3.17.2** above and credit the proceeds thereto to the account of the Contractor.

3.18.0 Commissioning Spares

3.18.1. It will be the responsibility of the Contractor to provide all commissioning spares required for initial operation till the Employer declares the equipment as ready for commissioning. All commissioning spares shall be deemed to be included in the scope of the Contract at no extra cost to the Employer.

3.18.2. These spares shall be received and stored by the Contractor at least 1 month prior to the schedule date of commencement of commissioning of the respective equipment and utilized as and when required. The unutilized spares and replaced parts, if any, at the end of successful completion of performance and guarantee test shall be the property of the Contractor and he will be allowed to take these parts back at his own cost with the permission of Employer's Representative.

3.19.0 Consignee Details

The Contractor shall supply the materials at 132kV Haflong GSS, AEGCL

Section - 4

Technical Specification

(This Section contains the Technical Requirements and supplementary information that describe the Goods and Related Services)

4.1 TECHNICAL SPECIFICATIONS FOR CONTROL & RELAY PANELS

4.1.1 SCOPE AND GENERAL TECHNICAL CONDITIONS

a) This Section is intended to cover the design, manufacture, assembly, testing at manufacturer's works and erection, testing & commissioning of Indoor Relay and Control Panels.

b) The Control and Relay Panels required are for control and protection of the Power Transformers and Feeders according to requirements. The supply shall include all accessories, special tools, supporting steels, spare parts, drawings, relevant software, instruction manuals etc. The panels shall be supplied complete with all accessories as specified and completely assembled and all internal wiring completed.

c) The sub-stations shall have automation as per IEC 61850 protocol in Bay & Station level. The bidder has to supply the C&R panels to match the requirement of Sub-station Automation System (SAS).

d) Design and fabrication of Control & Protection Panels for mounting the relay and relay assemblies along with all necessary accessories like switches, indicating lamps etc. and wiring up of the same to provide self contained and ready to use protection as per this specification.

e) Complete testing at manufacturer's works of the relays and protection schemes after mounting and fully wiring up in the Control & Protection Panels.

4.2 STANDARDS:

All equipment and all component parts supplied under this specification shall conform in all respects to the latest issue of relevant IEC and Indian Standard Specifications except where specified otherwise in this specification. Equipment meeting any other authoritative standards which ensure an equal or better quality may also be acceptable.

4.3 TYPE TEST REPORTS

4.3.1 Equipment, which have never been tested for critical performance, shall not be accepted. In such cases, a promise or agreement by a bidder to have the equipment tested after award of a contract is not acceptable.

4.3.2 All Bids must be accompanied by the full Type Test Certificates of equipment offered. Such type test certificates shall be acceptable only if:

i) Tests are conducted in KEMA/NABL accredited laboratory, *for GOOSE messaging etc as per relevant IEC 61850 Standards.*

ii) Inter-operability Tests are conducted in manufacturer's own laboratory. In this case (i) the laboratory must have ISO 9000 (or its equivalent) series certification; and (ii) tests have been witnessed by technically qualified representatives of earlier Indian clients of Central/State Transmission Utilities.

iii) The Validity of the Type Test Reports of CRP, Relays, BCUs and Energy Meters shall be as per CEA's "Guidelines for the Validity Period of Type Tests Conducted on Major Electrical Equipment in Power Transmission System", File No CEA-PS-14-80/1/2019-PSETD Division-Part (2).

4.4 TYPE OF PANEL

4.4.1 All simplex panels shall be swing type with front glass door with locking arrangement. The number of Panels shall be as per Table 1 below:

Table -1

	400kV	**220kV**	**132kV**	**33kV**
Feeder Panel	2 Nos	2 Nos	2 Nos	1 No
Bus Coupler/Tie Breaker/Sectionalizer Panel	1 No	1 No	1 No	1 No
Reactor Panel	1 No			
Bus Bar Protection panel	4 Nos	2 Nos		
Transformer Panel	400/220/33kV AT	220/132kV AT	132/33kV PT	
	2Nos (Minimum)	2Nos (Minimum)	2 Nos	

4.4.2 Swing type Simplex Control and Relay Panels shall consist of vertical swing front panels with equipment mounted thereon and having front glass door. As there will be no rear door, manufacturer shall have to keep suitable swing angle, for maintenance & testing of equipment, circuitry inspection etc. Panel front shall have lockable glass door.

4.4.3 These panels shall be of the following approximate dimensions:

i. Height: 2250mm + 15mm anti-vibration pad + 50 mm (base)
ii. Depth: 800mm to 1000 mm
iii. Width: 800 mm to 1000 mm
iv. Operating Height: 1800 mm.

4.4.4 For 33kV feeder, panel shall be of simplex type and it should accommodate one 33kV feeder in a single cubicle and one BCU will control single 33kV feeder.

4.5 CONSTRUCTIONAL FEATURES:

a) The panels shall be completely metal enclosed to ensure a dust, moisture and vermin proof atmosphere. The enclosure shall provide a degree of protection not less than IP 54 in accordance with IS-2147/IEC-60529.
b) Panels shall be rigid free standing and floor mounting type and comprise of structural frames enclosed completely with specially selected texture finished, cold rolled sheet steel of thickness not less than 3.15 mm for weight bearing members of the panels such as base frame, front sheet and door frames and not less than 2.0 mm for sides, door top and bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.

c) All joints shall be made flush and all edges shall be bent at right angles and rounded. All structural members shall be bolted or welded together. Necessary arrangement shall be provided for bolting together the adjacent panels as well as for fastening them to the floor. The opening required for mounting the equipment shall be punched or cut and filed smooth.
d) All doors, removable covers and panels shall be sealed all around with synthetic rubber gaskets Neoprene/EPDM generally conforming to provision of IS 11149. However, XLPE gaskets can also be used for fixing protective toughened glass doors. Ventilating louvers, if provided shall have screens and filters. The screens shall be made of either brass or GI wire mesh.
e) Panels shall have additional rolled channel plinth at the bottom with smooth bearing surface. The panels shall be fixed on the embedded foundation channels with intervening layers of anti-vibration strips made of shock absorbing materials which shall be supplied by the contractor.

4.6 MOUNTING OF EQUIPMENTS:

a) All equipment on and in the panels shall be mounted and completely wired to the terminal blocks ready for external connection. All equipment on the front panels shall be mounted flush. Terminal markings shall be clearly visible.

b) Bay level intelligent electronic devices (IED) BPU for protection and control (BCU) and the Managed Ethernet Switch shall be housed in the C&R panels installed in the local control room

4.7 INTERNAL WIRING:

a) Panels shall be supplied completely with interconnecting wiring provided between all electrical devices mounted and wired in the panels and between the devices and terminal blocks for the devices to be connected to equipment outside the panels. When panels are located adjacent to each other all inter panel wiring and connections between the panels shall be furnished and wiring shall be carried out internally. These adjacent inter panel wiring shall be clearly indicated in the drawing furnished by the supplier.

b) Wiring shall be carried out with 1100-Volt grade, single core, stranded copper conductor wires with PVC insulation. The minimum size of stranded copper conductor used for internal wiring shall be as follows:

i) All circuits except instrument transformers circuits: 1.5 sq. mm. per lead.
ii) Instrument transformers circuit: 2.5 sq. mm. per lead.

c) Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided near the top of the panel running throughout the entire length of the panels.

d) Wire terminals shall be made with solder less clamping type of tinned copper lugs, which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wires and shall not fall off when the wire is disconnected from blocks.

e) Interconnections to adjacent panels shall be brought out to a separate set of terminals blocks located near the slots or holes meant for taking the interconnecting wires. Arrangement shall permit easy interconnection to adjacent panels at site and wires for this purpose shall be provided by the supplier looped and bunched properly inside the panel.
f) A laminated copy of total schematics is to be fixed on the inside of door.

4.8 TERMINAL BLOCKS:

a) All internal wiring to be connected to the external equipment shall terminate on terminal blocks, preferably vertically mounted on the side of each panel. Terminal blocks shall be of 1100 volts grade and have 10 amps continuous rating, moulded piece, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Terminal block designs include a white fibre-marking strip with clear plastic/silicon chip on terminal covers. Marking on the terminal strips shall correspond to block and terminal number on the wiring diagram.
b) Terminal blocks for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. Current transformer secondary leads shall also be provided with short-circuiting and earthing facilities.
c) At least 20% spare terminals shall be provided on each panel and these terminals shall be uniformly distributed on all terminal blocks.
d) There shall be a minimum clearance of 250 mm between first row of terminal blocks and associated cable gland plates. Also, the clearance between two rows of terminal blocks shall be a minimum of 150 mm. A steel strip shall be connected between adjacent terminal block rows at 450-mm intervals for support of incoming cables.

4.9 PAINTING:

a) All Sheet steelwork shall be phosphated in accordance with IS 6005.

b) Oil grease, dirt and warp shall be thoroughly removed by emulsion cleaning. Rust and scale shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.

c) After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying. The phosphate coating shall be sealed with application of 2 (two) coats of ready mixed, stoving type zinc chromate primer. The first coat may be 'flash dried' while the second shall be stoved.

d) After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. The second finishing coat shall be applied after completion of tests. Exterior Paint shall be texture finishing with RAL 7032 paint shade.

e) Each coat of primer and finishing paint shall be of a slightly different shade to enable inspection of the painting.

f) The inside of the panels shall be glossy white.

g) A small quantity of finishing shall be supplied minor touching up required at site after installation.

4.10NAME PLATES AND MARKINGS:

a) All equipment mounted on front and rear side as well as equipment mounted inside the panel shall be provided with individual nameplates with equipment designation engraved. Also, on the top of each panel on front as well as rear side large and bold name plates shall be provided for circuit /feeder designation.

b) All front mounted equipment shall be also provided at the rear with individual name plates engraved with Tag numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring. The nameplates shall be mounted directly by the side of the respective equipment and shall not be hidden by the equipment wiring.

c) Nameplates shall be made of non-rusting metal or 3 ply lamicord. Nameplates shall be black with white engraved lettering.

4.11MISCELLANEOUS ACCESSORIES:

a) A 240 Volts, single-phase plug points shall be provided in the interior of each cubicle with ON-OFF switch for connection of headlamp.

b) Each panel shall be provided with a LED lighting fixtures for the interior illumination of the panel complete with all fittings, i.e., lamp, switch (controlled by panel door)

c) Each control panel shall be provided with necessary arrangements for receiving, distributing, isolating and fusing of D.C. and A.C. supplies of various control, AC & DC supervision, signalling, lighting and space heater circuits. MCBs of requisite capacity with fail indicators shall be used, HRC fuse is not acceptable. The main input A.C. and D.C. circuits will be protected with miniature circuit breakers.

4.12EARTHING:

a) All panels shall be equipped with an earth bus securely fixed along with inside base of the panels. The materials and the sizes of the bus bar shall be at least 25X4 mm copper. When several panels are mounted joining each other, the earth bus shall be made continuous and necessary connectors and clamps for this purpose shall be included in the scope of supply. Provisions shall be made for extending the earth bus bar to future adjoining panels on either side.

b) All metallic cases of equipment shall be connected to the earth bus by independent copper wires of size not less than 2.5 sq. mm. Earthing wire shall be connected on terminals with suitable clamp connectors and soldering shall not be permitted.

c) PT and CT secondary neutrals or common lead shall be earthed at one place only at the terminal blocks, where they enter the panels.

4.13 RECORDING METERS (ABT TRIVECTOR METERS):

4.13.1 General

All meters shall be housed in dust proof, moisture resistant, black finished cases and shall be suitable for tropical use. They shall be accurately adjusted and calibrated at works and shall have means of calibration, check and adjustment at site.

All these instruments and meters shall be flush mounted type and back connected, suitable for panel mounting.

The ABT meters shall be SAMAST compatible as per specification given in subsequent chapter.

The meters should be compatible to IEC62052-11 and IEC62053-22, IEC62053-24, IS14697, IS15959.

4.14 RELAYS:

4.14.1 General

a) All relays shall conform to the requirements of IS 3231/ IEC 60255/ IEC 61000 or other relevant standards.

b) All protective relays shall be numerical type and communication protocol shall be IEC 61850. Further, test levels of EMI as indicated IEC 61850 shall be applicable to these relays.

c) Two sets of relevant software for relay configuration & setting, maintenance etc to be supplied to each station. The numeric relay and software shall be upgradable.

d) The protective relays shall be suitable for efficient and reliable operation of the protection scheme described in the specification. Necessary auxiliary relays and timers required for interlocking schemes for multiplying of contacts suiting contact duties of protective relays and monitoring of control supplies and circuits etc. also required for the complete protection schemes described in the specification shall be provided. All protective relays shall be provided with at least two pairs of potential free isolated output contacts. Auxiliary relays and timers shall have pairs of contacts as required to complete the scheme contacts shall be silver faced with spring action. Relay case shall have adequate number of terminals for making potential free external connections to the relay's coils and contacts, including spare contacts.

e) Relays shall be suitable for flush or semi-flush mounting with connectors from rear.

f) All draw out cases or plug in type modular cases will have proper testing facilities. The testing facilities provided on the relays shall be specifically stated in the bid. All protective relays shall be with proper online testing facilities without isolation from TB where inputs viz CT/ PT and DC are wired. All main relays shall be provided with test plug to test the relay online & required test handle may be invariably indicated. Necessary test plug shall be in the supplier's scope of supply and shall be supplied loose. Unless otherwise specified all auxiliary relays and timers shall be supplied either in non-draw out cases or plug in type modular cases.

g) All A.C. relays shall be suitable for operation at 50 Hz. A.C. Voltage operated relays shall be suitable for 110 volts VT secondary and current operated relays for 1Amp. CT secondary. DC auxiliary relays and timers shall be designed for 110 volts/ 220 volts DC and shall operate satisfactorily between 70% and 110% of rated voltage. Voltage operated relays shall have adequate thermal capacity for continuous operation.

h) All Protective relays, auxiliary relays and timers except the lockout relays and interlocking relays shall be provided with self-reset type contacts. All protective relays, trip relays and timers shall be provided with externally/ electrically reset positive action operation indicators provided with proper inscription. All protective relays which do not have built-in hand reset operation indicators shall have additional auxiliary relays with operating indicators for this purpose. Similar separate operating indicators (auxiliary relays) shall also be provided in the trip circuits of protections located outside the board such as Buchholz relays, temperature protection etc.

i) No control relays that shall trip the circuit breaker when the relays are de-energized shall be employed in the circuits.

j) All relays shall withstand a test voltage of 2.5 kV, 50 Hz rms. voltage for one second.

k) Auxiliary seal-in unit provided in the protective relays shall preferably be of shunt reinforcement type. If series relays are used the following shall be strictly ensured:

   i. The operating time of the series seal-in unit shall be sufficiently shorter than that of the trip coil relay in series with which it operates to ensure definite operation of the flag indicator of the relay.

   ii. Seal - in unit shall obtain adequate current for operation when one or more relays operate simultaneously.

iii. Impedance of the seal-in unit shall be small enough to permit satisfactory operation of the trip coil on trip relays when D.C. supply is minimum.

iv. Trip-circuit seal-in is required for all trip outputs, irrespective of the magnitude of the interrupted current. The trip-circuit seal-in logic shall not only seal-in the trip output(s), but also the relevant initiation signals to other scheme functions, (e.g., initiate signals to the circuit-breaker failure function, reclosing function etc.), and the alarm output signals.

v. Two methods of seal-in are required, one based on the measurement of AC current, catering for those circumstances for which the interrupted current is above a set threshold, and one based on a fixed time duration, catering for those circumstances for which the interrupted current is small (below the set threshold).

vi. For the current seal-in method, the seal-in shall be maintained until the circuit-breaker opens, at which time the seal-in shall reset and the seal in method shall not now revert to the fixed time duration method. For this seal-in method, the seal-in shall be maintained for the set time duration. For the line protection schemes, this time duration shall be independently settable for single- and three-pole tripping.

vii. Seal-in by way of current or by way of the fixed duration timer shall occur irrespective of whether the trip command originates from within the main protection device itself (from any of the internal protection functions), or from an external device with its trip output routed through the main protection device for tripping. Trip-circuit seal-in shall not take place under sub-harmonic conditions (e.g. reactor ring down).

l) Whenever solid state auxiliary relays are used the following requirements shall be met with:
   i) The printed circuit cards shall be of fibre glass type and the contact shall be gold plated. All connectors with the connector pegs shall be through wire wrapping. All solder Joints on the printed circuit boards shall be encapsulated or covered with varnish.
   ii) The components shall be loaded by less than half of their rated values. The resistor shall be of carbon composition or metal oxide type and the capacitors shall be plastic film or tantalum type. Stringent measures including shielding of long internal wiring should be taken to make relays immune to voltage spikes. Relays must withstand 5kW, 1x150 microsecond, O.5 Joule source energy impulse test or 1.5 MHz damp oscillations with initial value of 2.5 kV decaying to half the initial value in 6 microseconds with internal source impedance of 150 ohms.
   iii) The supplier shall ensure that the terminals of the contacts of the relays are readily brought out for connectors as required in the final approved scheme.
   iv) DC /DC converter shall be provided in the solid state protective relays wherever necessary in order to provide a stable auxiliary supply for relay operation. Provision of DC cell in the protective relays as relievable stand-by power supplies will however not be acceptable.

m) Provision shall be made for easy isolation of trip circuits of each relay for the purpose of testing and maintenance.

n) All protective relays and alarm relays shall be provided with one/two extra isolated pair of contacts wired terminals exclusively for Employer's use.

o) All relays and their drawings shall have phase indications as R-Red, Y-Yellow, B-Blue.

p) The bidder shall include in his bid a list of installations where the relays quoted have been in satisfactory operation.

4.14.2 General Specification of Numerical Relays

a) Numerical Relays shall be provided for the following applications:
   i) Distance Protection (Main I & Main II) of different make for 400KV and 220 kV lines.
   ii) Distance Protection for 132 kV lines
   iii) Back up directional over current and earth fault relays for 132 kV Lines.
   iv) Back up non directional over current (3 O/C) and earth fault relays for 33kV lines
   v) Bus Bar Protection.
   vi) Integrated Numerical Transformer Differential Protection as Main –I & Main-II of different make with non-directional overcurrent and earth fault function with high set units for power and autotransformers/ reactors.
   vii) Reactor Protection.

b) All Numerical Relays should have following minimum features.
   i. Relays shall be communicable on IEC61850 protocol without any protocol converter. Certificate from KEMA confirming interoperability, Goose messaging & publishing as per IEC61850 standard shall be submitted along with the tender. The relay shall have suitable communication facility for future connectivity to SCADA.
   ii. Relays shall have one no. front RJ45 or USB port (for RS 232 port Converter to USB shall be supplied for each substation along with spare) for Local Relay Parameterization and Two nos. rear FO port for connectivity to SAS over IEC61850 protocol.
   iii. The relay shall have self-communication port monitoring feature and failure shall generate alarm.
   iv. The relay shall have sufficient battery back up to keep the internal clock running for at least 2 years in absence of auxiliary supply. The capacitor discharging power is not sufficient and won't be accepted. Proper battery back must be provided.
   v. Should have minimum 12 configurable LEDs.
   vi. Should have sufficient Binary Inputs and Binary Outputs as per scheme requirement including 30% BI & BO spare.
   vii. All BI/BOs shall be site configurable
   viii. Shall have front minimum 3 lines LCD display with Alpha numeric keypad.
   ix. Numerical relays are to be provided with built in Event / Disturbance / Fault Recorder features.
   x. The bidder shall bring out in the bid that the Numerical relays providing different protection features / application in a single unit if any one of the application/ features goes out of service the other feature/application (s) will remain un-effected.
   xi. The relays shall be site configurable (Including logic development**)**
   xii. Configured features & set values shall be in non-volatile memory
   xiii. Must have real time clock for time stamping of events/ disturbances with time synchronization inputs (GPRS etc.). Time synchronisation through SNTP compatible.
   xiv. The major component cards shall be hot swappable and front or rear loading.
   xv. The relays should have self-diagnostic features identifying area of fault or failure of a particular component or card.
   xvi. Shall have in built Circuit Breaker Failure protection based on undercurrent detection and/or circuit breaker auxiliary contact status. Provision shall be given to initiate the breaker fail logic using a digital input from external protection devices.
   xvii. Relay shall have inbuilt PRP ports

c) Hardware based measurement shall not be acceptable.

d) The relay should have high immunity to electrical and electromagnetic interference.

e) The same relay shall be provided with both 1A CT inputs and shall be site selectable.

f) It shall be possible to energise the relay from either AC or DC auxiliary supply. Auxiliary dc supply shall be suitable for both 110 and 220 Volt and shall be site selectable.

g) Be capable of performing basic instrumentation functions and displaying various instantaneous parameters like Voltage, current, active power, reactive power, phase sequence etc. in primary values. Additionally, all sequence current and voltage values shall be displayed on-line. Also, the direction of power flow shall be displayed.

h) Extensive disturbance recording facility shall be available for at least up to 10 seconds to capture maximum possible information. Necessary software shall be provided for retrieving and analysing the records.

i) Facility for developing customised logic schemes inside the relay based on Boolean logic gates and timers should be available. Facility for renaming the menu texts as required by operating staff at site should be provided.

j) Must have additional feature of local breaker back up protection
   (i) The relay shall have built in Circuit Breaker Supervision Functions.
   (ii) The relay shall be able to detect any discrepancy found between NO & NC contacts of breaker.
   (iii) The relay shall monitor number of breaker trip operations.
   (iv) The relay shall also monitor the breaker operating time.

k) The relays shall have the following tools for fault diagnostics:
   i) Fault record (shall be function of IED): – The relay shall have the facility to store fault records with information on cause of trip, date, time, trip values of electrical parameters.
   ii) Event record (shall be function of IED): – The relay shall have the facility to store time stamped event records with 1ms resolution.
   iii) Disturbance records (shall be function of IED): – The relay shall have capacity to store disturbance records of at least 10 sec. duration and sampling rate per cycle shall be more than 15.

l) It shall be possible to preserve stored information in the event of an auxiliary supply failure with the help of a battery backup.

m) The relay settings shall be provided with password protection.

n) It shall be possible to change the relay setting from the front panel using the key pads/ Work station of SAS and Laptop.

o) The relay shall have comprehensive self-diagnostic feature. This feature shall continuously monitor the healthiness of all the hardware and software elements of the relay. Any failure detected shall be annunciated through an output watchdog contact. The fault diagnosis information shall be displayed on the LCD. These records shall also be retrieved from local as well as remote terminal through the communication port.

p) The Numerical Relays shall be provided with 2 sets of common support software compatible with latest version of Windows OS which will allow easy settings of relays in addition to uploading of event, fault, disturbance records, and measurements to Station HMI/ DR Work Station. The relay settings shall also be changed from local or remote using the same software**.**

q) In case of line protection and transformer/reactor protection, the features like fault recorder, disturbance recorder and event logging function as available (including if available as optional feature) in these relays shall be supplied and activated **at no extra cost to the owner**.

r) The manufacturer shall have to provide up-graded support software if any within 10 years span.

4.15 Integrated Numerical Transformer Protection Relay

a) GENERAL REQUIREMENTS:

i. Shall be stable during magnetising inrush and over fluxing conditions. Stabilization under inrush conditions shall be based on the presence of second harmonic components in the differential currents.
ii. Shall have saturation discriminator as an additional safeguard for stability under through fault conditions.
iii. Shall have zero sequence current filtering, which may be deactivated separately for each winding, for special applications.
iv. Shall have software to take care of the angle & ratio correction of CT inputs.
v. Shall have all output relays suitable for both signals and trip duties

b) FUNCTIONAL DESCRIPTIONS:

The integrated Numerical Transformer Protection Scheme shall have following functional qualities:

1) Differential protection:

i) The relay shall be biased differential protection with triple slope tripping characteristics with faulty phase identification / indication. The range for the differential pick-up shall be from 0.1 to 2.5 p.u. Its operating time shall not exceed 30 ms at 5 times rated current.
ii) The relay shall have two adjustable bias slopes from 20 % to 150 % and slope from 40% to 150 %, to provide maximum sensitivity for internal faults with high stability for through faults
iii) The relay shall have an unrestrained high set element to back up the biased differential function and the setting range for it shall have a minimum setting of 5pu and a maximum setting of 30pu.
iv) The relay shall have the second harmonic restraint feature for stability under transformer inrush condition. The setting shall be 15-25%.
v) Further, the fifth harmonic blocking for stability under transient over fluxing condition shall be provided.
vi) Have suitable non-linear resistors along with stabilizing resistor for CT Circuit to limit peak voltage during in-zone faults in case of high impedance type.
vii) Have a fault recording feature to record graphic form of instantaneous values of following analogue channels during faults and disturbances for the pre fault and post fault period: Current in all three windings in nine analogue channels in case of 400kV class or 6 analogue channels for lower voltage transformers and voltage in one channel.
viii) The Disturbance recorder function built in the Differential Protection IED shall have the facility to record the following external digital channel signals associated with transformer which shall be wired to differential relay apart from the digital signals pertaining to differential relay:
    a) REF Protection Operated
    b) HV Breaker Status (Main &Tie/Transfer both separately)
    c) IV Breaker status (Main & Tie/Transfer both separately)
    d) Bucholz/OLTC/OTI/WTI alarm
    e) Bucholz/ PRD/ SPR Trip
    f) Group-A/ Group-B lockout relay trip

Necessary hardware and software, for automatic up loading of the data captured by disturbance recorder to the personal computer (DR Work Station) available in the substation, shall be included in the scope.

2) Restricted Earth fault Protection:

The scheme shall have in-built restricted earth Fault (REF) for both the windings. The REF function shall be configurable to Auto Transformer also. This function should be provided to maximise the sensitivity of the protection of earth faults. Both the Differential relay shall have inherent low impedence REF element. Also, the Bidder shall have to supply standalone High Impedence REF Relays separately for the Transformers. The REF function should be able to share Current Transformers with the biased differential function. As in traditional REF protections, the function should respond only to the fundamental frequency component of the currents. For star/star transformer, both the windings shall be protected through REF, as such relay shall have sufficient analogue channels to accommodate the same.

3) Over fluxing Protection:

i) The over fluxing protection shall be built in the relay. By pairs of V/f and t, it shall be possible to plot the over fluxing characteristics so that accurate adaptation of the power transformer data is ensured.
ii) In addition, the relay should have a definite time element for alarm.
iii) The relay should monitor all the three phase voltages for calculation of V/f and should take the highest voltage for V/f calculation.

4) Thermal Overload Protection:

i) Shall have two stages of thermal overload protection for alarm and trip condition with continuously adjustable setting range of 100-400% of rated current and time constant setting range of 1.0 to 10.00sec continuously.
ii) Shall be single pole type.
iii) Shall have a drop off/pick up ratio greater than 95%.
iv) Shall have separately adjustable time delay relays for alarm having a setting range of 1to 10 seconds continuously.

5) Over Current and Earth fault protection:

i) The relay shall have three stages of definite time over current protection as backup operating with separate measuring systems for the evaluation of the three phase currents, the negative sequence current and the residual current.
ii) In addition, the relay shall have three stages of Inverse time over current protection operating based on one measuring system each for the three phase currents, the negative sequence current and the residual current.
iii) Shall have additional features to provide under/ over voltage protection.
iv) Shall have additional features to provide under frequency protection.
v) The Earth fault relay shall have directional IDMT characteristic with a definitive minimum time of 3.0 seconds at 10 times setting and have a variable setting range of 20-80% of rated current. (with selectable IEC Curves).
vi) The Earth fault relay shall have low transient, overreach high set instantaneous unit of continuously variable setting range 200-800 % of rated current.

6) Transformer Neutral Current relay (for 400 KV class transformer only) shall

i) Have directional IDMT characteristic with a definite minimum time of 3.0 seconds at 10 times setting and have a variable setting range of 20-80% of rated current. (with selectable IEC Curves)

4.16 Over Current and Earth Fault Relays

These relays shall be of numeric, single/multi pole, directional /non-directional type with high set element as specified. These relays shall have the following features/characteristics:

(i) IDMT characteristic with definite minimum time of 3 second at 10 times setting.
(ii) Other operating curves such as inverse, very inverse shall be selectable
(iii) Adjustable setting range of 50-200 % and 20-80% of rated current for over current and earth fault relays respectively.
(iv) The directional relays shall have a Maximum torque angle of 45° current leading for directional over current unit & 30 lag for directional earth fault. Other MTAs should be settable
(v) Voltage polarizing coil: 63.5 or 110volt
(vi) Must have faulty phase, type of fault identification
(vii) The directional relays shall have over voltage/ under voltage & under frequency built in protection
(viii) The relay shall have blocking scheme on Reverse Power Flow.
(ix) Include LED indicators.

4.17 Trip Circuit Supervision Relay

- Trip circuit supervision relay shall be provided for each pole of the breaker for both trip coils with separate DC source.
- The relay shall be capable of monitoring the healthiness of each 'phase' trip-coil and associated circuit of circuit breaker during 'ON' and 'OFF' conditions.
- The relay shall have adequate contacts for providing connection to alarm and event logger.
- The relay shall have time delay on drop-off of not less than 200 milli seconds and be provided with operation indications for each phase.

4.18 Master Trip Relay

- High Speed Tripping Relay shall be instantaneous (operating time not to exceed 10 milli-seconds
- The relays shall reset within 20 milli seconds
- The relay shall be re-settable/configurable from local SCADA.
- The relays shall be D.C. operated
- The relays shall have adequate contacts to meet the requirement of scheme, other functions like auto-reclose relay, LBB relay as well as cater to associated equipment like event logger, Disturbance recorder, fault Locator, etc.
- The relays shall be provided with operation indicators for each element/coil.

4.19 Other Trip Relays

- For transformer protection other trip relays for Buchholz, winding & oil temperature high, PRD etc. shall be provided as per requirement.
- These High-Speed Tripping Relays shall be instantaneous (operating time not to exceed 10 milli-seconds)
- The relays shall have adequate contacts to meet the requirement of scheme

4.20 Dc Supply Supervision Relay

- The relay shall be capable of monitoring the failure of D.C. supply to which, it is connected.

- It shall have adequate potential free contacts to meet the scheme requirement.
- The relay shall have a 'time delay on drop-off' of not less than 100 milli seconds and the relays shall be provided with operation indicator/flag.

4.21 BAY CONTROL UNIT (BCU)

- The BCU must be type tested at KEMA/Internationally or nationally accredited other testing laboratories for IEC 61850 and other tests as per relevant IEC standards. The bidder is to submit type test reports along with the bid. The validity of type test report shall be as per Clause 4.3.2(iii).

- The bay unit shall use industrial grade components. The BCU shall be modular type. The bay level unit, based on microprocessor technology, shall use numerical techniques for the calculation and evaluation of externally input analogue signals. These shall incorporate select-before-operate control principles as safety measures for operation via the HMI. These shall perform all bay related functions, such as control commands, bay interlocking, data acquisition, data storage, event recording and shall provide inputs for status indication and outputs for commands. These shall be directly connected to the switchgear. The bay unit shall acquire and process all data for the bay (Equipment status, fault indications, measured values, alarms etc.) and transmit these to the other devices in sub-station automation system. In addition, these shall receive the operation commands from station HMI and SLDC. The bay unit shall have the capability to store all the data for at least 24 hours even if there is any power off conditions during the day. The BCU shall have back up directional & non-directional back-up protection features in addition to Auto Reclose, LBB, U/O voltage and Synchronization function. The BCU shall have redundant power supply card i.e. in case of failure of one source/Card fail, the redundant shall pick up instantly. Power supply card failure shall generate necessary alarm to local SCADA.

- The BCU must have metering functions like phase current, phase voltages, active & apparent power, power factor, frequency etc. The metering functions shall be accurate for a minimum of 1% of rated current.

- BCU HMI shall display complete mimic of the respective bay, and operator shall be able to select the equipment in the mimic diagram for which operation of equipment is required. The control operation shall be password protected. For 33kV, the HMI should display one bay and control thereof.

- The mimic diagram shall indicate the live & dead portion of the Bay.
- The BCU shall be capable to generate password for maintenance shutdown.
- One Bay level unit shall be provided for supervision and control of each 400KV, 220KV, 132kV and 33kV bay (a bay comprises of one circuit breaker and associated disconnectors, earth switches and instrument transformer). If the 33kV bus section comprises isolator only, then the isolator shall be controlled from the transformer LV side bay and same is the case for Bus PT Isolator which shall be controlled by Transformer LV side BCU. The Bay level unit shall be equipped with analogue and binary inputs/outputs for handling the control, status monitoring and analogue measurement functions. All bay level interlocks are to be incorporated in the Bay level unit so as to permit control from the Bay level unit/ local bay mimic panel, with all bay interlocks in place, during maintenance and commissioning or in case of contingencies when the Station HMI is out of service.
- The BCU shall have sufficient number of BI/BO as per the scheme requirement with additional 30% spare BI/BO.
- The Bay level units shall be installed in the control and relay panels located in the control room.

- The Bay level unit shall meet the requirements for withstanding electromagnetic interference according to relevant parts of IEC 61850. Failure of any single component within the equipment shall neither cause unwanted operation nor lead to a complete system breakdown.

- **Input / Output (I/O) modules**
  The I/O modules shall form a part of the bay level unit and shall provide coupling to the substation equipment. The I/O modules shall acquire all switchgear information (i.e., data coming directly from the switchgear or from switchgear interlocking devices) and transmit commands for operation of the switchgear.

  The measured values of SF6 Gas Pressures, Operating Mechanism Pressures, WTIs, OTI etc. are received through transducers to Bay Level Unit

  The digital inputs shall be acquired by exception with 1 ms resolution. Contact bouncing in digital inputs shall not be assumed as change of state.

- **Operator Interface**
  The HMI of BCU shall display the following information

  i. The bay name
  ii. The date and time
  iii. The local / remote/maintenance bay mode
  iv. The auto-recloser function status (on / off),
  v. The synchrocheck function status (on / off),
  vi. The interlock function status (on / off),
  vii. A list of measurements (in real value)
  viii. The bay graphical representation
  ix. The bay events classified in a chronological order
  x. The bay alarms
  xi. The list of disturbance records available
  xii. Bay interlock diagram

In addition, it shall be possible to plug a PC laptop on the Bay and get the full substation operator interface.

4.22PROTECTION SCHEME FOR PANELS:

- **33KV Feeder Protection Panel**
  The 33kV Feeder Panels shall be provided non directional single/ multi pole relays as specified in Clause 4.17. One triple pole over current relays for phase faults and one Earth Fault Relay for Earth Faults with high set elements shall be provided.

- **Power and Auto Transformer Protection Panel**
  Integrated Transformer protection scheme as detailed in Clause 4.16 of the BID shall be provided for Panels for all Power and Auto Transformers:

  (a) Main Protection -1

  Biased transformer differential protection employing relay type specified in Clause 14.16. The scheme shall include also following:

  (i) Second and fifth harmonic restraint feature.
  (ii) The relay shall also provide Restricted Earth Fault Protection

(iii) The scheme shall have suitable input and output for transformer auxiliary protection like Buchholz, oil temperature, winding temperature etc.

(iv) Over-fluxing protection

(v) The relay shall have Back up protection features i.e over current and earth fault with high set element.

(vi) The high set unit should not operate due to transformer in-rush current.

(b) Main Protection - 2

Protection function shall be same as Main Protection – I.

(c) Backup Protection

The backup protection shall be provided with non-directional relays as specified in Clause 4.16/ 4.17. One triple pole over current relays for phase faults and one Earth Fault Relay for Earth Faults with high set elements shall be provided. The high set unit should not operate due to transformer in-rush current.

4.23 TESTS

- The supplier shall carryout all tests as per relevant standards as all associated equipment including relays, meters, instruments etc. The supplier shall submit all that reports to Employer for approval before despatching the control and relay panels. The Bidder shall also submit along with the bid type test reports for relays instruments, meters and other devices of the type and class being offered. Bidder has to submit KEMA test certificate for Numeric relay on interoperability compliance of IEC 61850 in general and GOOSE messaging and publishing in particular along with the bid.

- Control and relay panels shall be subjected to the following tests:
    a. Mechanical operation test.
    b. Verification of degree of protection.
    c. High voltage test (2000 volts for 1 minute)
    d. Electrical control interlock and sequential operation test.
    e. Verification of wiring as per approved schematic.
    f. Interoperability test as per IEC 61850 (interoperability with ABB, AREVA, SIEMENS, GE and SEL)

4.24 PRE-COMMISSIONING TESTS

- The contractor shall have to perform following minimum Pre-commissioning tests for commissioning of the C&R panels. For this purpose, the contractor shall arrange all required tools and testing equipment at site

(i). IR values of all circuits

(ii). Measurement of burden in CT & PT circuits

(iii). Primary current injection of CT circuits with connected burden

(iv). Energisation of PTs at suitable low voltage and measurement of PT inputs at all measuring points

(v). Secondary ac current injection of relays, dynamic testing of all numeric relays. Tracing of zone curves, limits. Checking of relay timings, inherent or set values. For this testing, the contractor shall bring 'Omicron' or equivalent test kit.

(vi). Testing of voltage related elements like directional element, over fluxing, over/ under frequency, over/ under voltage features, tracing of curves and checking limits of set values and associated timings

(vii). Checking of Boolean logic gates, BI/BO points of the numeric relays, checking conformity to specification and checking of set logics

(viii). Checking of stability and sensitivity of differential zones by suitably applying 3-phase low voltages and shorting of primary circuits. Measurements of voltage and current inputs to all relays.

(ix). Checking stability & sensitivity of bus differential relay zones by suitably injecting current

(x). Primary injection of REF connected CTs, measurements of relay inputs and checking of stability and sensitivity of REF scheme

(xi). Checking registration of event and disturbance records in the numeric relays and downloading

(xii). Testing of carrier aided protection schemes and simulation with regard to transmission and receipt of protection signalling

(xiii). Testing of AR schemes

(xiv). Checking of healthiness of each dc circuit of panels

(xv). Simulation of faults like Buchholz, OTI, WTI and other relays and checking of tripping of breaker and connected annunciation

(xvi). Operation of master trip relays, tripping of breaker through each trip coil and checking of interlocks

(xvii). Simulation of faults like low gas, air pressure and checking operation of interlocks. Checking anti pumping scheme of CB

(xviii). Simulation to Check Checking of PT selection schemes

(xix). Simulation to Check interlocks of all CB and isolator interlocks

(xx). Simulation to Check annunciation of all events in BCU (Bay control unit) as well as SAS (Sub-station Automation System)

(xxi). Simulation to Check of logic of BCU

(xxii). Operation of tap changing of transformer through SAS

(xxiii) The pre-commissioning checklist will be further developed by the contractor and will seek approval prior to commencement of pre-commissioning tests from the DGM, MRT Circle, AEGCL. The tests will be witnessed and approved by him or by his authorized officers.

4.25TECHNICAL DATA SHEET FOR THE RELAY AND CONTROL PANELS

- Features to be provided in various Relay and Control panels are indicated below. Description below are only indicative; the Contractor shall ensure that all items are included in their offer to complete the schemes described in the Specification whether such items are specifically mentioned or not.

33kV feeder Panels:

SL NO	ITEM	RATINGS AND PARTICULARS
		33 kV feeder panel with single bus system
		VI
A	LINE PANELS	
1	Protection and relays:	

	(a) Distance Protection Scheme	-.
	(b) Back up directional over current and earth fault scheme	-
	(c) Back up non directional over current and earth fault scheme	1 set
	(d) LBB Protection Scheme.	Can be function of BCU/IEDs
	(e) Trip Circuit Supervision Relay for pre and post-closing	Supervision for 2 trip coils
	(f) DC Supply healthy monitoring scheme, for two DC source	2 No.
	(f 1) DC Changeover	2 Nos
	(g) AC Supply healthy monitoring scheme	1 No.
	(h) High Speed Trip relay	2 No.
	(i) Auxiliary relay, timer relay for healthiness of relays, auto reclose communication link etc.	As required (Can be function of BCU)
	(j)Trip Transfer Relay	2 sets
	(j) Line CVT-Bus PT selection relay	-
	(k) 33kV Incomer PT selection	1 No
	(l) Distance to Fault Locator	-
2	**Meters**	
	(a) ABT tri-vector Meter (SAMAST Compliant) with TTB	1 No
3	**Controls/ Status indication/ Annunciation**	
	Bay Control Unit (IED with HMI)	1No.
4	Managed Ethernet Switch	1No.

Transformer Protection Panels

SL NO	ITEM	RATINGS AND PARTICULARS			
		400/220/33 kV Transformer Panel	220/132 kV Transformer Panel	220/33 kV Transformer Panel	132/33kV Transformer Panel
		VII	VIII	IX	X
B	**TRANSFORMER PANELS**				
1	**Protection and Relays:**				
	(a) Differential Protection Scheme	2 No.	2 No.	2 No.	2 No.
	(b) Restricted Earth Fault Protection Scheme	1 No (inherent low imp REF) + 1 No standalone High Imp REF Relay	1 No (inherent low imp REF) + 1 No standalone High Imp REF Relay	1 No (inherent low imp REF) + 1 No standalone High Imp REF Relay	1 No (inherent low imp REF)+ 1 No standalone High Imp REF Relay
	(c) Back up non-directional over current scheme for HV side	Could be feature of relay	Could be feature of relay	Could be feature of relay	Could be feature of relay
	(d) Back up non-directional over current and earth fault scheme for MV/LV Side	Could be feature of relay	Could be feature of relay	Could be feature of relay	Could be feature of relay
	(e) LBB Protection Scheme.	Can be function of BCU/IEDs	Can be function of BCU/IEDs	Can be function of BCU/IEDs	Can be function of BCU/IEDs
	(f) Over Fluxing Protection scheme	2 Set	1 Set	1 Set	1 Set-
	(g) Overload protection scheme	1 No	1 Set	1 Set	1 Set
	(g.1) Tertiary Side O/C and Open Delta Voltage Protection	1 set	-	-	-
	(h) Trip Circuit Supervision Relay Scheme for ascertaining pre and post-closing healthiness	Supervision for 4 trip coils (2 trip coils per breaker on each side)	Supervision for 4 trip coils (2 trip coils per breaker on each side)	Supervision for 4 trip coils (2 trip coils per breaker on each side)	Supervision for 4 trip coils (2 trip coils per breaker on each side)
	(i) DC Supply healthy monitoring scheme	3 No.	3 No.	2 No.	2 No.
	DC Changeover Relay	2 No.	2 No.	2 No.	2 No.
	(j) AC Supply healthy monitoring scheme	1 No.	1 No.	1 No.	1 No.
	(k) High Speed Trip relay (HV Side)	2 No.	2 No.	2 No.	2 No.
	(l) High Speed Trip relay (MV/LV Side)	2 No.	2 No.	2 No.	2 No.
	Trip Transfer Relay	2 sets	2 sets	2 sets	2 sets

	(m) PT Selection Scheme on HV / MV/LV Side as applicable	1No. Complete Bus PT Selection Scheme (Can be function of BCU)	1No. Complete Bus PT Selection Scheme (Can be function of BCU)	1No. Complete Bus PT selection scheme (can be function of BCU)	1No. Complete Bus PT selection scheme (can be function of BCU)
	(n) Tripping relay for Bucholtz, PRD, WTI, OTI, OSR etc.	As required	As required	As required	As required
	(o) Alarm auxiliary for Bucholtz, PRD, WTI, OTI, MOG, Air Cell leakage etc.	As required (Can be a function of BCU)	As required (Can be a function of BCU)	As required (Can be a function of BCU)	As required(Can be a function of BCU)
	(p) Transformer tap position status/ raise & lower	Can be a function of BCU	Can be a function of BCU	Can be a function of BCU	Can be a function of BCU
2	**Meters**				
	(a) ABT tri-vector Meter (SAMAST Compliant) With TTB	2 No. (on 400kV and 220 kV side)	2No. (on 220 kV and 132 kV side)	2No. (on 220 kV and 33kV side)	2 Nos. (132 kV & 33 kV side)
3	**Controls / interlocks / Status indication/ Annunciation**				
	Bay Control Unit (IED), one no each for HV & LV side.	2 Nos. (Function of BCU/ SAS)	2 Nos. (Function of BCU/ SAS)	2 Nos. (Function of BCU/ SAS)	2 Nos. (Function of BCU/ SAS)

4.26 SAS Integration

Augmentation of Bays under present scope with existing Sub Station Automation System: The scope of the Bidder shall include but not limited to integration of IEDs under present scope of augmentation with existing substation automation which is based on IEC 61850 and capability enhancement of same as required including up-dating of system database, displays, development of additional displays and reports as per requirement. Furthermore, supply of Ethernet switches and other equipment for integration with existing SAS shall be included in the scope of the Contractor.

All SAS integration work should be carried out in presence of existing SAS OEM authorized personnel, arrangrement of SAS OEM authorized personnel under the scope of the contractor.

Any upgradation of hardware and software for above integration shall be in the scope of contractor including license fee (if any).

4.26 TECHNICAL SPECIFICATION FOR SAMAST METER

4.26.1 Interface Energy Meters Technical Specification

i) Basic Features of Interface Energy Meters

a) The energy metering system specified herein shall be used for tariff metering for bulk, inter-utility power flows, in different States of India. Static composite meter shall be installed at interface points as a self-contained device for measurement of Voltage (V), Frequency (f), Active (Wh) and Reactive (VArh) energy exchanged in each successive 5 min time block. All meters shall be compliant to IS 15959 and its latest amendments.

b) Each meter shall have a unique identification code, which shall be marked permanently on its front, as well as in its memory. All meters supplied to as per this specification shall have their identification code starting with "IEM", which shall not be used for any other supplies. "IEM" shall be an eight digit running serial number, further followed by "A" and "B" for the use with CT secondary of 1A and 5A respectively. This shall be mutually agreed between the buyer and the vendor. Note: The secondaries of all the CT cores will be 1A.

c) The meters shall be suitable for communication with external device like modem, DCU, etc. which shall be able to communicate with CDCS for local/remote data transfer. The meter shall compulsorily have at least 1 optical port for taking reading through Hand Held Unit (HHU).

d) Auxiliary Supply to IEM- The meters shall normally operate with the power drawn from DC auxiliary power supply (Range 110V to 220V DC) to reduce the Voltage Transformer (VT) burden. In addition, there shall be provision to operate the meter from the Voltage Transformer (VT) secondary circuit having a rated secondary line-to-line voltage of 110V, and current transformers (CTs) having a rated secondary current of 1 A or 5A. Any further transformers/ transactions/ transducers required for their functioning shall be in-built in the meters. Necessary isolation and/or suppression shall also be built-in, for protecting the meters from surges and voltage spikes that occur in the VT and CT circuits of extra high voltage switchyards. The reference frequency shall be 50Hz. Also, the meter shall have suitable tolerance (up to 15% either side) for DC supply.

e) The meters shall safely withstand the usual fluctuations arising during faults etc. In particular, VT secondary voltages 115% of Vref applied continuously and 190% of Vref for 3.0 seconds, and CT secondary current 150% of Iref applied continuously and 30 times of Iref applied for 0.5 seconds shall not cause any damage to or maloperation of the meters.

f) The meters shall continue to function for the remaining healthy phase(s), in case one or two phases of VT supply fails. In case of a complete VT supply failure, the computation of average frequency shall be done only for the period during which the VT supply was available in the 5-minute block. Any time block contraction or elongation for clock correction shall also be duly accounted for.

g) The total burden imposed by a meter for measurement and operation shall be defined as per IS 14697. An automatic backup for continued operation of the meter's calendar-clock, and for retaining all data stored in its memory, shall be provided through a long-life battery, which shall be capable of supplying the required power for at least 2 years. The meters shall be supplied duly fitted with the batteries, which shall not require to be changed for at least 10 years, as long as total VT supply interruption does not exceed two years. The battery mounting shall be designed to facilitate easy battery replacement without affecting PCB of the meter.

h) The meters shall fully comply with all stipulations in IS 14697 except those specifically modified by this specification. The reference ambient temperature shall be 27°C.

i) Each meter shall have a test output device (visual), as per clause 6.11 of IS 14697.1999, for checking the accuracy of active energy (Wh) measurement. The preferred pulsing rate is twenty (20) per Wh for CT sec-1A and four (4) per Wh for CT sec –5A. It shall be possible to couple this device to suitable testing equipment also.

j) **Exception Management**- The three line-to-neutral voltage shall be continuously monitored and in case any of these falls below defined threshold (70% of Vref), meter shall have suitable indication on LED/ LCD. The meter shall also have provision for low voltage event logging in meter memory in case of any phase voltage going below a defined threshold. The time blocks in which such a voltage failure occurs/persists shall also be recorded in the meter's memory with a symbol "*" if 3 Phase RMS voltage applied to the IEM is in between 5% to 70% of Vref and if Voltage is less than 5% of Vref, meter should record Zero voltage symbol "Z".

k) **Time Accuracy** - Each meter shall have a built-in calendar and clock, having an accuracy of 10 seconds per month or better. The calendar and clock shall be correctly set at the manufacturer's works. The date (year-month-day) and time (hour-min.-sec.) shall be displayed on the meter front on demand. Meter shall have the intelligence to synchronize the time with GPS (Local GPS/CDCS GPS/ NAVIC) signal and from PC using software. Limited time synchronization through meter communication port shall be possible at site. When an advance or retard command is given, twelve subsequent time blocks shall be contracted or elongated by five seconds each. All clock corrections shall be registered in the meter's memory and suitably shown on print out of collected data.

l) A touch key or push button shall be provided on the meter front for switching on the display and for changing from one indication to the next. The display shall switch off automatically about one minute after the last operation of touch key/push button. When the display is switched on, the parameter last displayed shall be displayed again, duly updated.

m) The whole system shall be such as to provide a print out (both from the local PC, and from remote central computer) of the following format:

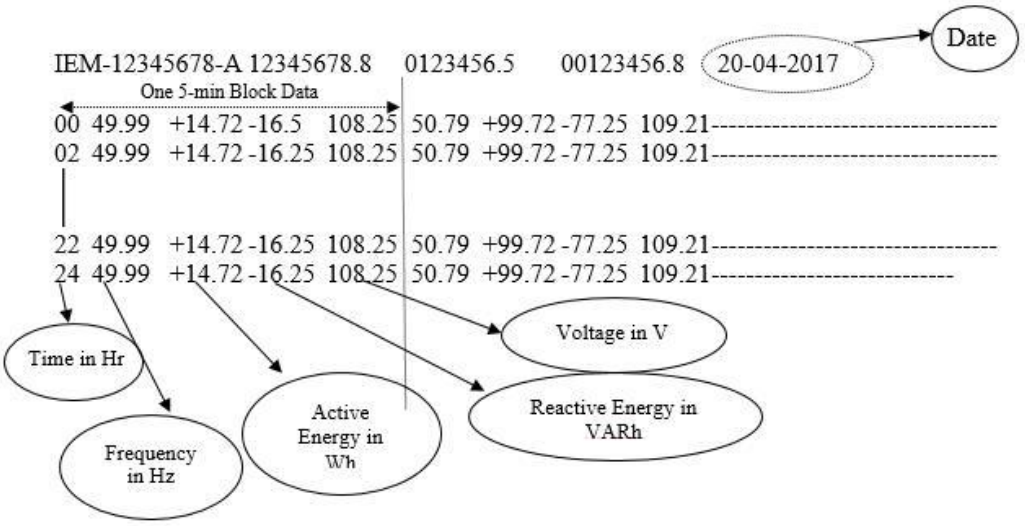

Figure 1: Standard Raw Data Format for IEM

There are 4 values in one 5 min time block. The first row shall contain the meter data for 2 hours, i.e., 24 time blocks, 00 hrs to 02:00 hrs. Similarly, the 2nd row shall contain the data for the next 2 hours and henceforth.

The above data shall be available in text file format (file extension as per IEEE standard/.txt) exportable to Excel. Indication of time retard or advance to be provided without disturbing the proposed format. Each 5-min block data consists of Frequency (in HZ), Active energy (in Wh), Reactive energy (in VARh) and Voltage (in V). All 5 minute Wh and VARh figures in. NPC/output report shall be rounded off upto third decimal.

n) The portable hand held unit (HHU)/ Common meter reading instrument (CMRI)/ Data Collecting Device (DCD) shall be having IS-15959:2011 compatibility for standardized parameters. The optical coupler for tapping data stored in the SEMs memory shall be compatible universally across different make of SEMs.

4.26.2 Constructional Features

a) The meters shall be supplied housed in compact and sturdy, metallic or moulded cases of non-rusting construction and/or finish. The cases shall be designed for simple mounting on a plane, vertical surface such as a control/relay panel front. All terminals for CT and VT connections shall be arranged in a row along the meter's lower side. Terminals shall have a suitable construction with barriers and cover, to provide a secure and safe connection of CTs and VTs leads through stranded copper conductors of 2.5 sq. mm. size.

b) All meters of the same model shall be totally identical in all respects except for their unique identification codes. They shall also be properly sealed and tamper evident, with no possibility of any adjustment at site, except for transactions allowed in IS 15959.

c) The meters shall safely withstand, without any damage or mal operation, reasonable mechanical shocks, earthquake forces, ambient temperature variations, relative humidity etc. in accordance with IS-14697. They shall have an IP-51 category dust-tight construction, and shall be capable of satisfactory operation in an indoor, non-air conditioned installation.

d) Either the meters shall have built-in facility (e.g., test links in their terminals) for in-situ testing, or a separate test block shall be provided for each meter.

4.26.3 Measurement

i. The active energy (Wh) measurement shall be carried out on 3-phase, 4-wire principle, with an accuracy as per class 0.2S (IS 14697).

ii. The meter shall compute the net active energy (Wh) sent out from the substation bus bars during each successive 5 min block, and store it in its memory up to fourth decimal with plus sign if there is net Wh export and with a minus sign if there is net Wh import. Further Wh data in. NPC/output report shall be rounded upto third decimal.

iii. The meter shall count the number of cycles in VT output during each successive 5 min block, and divide the same by 300 (60 sec/min x 5min) to arrive at the average frequency. The frequency data shall be stored in the meter's memory in Hertz up to third decimal. Further Frequency data in. NPC/output report shall be rounded off upto second decimal.

iv. The meter shall continuously compute the average of the RMS values of the three line-to-neutral VT secondary voltages as a percentage of 63.51 V, and display the same on demand. The accuracy of the voltage measurement/computation shall be at least 0.5%, a better accuracy such as 0.2% in the 95-105% range being desirable. The voltage data shall be stored in the meter's memory in volts up to third decimal. Further voltage data in. NPC/output report shall be rounded off upto second decimal.

v. The Reactive energy (VARh) measurement shall be carried out on 3-phase, 4-wire principle, with an accuracy of 0.5S as specified in IS 14697. The meter shall compute the net Reactive energy (VARh) sent out from the substation bus bars during each successive 5 min block, and store it in its memory up to fourth decimal with plus sign if there is net VARh export and with a minus sign if there is net VARh import. It shall also display on demand the net VARh sent out during the previous 5 min block. Further VARh data in. NPC/output report shall be rounded off upto third decimal.

vi. The meter shall also integrate the reactive energy (VARh) algebraically into two separate registers, one for the period for which the average RMS voltage is above 103.0%, and the other for the period for which the average RMS voltage is below 97.0 %. The current reactive power (VAR), with a minus sign if negative, and cumulative reactive energy (VARh) readings of the two registers (>103% and <97%) shall be displayed on demand. The readings of the two registers at each midnight shall also be stored in the meter's memory. When reactive power is being sent out from substation bus bars, VAR display shall have a plus sign or no sign and VARh registers shall move forward. When reactive power flow is in the reverse direction, VAR display shall have negative sign and VARh registers shall move backwards. Generally, the standard PT ratios are 33kV/110V, 132kV/110V, 220 kV /110 V, 400 kV /110 V and 765 kV / 110 V. However, at the time of commissioning the vendor may confirm the same from site and configure the meter accordingly to ensure correct recording of reactive energy.

vii. For CT secondary rating of 5A, all computations, displays and memory storage shall be similar except that all figures shall be one fifth of the actual, worked out from CT and VT secondary quantities.

viii. Further, the meter shall continuously integrate and display on demand the net cumulative active energy sent out from the substation bus bars up to that time. The cumulative Wh reading at each midnight shall be stored in the meter's memory. The register shall move backwards when active power flows back to substation bus bars.

ix. Errors for different power factors shall be as defined in IS14697.

x. For reactive power (VAR) and reactive energy (VARh) measurements, IS14697 shall be complied with. The accuracy of measurement of reactive energy shall be as per class 0.5S.

xi. The harmonics shall be filtered out while measuring Wh, V and VARh, and only fundamental frequency quantities shall be measured/computed.

xii. Data security shall be ensured as per IS 15959 (three layers of security).

4.26.4 Memory/ Storage

i. Each meter shall have a non-volatile memory in which the following shall be automatically stored:

ii. Average frequency for each successive 5 min block, in Hertz up to third decimals.

iii. Net Wh transmittal during each successive 5 min block, up to fourth decimal, with plus sign if there is net Wh export and with a minus sign if there is net Wh import.

iv. Net VARh transmittal during each successive 5 min block, up to fourth decimal, with plus sign if there is net VARh export and with a minus sign if there is net MVARh import.

v. Cumulative Wh transmittal at each midnight, in eight digits including one decimal.

vi. Cumulative VARh transmittal for voltage high condition, at each midnight in eight digits including one decimal.

vii. Cumulative VARh transmittal for voltage low condition, at each midnight, in eight digits including one decimal.

viii. Average RMS voltage for each successive 5min block.

ix. Date and time blocks of failure of VT supply on any phase, as a star (*)/ (Z) mark.

x. The meters shall store all the above listed data in their memories for a period of fifteen (15) days. The data older than fifteen (15) days shall be erased automatically

xi. The software provided at CDCS, i.e., SLDC, will manage all functionalities of collection of data through DCUs, validate the data, store the data in a database, and manage the complete system. Software will also have a scheduler for scheduling the task of collection of data periodically. The periodicity of data collection shall be user defined.

4.26.5 Display

Each meter shall have digital display for indication of the following (one at a time), on demand:

i.	Meter serial no. and model:	IEM12345678A or IEM12345678B
ii.	Date (year month day /yyyy mm dd):	20160311 d
iii.	Time (hour min sec /hh mm ss):	195527 t
iv.	Cumulative Wh reading:	1234567.8 C
v.	Average frequency of the previous block:	49.89 F
vi.	Net Wh transmittal during the previous block:	28.75 E
vii.	Net VARh transmittal during the previous block:	18.75 R
viii.	Average % Voltage:	99.2 U
ix.	Reactive power (VAR):	106.5 r
x.	Voltage - high VARh register reading:	1234567.5 H
xi.	Voltage - low VARh register reading:	1234567.4 L

xii. Low battery indication

xiii. The three line-to-neutral voltages shall be continuously monitored and in case any of these falls below 70 %, a preferably flashing three LEDs (one LED/phase) provided on meter's front shall become steady. They shall go off if all three voltages fall below 70 %. The LED shall automatically resume flashing when all VT secondary voltages are healthy again.

xiv. The two VARh registers (xv and xvi) shall remain stay-put while VT supply is unhealthy.

Any other better or more informative mechanism to display the above shall be preferred. The above shall be mutually agreed between the meter buyer and vendor.

Navigation keys to be provided at the meter front plate to navigate the display menu.

4.26.6 Communication

i) Each meter must have an optical port on its front for tapping all data stored in its memory through HHU. In addition to the above each meter shall also be provided with a RS-485, Ethernet and USB port on one of its sides, from where all the data stored in the meter's memory can also be transferred to CDCS (through DCU), local computer and external storage. The overall intention is to tap the data stored in the meter's memories at a scheduled time from any of the above mentioned ports or any other means and transmit the same to a remote central computer using suitable means of communication. It shall be possible to securely download the IEM data through an USB port via external storage thereby removing the requirement of a MRI (Meter Reading Instrument). It shall be ensured that data transfer through USB shall be unidirectional only i.e., from Meter to external storage device in an authentication process. Meter data shall be tamper-proof.

ii) All meters shall be compatible with Optical port, RS-485 port, Ethernet port and USB / RS-232 port all together at a time and communicate independently. It shall also be possible to obtain a print out (hard copy) of all data collected from the meters, using the local PC. Data collection from any local laptop/PC shall be possible by installing data collection software. Entire project has to be based on Optic Fibre/GSM/4G/3G.

iii) The Tenderer may design appropriate architecture for providing end to end metering solution. He is free to decide upon the best solution out of all the available options to ensure that data from all IEMs in ASSAM are available at State Load Despatch Centre by the scheduled time. However, the entire responsibility of fully functional end to end metering system shall rest with the Tenderer in order to meet the performance levels as given in this document. The communication provider may adopt Optical Fibre/GSM/3G/4G communication technology or a combination of these technologies as per the site requirement adopting best available technology in the proposed area of implementation. The successful Tenderer shall be responsible for proper data exchange among IEM, DCU, CDCS, MDP and other operational/requisite software as part of fully functional metering system.

The operational testing of all the network elements has to be demonstrated by the Tenderer to the satisfaction of the utility.

iv) The Tenderer shall provide the necessary software which would enable a local PC/ CDCS to:

i. Accept the data from the Optical/Ethernet/WAN and store it in its memory in user defined formats (text, csv, xls, etc.) in a user-defined file name (file name format must be ddmmyy substation name-utility name).
ii. Polling feature along with a task scheduler to run the data downloading software at a pre-designated date and time repeatedly or by manually selecting a meter. File naming for such downloaded data should also be in user-defined format. A detailed activity log shall also be available for each downloading operation.
iii. Upload/Import meter data (binary files) in the software for further processing. While uploading, there shall be provision to upload all selected files with single key-stroke.
iv. Convert the binary file(s) to text file(s). There should be provision to select multiple files based on filename, convert all selected files with single key-stroke and store the text files in the same location where binary files are stored.
v. Display the collected data on PC's screen in text format, with forward/backward rolling
vi. Print out in text format the data collected from one or more meters, starting from a certain date and time, as per operator's instructions

vii. Transmit the collected data, in binary format, through an appropriate communication link to the central computer, starting from a certain date and time, as per operator's instructions.

viii. Store the collected data in binary format, on a CD/Pen Drive. In addition to above, in general the software shall be able to convert IEMs data to existing format as well as in tabular (.csv) format as applicable.

ix. The above software shall further ensure that absolutely no tampering (except erasing of complete data with password protection) of the collected metering data is possible during its handling by the PC. The software shall be suitable for the commonly available PCs, (Windows) and shall be supplied to Owner in a compatible form to enable its easy loading into the PCs available (or to be installed by the Owner/others) at the various substations.

x. The Tenderer shall ensure data integrity checks on all metered data received from data collection systems.

xi. The quality of installation of the various equipment & power supply wiring to all field equipment shall be as per standards/ regulations/prevailing practices of the utility. The supply of electricity needed for operation and maintenance of entire Metering system shall be provided free of cost by the respective owners of the premises.

4.26.7 Climatic Condition

The meters to be supplied against this specification shall be required to operate satisfactorily and continuously under the following tropical conditions of hot, humid, dusty, rust and fungus prone environment.

Maximum ambient air temperature (°C)	55
Minimum ambient air temperature (°C)	(-) 5
Average Daily ambient air temperature (°C)	32
Maximum Relative Humidity (%)	95
Minimum Relative Humidity (%)	10
Maximum altitude above sea level (m)	1000
Average Annual Rainfall (mm)	1200
Maximum Wind Pressure (Kg/sq.m)	195
Isoceraunic Level (days per year)	50
Seismic Level (Horizontal Accn. In g)	0.3

4.26.8 Quality Assurance

The quality control procedure to be adopted during manufacturing of the specified equipment shall be mutually discussed and finalized in due course, generally based on the established and proven practices of the manufacturer. The software shall be user friendly which can be easily installed in any PC/Laptop irrespective of operating system of the PC/Laptop, and shall be certified for ensuring data handling capabilities. The same shall be demonstrated by the party during technical evaluation. During demonstration party shall bring standard meter. Thereafter software shall be offered for technical compatibility before taking up further necessary action in the procurement process.

4.26.9 Testing

i) All equipment, after final assembly and before dispatch from manufacturer's works, shall be duly tested to verify that is suitable for supply to the Owner. Routine and acceptance tests shall be carried out on the meters in line with IS 14697.

ii) Any meter which fails to fully comply with the specification requirements shall be liable to be rejected by the Owner. However, the Owner may purchase such meters at a reduced price in case of marginal non-compliance, at his sole discretion.

iii) Acceptance Tests for PC Software and data down loading using meter communication ports- All IEMs after final assembly and before despatch from Tenderer's/Manufacturer's works shall be duly tested to verify that they are suitable for downloading data using meter communication ports shall be subjected to the following acceptance test.
iv) Downloading Meter Data from the Meter(s) to PC via optical port.
v) Downloading meter data through USB port and RS 232.
vi) Downloading meter data to DCU/CDCS through Ethernet as well as RS 485 port.
vii) Compatibility with PC Software.
viii) Functioning of Time synchronisation, advance and retard time commands.
ix) Per meter downloading time verification.

Copy of Certificate shall be submitted.

4.26.9.1 **Type Tests**

One (1) meter in a batch shall be subjected to the complete range of type tests as per IS14697 and IS15959, after final assembly. In case of any failure to pass all specified tests, the Tenderer shall arrange to carry out the requisite modifications/replacements in the entire lot of meters at his own cost. After any such modifications and final assembly, two (2) meters selected out of the lot by the Owner's representative shall be subjected to the full range of type tests. The lot shall be accepted by the Owner only after successful type testing.

The meters used for type testing shall be separately identified, duly marked, and supplied to the Owner in case they are fully functional and as good as other (new) meters, after necessary touching up/refurbishing. In case this is not possible, the Tenderer shall provide their replacements at no extra cost to Owner.

The Tenderer shall arrange all type testing specified above, and bear all expenses for the same.

Copy of Test certificate shall be submitted to SLDC.

4.26.10 ANOMALY DETECTION FEATURES

4.26.10.1 The meter shall have features to detect and log the occurrence and restoration of following anomalies, along with date and time of event: 6.1.1. Phase wise Missing Potential – The meter shall detect missing potential (1 or 2 phases) provided the line current is above a specified threshold. The voltage at that stage would be below a specified threshold.

4.26.10.2 Phase wise Current Circuit Reversal – The meter shall detect reversal of polarity provided the current terminals are reversed. This shall be recorded for 1 or 2 phase CT reversal.

4.26.10.3 Voltage Unbalance – The meter shall detect voltage unbalance if there is unbalance in voltages.

4.26.10.4 Current Unbalance – The meter shall detect current unbalance if there is unbalance in load conditions. Meter should ensure true system conditions before going for current unbalance checks.

4.26.10.5 CT Miss – The meter shall detect current miss if the current is below a defined threshold, provided the phase voltage is above a specified threshold. Snapshots of phase wise voltage, phase wise active current and phase wise power factor shall be provided with above specified anomaly events. Further, each meter module shall record the following events along with total duration:

4.26.10.6 Power On/Off – The meter shall detect power off if both the auxiliary supplies fail. The event shall be recorded on the next power up. At the same time power on event shall be recorded. No snapshot shall be logged with this event.

4.26.10.7 Feeder Supply Fail -This event shall be logged when feeder supply, i.e., all the voltages goes below certain threshold. No snapshot shall be logged with this event.

4.26.10.8 Last three hundred & fifty (350) events (occurrence + restoration), in total, shall be stored in the meter memory on first in first out basis.

4.26.10.9 There shall be five separate compartments for logging of different type of anomalies:

Compartment No. 1	100 events of missing potential
Compartment No. 2	100 events of CT reversal
Compartment No. 3	100 events of power failure/ Power on-off
Compartment No. 4	50 events of transaction related changes as per ICS Category B

4.26.10.10 Once one or more compartments have become full, the last anomaly event pertaining to the same compartment shall be entered and the earliest (first one) anomaly event should disappear. Thus, in this manner each succeeding anomaly event shall replace the earliest recorded event, compartment wise. Events of one compartment/ category should overwrite the events of their own compartment/ category only. In general persistence time of 5 min. for occurrence and restoration respectively need to be supported in meter.

4.26.10.11 Anomaly count should increase as per occurrence (not restoration) of anomaly events. Total no. of counts shall be provided on BCS.

4.26.11 Installation and Commissioning

4.26.11.1 The Tenderer shall be responsible for total installation and commissioning of the meters (along with test blocks, if supplied separately) as per Owner's advice, including unpacking and inspection on receipt at site, mounting the meters on control and relay panels at an appropriate viewing height, connection of CT and VT circuits including any required rewiring, functional testing, commissioning and handing over. The Tenderer's personnel shall procure/carry the necessary tools, equipment, materials and consumables (including insulated wires, lugs, ferrules, hardware etc.)

4.26.11.2 As part of commissioning of DCDs the Tenderer shall load the software specified in clause 5(d) into the PCs at the respective substations, and fully commission the total meter reading scheme. He shall also impart the necessary instructions to substation engineers. At least 2-hour training session shall be arranged for substation staff and SLDCs. Also, an operating manual (pdf as well as hard copy) of the meter containing all details of the meter, various data downloading features, etc. shall be made available at site and SLDC.

4.26.11.3 At the time of commissioning, the meters lying in stores shall be time synchronized through GPS signal before installation in the panel to avoid the large time mismatch.

4.26.12 General

4.26.12.1 The meter shall be supplied with latest/compatible software (shall be compatible with old & new meters data download handling). Any new software as required to be installed within warranty period are to be done by party or through remote support to client.

4.26.12.2 The total arrangement shall be such that one (1) operation (click on "data down load from meter" button on software) can carry out the whole operation in about five (5) minutes per meter or preferably faster.

4.26.12.3 Software for windows/office/antivirus to be supplied. Antivirus should not slow down processes and same will be demonstrated during technical demonstration.

4.26.12.4 Above specification is minimum only, any higher standard required for the purpose intended (meter data handling) would be assessed by vendor and would be supplied accordingly. The detailed architecture shall be approved during drawing approval stage.

4.26.12.5 Meter shall be accommodated in existing C&R panel of standard size (Alstom/ ER/ABB/Siemens) in kiosk or C&R panel with door closed. If required before Tendering, Tenderer may collect necessary data or else the scope is deemed to be included.

4.26.12.6 Step by Step procedure (on screen shot type and desktop video capture) shall be provided for

- Installation/Re-installation of Database handling software in to Laptop / PC
- Meter maintenance/site-testing procedure as per relevant IS/IEC standard
- Procedure for data downloading from Meter by HHU/Laptop/Desktop PC.
  As on date of delivery, the supplied meters shall comply with all statutory regulation as required under CERC/CEA/IEGC as applicable and the same should be declared by the vendor during delivery along with warranty certificate.

4.26.13 STANDARDS TO BE COMPLIED WITH

Standards to be complied

S.No	Reference	Reference Title
	Detail	
1	IS-15959:2011	Data Exchange for Electricity Meter Reading Tariff &
		Load Control – Companion Specification
2	IS-14697:1999	Specifications for AC Static Transformer operated Watt
		Hour & VAR-Hour meters, class of 0.2S and 0.5S
3	IEEE 830-1998	IEEE Recommended Practice for Software
		Requirements Specifications

4.26.14 System Security& Cyber Security

4.26.14.1 The Contractor shall document and implement a Cyber Security Policy in line with CERT-In latest guidelines (http://www.cert-in.org.in) to secure the system and the Contractor shall keep updating the Security settings as per the revised guidelines of CERT-In at time to time. Below listed basic strategies shall be followed by the Contractor for making the entire Control Centre immune to Cyber-attacks.

4.26.14.2 All the Hardware, OS and application software shall be hardened.

4.26.14.3 Network partition and DMZ through use of Firewall as required maximizing the security of ABT, OA AND MIS System while facilitating access for data and information to all stake holders.

4.26.14.4 All default user id & passwords shall be changed.

4.26.14.5 All log in/log out and cable plug in/plug out shall also be logged in the System.

4.26.14.6 Prevent unauthorized users from reading or writing data or files, executing programs or performing operations without appropriate privileges

4.26.14.7 Document all user sign on procedure

4.26.14.8 Record all network traffic for detecting unauthorized activity, unusual activity and attempts to defeat system security (Contractor to propose and document what constitutes normal activity/traffic)

4.26.14.9 Vendor has to identify and list the entire network and other protocols that communicate with physical systems and limit what is not required.

4.26.14.10 Network Zoning shall be implemented as per the proposed architecture given in Fig.1. However, the Contractor may suggest other methods of network architecture without compromising the security of the System.

4.26.14.11 No user shall be allowed to access remote network zones other than the adjacent zone.

4.26.14.12 Latest Cyber Security Guidelines of CERT-In specified at (http://www.cert-in.org.in) shall be followed.

4.27.0 TECHNICAL SPECIFICATION OF OUTDOOR CURRENT

4.27.1 SCOPE OF CONTRACT

4.27.1.1 This Section of the Specification covers general requirements for design, engineering, manufacture, assembly and testing at manufacturer's works of 33 kV outdoor Current Transformer.

4.27.2 STANDARDS

4.27.2.1 The equipment covered by this specification shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities.

4.27.2.2 In case of any conflict between the Standards and this specification, this specification shall govern.

4.27.2.3 The current transformer shall comply also with the latest issue of the following Indian standard.

(i)	IS: 2705(Part-I)	Current transformers: General requirement.
(ii)	IS: 2705(Part-II)	Current transformers: Measuring Current transformers
(iii)	IS: 2705(Part-III)	Current transformers: Protective Current transformers
(iv)	IS: 2705(Part-IV)	Current transformers: Protective Current transformers for special purpose application.
(v)	IS: 3156(Part-I)	Potential transformers: General requirement.
(vi)	IS: 3156 (Part-II)	Potential transformers: Measuring Potential transformers
(vii)	IS: 3156 (Part-III)	Potential transformers: Protective Potential transformers

4.27.3 GENERAL REQUIREMENTS

4.27.3.1 The cores of the instrument transformers shall be of high grade, non-aging CRC steel of low hysteresis loss and high permeability.

4.27.3.2 Instrument transformers shall be of Dead Tank design or Live Tank design.

4.27.3.3 The instrument transformers shall be truly hermetically sealed to completely prevent the oil inside the tank coming into contact with the outside temperature. To take care of oil volume variation the tenderer are requested to quote the current transformers with stainless steel diaphragm (bellow).

4.27.3.4 The instrument transformers shall be completely filled with oil.

4.27.3.5 A complete leak proof secondary terminal arrangement shall be provided with each instrument transformers, secondary terminal shall be brought into weather, dust and vermin proof terminal box. Secondary terminal boxes shall be provided with facilities for easy earthing, shorting, insulating and testing of secondary circuits. The terminal boxes shall be suitable for connection of control cable gland.

4.27.3.6 All instrument transformers shall be of single phase unit.

4.27.3.7 The instrument transformers shall be so designed to withstand the effects of temperature, wind load, short circuit conditions and other adverse conditions.

4.27.3.8 All similar parts, particularly removable ones, shall be interchangeable with one another.

4.27.3.9 All cable ferrules, lugs, tags, etc. required for identification and cabling shall be supplied complete for speedy erection and commissioning as per approved schematics.

4.27.3.10 The instrument transformers shall be designed to ensure that condensation of moisture is controlled by proper selection of organic insulating materials having low moisture absorbing characteristics.

4.27.3.11 All steel work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint.

4.27.4 INSULATING OIL

4.27.4.1 The quantity of insulating oil for instrument transformers and complete specification of oil shall be stated in the tender. The insulating oil shall conform to the requirement of latest edition of IS: 335

4.27.5 COMMON MARSHALLING BOXES

4.27.5.1 The outdoor type common marshalling boxes shall conform to the latest edition of IS 5039 and other general requirements specified hereunder.

4.27.5.2 The common marshalling boxes shall be suitable for mounting on the steel mounting structures of the instrument transformers.

4.27.5.3 One common marshalling box shall be supplied with each set of instrument transformers. The marshalling box shall be made of sheet steel and weather proof. The thickness of sheet steel used shall be not less than 3.0 mm. It is intended to bring all the secondary terminals to the common marshalling.

4.27.5.4 The enclosures of the common marshalling boxes shall provide a degree of protection of not less than IP 55 (As per IS 2147).

4.27.5.5 The common marshalling boxes shall be provided with double hinged front doors with pad locking arrangement. All doors and removable covers and plates shall be sealed all around with neoprene gaskets or similar arrangement.

4.27.5.6 Each marshalling box shall be fitted with terminal blocks made out of moulded non-inflammable plastic materials and having adequate number of terminals with binding screws washers etc. Secondary terminals of the instrument transformers shall be connected to the respective common marshalling boxes. All out going terminals of each instrument transformer shall terminate on the terminal blocks of the common marshalling boxes. The terminal blocks shall be arranged to provide maximum accessibility to all conductor terminals.

4.27.5.7 Each terminal shall be suitably marked with identification numbers. Not more than two wires shall be connected to any one terminal. ***At least 20 % spare terminals shall be provided over and above the required number***.

4.27.5.8 All terminal strips shall be of isolating type terminals and they will be of minimum 10 A continuous current rating.

4.27.5.9 All cable entries shall be from bottom. Suitable removable gland plate shall be provided on the box for this purpose. Necessary number of cable glands shall be supplied fitted on to this gland plate. Cable glands shall be screw on type and made of brass.

4.27.5.10 Each common marshalling box shall be provided with two numbers of earthing terminals of galvanised bolt and nut type.

4.27.5.11 All steel, inside and outside work shall be degreased, pickled and phosphate and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint. The colour of finishing paint shall be as follows: -

i) Inside: Glossy White

ii) Outside: Light Grey (Shade No. 697 of IS: 5)

4.27.6 BUSHINGS AND INSULATORS

4.27.6.1 Bushings and Insulators shall be of Porcelain, Solid core type. Porcelain used for the manufacture of bushings and insulators shall be homogeneous, free from defects, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture.

4.27.6.2 Glazing of the porcelain shall be of uniform brown colour, free from blisters, burns and other similar defects. Bushings shall be designed to have sufficient mechanical strength and rigidity for the conditions under which they will be used. All bushings of identical ratings shall be interchangeable.

4.27.6.3 Puncture strength of bushings shall be greater than the dry flashover value. When operating at normal voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the bushings when operating at the normal rated voltage.

4.27.6.4 The design of bushing shall be such that the complete bushing is a self-contained unit and no audible discharge shall be detected at a voltage up to a working voltage (Phase Voltage) plus 10%. The minimum creepage distance for severely polluted atmosphere shall be 25 mm/KV.

4.27.6.5 Sharp contours in conducting parts should be avoided for breakdown of insulation. The insulators shall be capable to withstand the seismic acceleration of 0.5 g in horizontal direction and 0.6g in vertical direction.

4.27.6.6 Bushings shall satisfactorily withstand the insulation level specified in data sheet.

4.27.7 TESTS

4.27.1.1 Routine/Acceptance Tests (all units)

4.27.1.2 **A**ll routine tests shall be carried out in accordance with relevant Standards. All routine/acceptance tests shall be witnessed by the Purchaser/his authorized representative.

4.27.1.3 **Type Tests:** The bidder shall furnish type test certificates and results for the all tests as per relevant Standards along with the bid for current and potential transformers of identical design.

4.27.1.4 Type test certificates so furnished shall not be older than 5 (five) years as on date of Bid opening.

4.27.2 NAME PLATES

4.27.2.1 All equipment shall have non-corrosive name plates fix at a suitable position indelibly mark with full particular there on in accordance with the standard adapted.

4.27.3 MOUNTING STRUCTURES

4.27.3.1 All the equipment covered under this specification shall be suitable for mounting on steel structures.

4.27.3.2 Supply of mounting structures is also in the scope of this tender.

4.27.3.3 Each equipment shall be furnished complete with base plates, clamps, and washers etc. and other hardware ready for mounting on existing steel structures.

4.27.4 SAFETY EARTHING

4.27.4.1 The non-current carrying metallic parts and equipment shall be connected to station earthing grid. For this two terminals suitable for 40mm X 10mm GI strip shall be provided on each equipment.

4.27.5 TERMINAL CONNECTORS

4.27.5.1 The equipment shall be supplied with required number of terminal connectors of approved type suitable for ACSR. The type of terminal connector, size of connector, material, and type of installation shall be approved by the Purchaser, as per installation requirement while approving the equipment drawings.

4.27.6 TECHNICAL DATA SHEET FOR CURRENT

4.27.6.1 For 132 & 33 kV CTs the instrument security factor at all ratios shall be less than five (5) for metering core. If any auxiliary CTs/reactor are used in the current transformers then all parameters specified shall have to be met treating auxiliary CTs as an integral part of the current transformer. The auxiliary CTs/reactor shall preferably be inbuilt construction of the CTs. In case these are to be mounted separately these shall be mounted in the central marshalling box suitably wired up to the terminal blocks.

4.27.6.2 TYPE AND RATING:

All instrument transformer shall be outdoor type, single phase, oil immersed, self-cooled suitable for mounting on steel structure. The instrument transformer shall have the following ratings and particulars.

Item	**Ratings and Particulars**	
(A) Nominal system voltage	**132kV**	**33 kV**
(B) Highest system voltage, kV	145	36
(C) Rated frequency ,HZ	50	50
(D) System earthing	Solidly earth	Solidly earth
(E) Insulation level		
(a) Impulse withstand voltage: kVp	550	170
(b) One minute p.f. Withstand voltage, kV (r.m.s.)	230	70
(F) Short time current for one second, kA	31.5	20
(G) Minimum creepage distance, mm	As per ISS	As per ISS
(H) Temperature rise		
(I) Feeder/ BYPASS/ Bus Coupler CT		
(i) No. of Cores	3	2
(ii) Transformation Ratio	As per schedule of requirement	
(iii)Rated Output		
(a) Core-1	30 VA	30 VA
(b) Core-2	15 VA	15 VA
(c) Core-3		N.A
(iv) Accuracy Class		
(a) Core-1	0.2	0.2
(b) Core-2	5P	5P
(c) Core-3	PS	N.A
(v) Accuracy Limit Factor		
(a) Core-1	--	-
(b) Core-2	10	10
(c) Core-3	-	-
(vi) Instrument security factor		
(a) Core-1	<5	<5
(b) Core-2	-	-
(c) Core-3	-	-
(vii) Minimum Knee point voltage, Volts		
(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3	1200	-
(viii) Maximum secondary resistance, ohm		
(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3	3	N.A
(ix) Maximum exciting current, at Vk/4 mA		

(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3 (at Vk/4)	30	N.A
(J) Transformer CT		
(i) No. of Cores	3	2
(ii) Transformation Ratio	As per schedule of requirement	
(iii)Rated Output	3	3
(b) Core-1	30 VA	30 VA
(b) Core-2	15 VA	15 VA
(c) Core-3	-	-
(iv) Accuracy Class		
(a) Core-1	0.2	0.2
(b) Core-2	5P	5P
(c) Core-3	PS	PS
(v) Accuracy Limit Factor		
(a) Core-1	--	-
(b) Core-2	10	10
(c) Core-3	-	-
(vi) Instrument security factor		
(a) Core-1	<5	<5
(b) Core-2	-	-
(c) Core-3	-	-
(vii) Minimum Knee point voltage, Volts		
(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3	1200	600
(viii) Maximum secondary resistance, ohm		
(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3	3	3
(ix) Maximum exciting current, at Vk/4 mA		
(a) Core-1	-	-
(b) Core-2	-	-
(c) Core-3 (at Vk/4)	30	15

Note: It is intended to use different ratios of the same CT at the same time for various protections and metering cores. The CTS should therefore be suitable for the above purpose by secondary tapings only. The ratio change by secondary taps is acceptable as long as the required CT specifications are achieved at all ratios.

The knee point voltage specified above shall be at higher ratio/ taps.

Section - 5

General Conditions of Supply and Erection of AEGCL

This Section 'General Conditions of Supply and Erection of AEGCL' is supplementary to Section -5 'Special Conditions of Contract' of this document.

Whenever there is a conflict, the provisions in SCC or the other Sections of this document shall prevail over those in the 'General Conditions of Supply and Erection of AEGCL'.

Section - 6

Special Conditions of Contract

This Section 'SCC' is supplementary to Section -5 'General Conditions of Supply and Erection of AEGCL'.
Whenever there is a conflict, the provisions in this Section shall prevail over those in the 'General Conditions of Supply and Erection of AEGCL'.

Section - 6
Special Conditions of Contract

6.0.0 DEFINITION OF TERMS

"Contract" means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein; they shall constitute the Contract, and the term "the Contract" shall in all such documents be construed accordingly.

"Contract Documents" means the documents listed in Article 1.1 (Contract Document) of the Contract Agreement (including any amendments thereto).

"Contract Price" means the price payable to the Supplier as specified in the Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.

"Day" means calendar day

"Year" means 365 days.

"Month" means calendar month.

"Party" means the "Purchaser" or the "Supplier", as the context requires.

"*Purchaser*" means the Assam Electricity Grid Corporation Limited (in short AEGCL) and its assignees.

The "*Supplier*" shall mean the bidder whose tender/ bid has been accepted by the "Purchaser" and shall include the bidder's legal representatives, successors and assignees.

"Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.

"Delivery" means the transfer of the Goods from the Supplier to the Purchaser in accordance with the terms and conditions set forth in the Contract.

"Completion" means the fulfilment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.

"Related Services" means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other similar obligations of the Supplier under the Contract.

The "Specification" shall mean the "Purchaser's Requirements".

"Supplier" means the natural person, a company/firm, or a combination of these, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Supplier.

6.1.0 CONTRACT DOCUMENTS

6.1.1. Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole.

6.2.0 LEGAL JURISDITCTION

6.2.1. For any litigation arising out of the contract which cannot be resolve through mutual agreement or through Arbitration the honorable Guwahati High Court will have sole jurisdiction of all settlement.

6.3.0 LANGUAGE

6.3.1. The ruling language of the Contract shall be English.

6.4.0 SCOPE OF SUPPLY

6.4.1. The Goods and Related Services to be supplied shall be as specified in Schedule No. 1 and Schedule No. 2 of Section -2, Bidding Forms.

6.4.2. Unless otherwise stipulated in expressly limited in the ***Purchaser's Requirements***, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the Goods and Related Services as if such items were expressly mentioned in the Contract.

6.5.0 DELIVERY SCHEDULE

6.5.1. For the purpose of determining the completion time of the Contract, the date on which the Supplier signs the Contract Agreement, shall be taken as Commencement Date of the contract.

6.5.2. The Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and **Completion Schedule specified in the Article 3** of the Contract Agreement (Contract Forms) or within such extended time to which the Supplier shall be entitled under ***SCC Clause* 6.15.0** hereof.

6.6.0 CONTRACT PRICE

6.6.1. The Contract Price shall be as specified in **Article 2 (Contract Price)** of the Contract Agreement.

6.6.2. Unless an escalation clause is provided for in the **Article 2 (Contract Price)**, the Contract Price shall be a firm shall not subject to any alteration, except in the event of a Change in the Works or as otherwise provided in the Contract.

6.7.0 TERMS OF PAYMENT

6.7.1. The Contract Price shall be paid as specified in subsequent sub-clauses, if not provided in Contract Forms, Section-7.

6.7.2. Payment against Goods and F&I (Price Schedule 1& 2) shall be made as follows:

Progressive Payments for supply items within the country:

1. Within 60 (sixty) days from the date of submission of the invoice against supply, 60% (sixty percent) payment of the total supply amount would be made along with 100% GST on receipt and acceptance of materials in full and good condition.
2. In total, 10 (ten) Nos. of progressive supply invoices would be entertained.
3. For payment of 60% (sixty percent) of total supply amount, maximum 6 (Six) Nos of progressive supply invoices would be entertained
4. Remaining 4(four) Nos of supply invoices would be entertained on fulfillment of the following conditions
   a) 50% of balance supply amount would be paid on completion of 50% of the total erection works or on proportionate basis, of the project.
   b) Remaining 50% of the supply amount would be paid on completion of 100% erection, testing and commissioning activities of the project.

6.7.3 Payment against Installation and other services (Price Schedule 3) shall be made as follows:

Progressive Payments for erection work:

1. In total 5 (five) Nos. of progressive erection invoice/ bill would be entertained.

2. The 1st progressive erection invoice/ bill would be entertained on completion of 20% of total erection cost of the project.
3. Thereafter, progressive erection invoice/ bill can be submitted on completion of 10% of the subsequent erection work and payment will be made on proportionate basis. However, the total amount paid vide all progressive payment should not be greater than 90% of the total value of the Erection works.
4. Remaining 10% of the erection value would be paid on completion of 100% erection, testing and Commissioning activities of the project.

6.7.4 DOCUMENTS TO BE SUBMITTED WITH THE INVOICE (For Turnkey Contract)

i. Administrative Approval of the Work (wherever applicable).
ii. Financial Clearance for the work (wherever applicable).
iii. TPC/ZPC resolution/Board Approval (where necessary)
iv. Copy of Work order.
v. Copy of Bank Guarantee (if BG has to be submitted as per agreement)
vi. Measurement Books* & Joint Measurement Sheet (in case of erection work and civil work)
vii. Copy of Challans in original (Duly verified and signed by both parties)
viii. Invoices in details (Three Copies under GST)
ix. Good Receipts Sheets (In case of Capital and O&M Works/goods)
x. Materials Received Vouchers (MRV) & Materials Handing over Vouchers (MHOV) (in case of supply invoices, wherever necessary, with specific date)
xi. Statement of bill of Contractor/ Suppliers for payment.
xii. Work-in-progress certificate in case of Running bill.
xiii. Completion Certificate in case of Final Bill.
xiv. Handing over and taking over certificate and successful testing/operational acceptance certificate from the project authority for final bill.
xv. Journal Entries (whether it has been made or not).
xvi. Lorry Receipt (in case of F&I bill)/ E-way bill.
xvii. Certificate of insurance as per contract (Where necessary).
xviii. Original copy of Challans for reimbursement of any taxes/Duties.
xix. Verified copies of photographs, duly signed by contractor and concerned AGM and countersigned by DGM.
xx. Dispatch Clearance/Instruction / Equipment Inspection Report to be attached alongwith supply invoices.
xxi. Physical Verification of site by AEGCL official not below the rank of AGM of concerned Division.

6.7.5 ADVANCE PAYMENT

No advance payment is applicable for this contract.

6.8.0 PERFORMANCE SECURITY DEPOSIT

6.8.1. The Supplier shall have to deposit to the extent of 10% (ten percent) of the total value of the order as performance security (Bank Guarantee), within Fifteen (15) days of receipt of notification of award, duly pledged in favor of the Purchaser and such security deposits shall be valid up to 60 days beyond the warranty period.

6.8.2. If required, the supplier on his own has to renew the BG at least 1(one) month before the date of expiry of the BG; failing which the BG shall be revoked by AEGCL within the claim period without any prior intimation to the contractor

6.8.3. If the Supplier fails or neglects to observe, perform any of his obligations under the contract, it will be lawful for the "Purchaser" to forfeit either in full or in part at his absolute discretion, the security deposit furnished by the supplier.

6.8.4. No interest shall be payable on such deposits.

6.9.0 WARRANTY

6.9.1. The Supplier/Manufacturer warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract

6.9.2. The Supplier/Manufacturer further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination

6.9.3. The warranty shall remain valid for a period of ***sixty (60) months*** *from the date of supply* (the Goods having been delivered to and accepted at the final destination indicated in the Purchaser's Requirement

6.9.4. If during the Period Warranty any defect should be found, the Purchaser shall give Notice to the Supplier/Manufacture stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier/Manufacturer to inspect such defects.

6.9.5. If having been notified, the Supplier/Manufacturer fails to remedy the defect within a period of 15 (fifteen) days, the Purchaser may, following notice to the Supplier/Manufacturer, proceed to do such work, and the reasonable costs incurred by the Purchaser in connection therewith shall be paid to the Purchaser by the Supplier or may be deducted by the Purchaser from any monies due the Supplier or claimed under the Performance Security.

6.10.0 COPY RIGHT ETC

6.10.1 The Supplier shall indemnify the purchaser against all claims actions, suits and proceedings for the infringement or alleged infringement of any patent, design or copyright protected either in the country of origin or in India by the use of any equipment supplied by the Supplier but such indemnity shall not cost any use of the equipment other than for the purposes indicated by or reasonably to be inferred from the specification.

6.11.0 QUANTITY VARIATION

6.11.1. "Purchaser" shall have the right to increase/decrease the ordered quantity by 20% within 50 days of the period of completion and the same shall be carried out at the same rates /prices and terms and conditions stipulated in the order except in regard to completion schedule, which shall be mutually agreed upon in case of enhancement of the ordered quantity.

6.12.0 INSPECTION AND TESTING

6.12.1. The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections 3, Purchaser's Requirements.

6.12.2. The inspections and tests may generally be conducted on the premises of the Supplier/Manufacture, at point of delivery. Subject to Sub-Clause **6.12.3**, The Supplier shall furnish all reasonable facilities and assistance, including access to drawings and production data to the inspectors at no charge to the Purchaser.

6.12.3. The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in SCC Sub-Clause**6.12.2**, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all travelling and board and lodging expenses.

6.12.4. Whenever the Supplier is ready to carry out any such test and/or inspection, the Supplier shall give a reasonable advance notice (not less than 30 days) of such test and/or inspection and of the place and time thereof to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

6.12.5. The Supplier/manufacture shall provide the Purchaser with a certified report of the results of any such test and/or inspection.

6.12.6. The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to SCC Sub-Clause **6.12.4**

6.12.7. If it is agreed between the Purchaser and the Supplier that the Purchaser shall not attend the test and/or inspection, then the Supplier may proceed with the test and/or inspection, and should provide the Purchaser with a certified report of the results thereof.

6.12.8. The Supplier agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to SCC Sub-Clause **6.12.5** & **6.12.7**, shall release the Supplier from any warranties or other obligations under the Contract.

6.13.0 INSURANCE

6.13.1. The “Supplier” shall, have, unless, otherwise specified by the Purchaser, insure the materials through their underwrites at their cost and shall keep it insured against any loss/ damaged/ pilferage in transit, destruction or damage by fire/ flood, without exposure to vagaries of weather or through riot, civil commotion, war or rebellion, for the full value of the materials until the materials are received at the purchaser’s destination store.

6.13.2. The “Supplier” shall be responsible for safe arrival at destination, unloading and receipt of the materials by the consignee. The Purchaser will discharge consignee’s responsibilities only and shall not be responsible for any damage/ loss/ pilferage/ non-delivery by the carriers.

6.13.3. In case of any loss/ damage/ pilferage/ non-delivery/ short delivery by carriers etc.; the Supplier shall replace free of cost missing / damaged / lost materials within 30(thirty) days from the receipt of report thereof from the consignee(s) without waiting for settlement of their claims with their carriers / under-writers. Normally, such reports from the consignee(s) to the supplier shall be initiated within a period of 30(thirty) days from the date of receipt of each consignment by him /them.

6.13.4. If it is considered necessary that the damage equipment either in part or in full to be sent back to the manufacturer’s works for repair, the manufacturers/ suppliers will furnish the Bank Guarantee for the full value of equipment needing repairs and such Bank Guarantee shall remain valid till such time, the equipment are repaired and returned to the consignee in good condition. The to and fro freight, handling and insurance charges in such cases will be borne by the Supplier.

6.13.5. Unless, otherwise mutually agreed upon, in case of failure by the Supplier to replenish /make good of the loss /damage /short supplied quantities, within the stipulated period, the Purchaser reserves the right to forfeit the security deposit and/ or adjust any outstanding payment to the “Supplier” with the Purchaser or take any other appropriate action.

6.14.0 FORCE MAJEURE

6.14.1. "Force Majeure" shall mean any event beyond the reasonable control of the Purchaser or of the Supplier, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:

(a) war, hostilities or warlike operations whether a state of war be declared or not, invasion, act of foreign enemy and civil war

(b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts

(c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority

(d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine and plague

(e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster

(f) shortage of labor, materials or utilities where caused by circumstances that are themselves Force Majeure.

6.14.2. 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 fourteen (14) days after the occurrence of such event.

6.14.3. 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 in accordance with ***SCC Clause* 6.15.0**.

6.15.0 EXTENSION OF TIME FOR COMPLETION

6.15.1. The Time(s) for Completion specified in the Article 3 of the Contract Agreement (Contract Forms) shall be extended if the Supplier is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

(a) any Change in the scope of works by the Purchaser; which justifies extension of completion time as provided in ***SCC Clause*** 6.11.0; and

(b) any occurrence of Force Majeure as provided in ***SCC Clause*** 6.14.0.

6.15.2. Except where otherwise specifically provided in the Contract, the Supplier shall submit to the Purchaser's Representative a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Purchaser and the Supplier shall agree upon the period of such extension. In the event that the Supplier does not accept the Purchaser's estimate of a fair and reasonable time extension, the Supplier shall be entitled to refer the matter to a Dispute Board, pursuant to ***SCC Sub-Clause 6.18.0***.

6.16.0 LIQUIDATED DAMAGE

6.16.1. The Supplier guarantees that it shall attain Completion of the Works within the Time for Completion specified in the Contract Agreement pursuant to ***SCC Sub-Clause 6.5.2***, or within such extended time to which the Supplier shall be entitled under ***SCC Clause 6.15.0*** hereof.

6.16.2. If the Supplier fails to attain Completion of the Works within the Time for Completion or any extension thereof under ***SCC Clause 6.15.0***, the Supplier shall pay to the Purchaser liquidated damages at the rate 1 ***% (half percent)*** of the total Contract Price per week or part thereof delay. The aggregate amount of such liquidated damages shall in no event exceed ***10% (ten percent)*** of the total contract price.

However, the payment of liquidated damages shall not in any way relieve the Supplier from any of its obligations to complete the Works or from any other obligations and liabilities of the Supplier under the Contract.

6.16.3. Once the aggregated "Liquidated damage" reaches 10% of the total contract price, the Purchaser may consider following actions:

(a) Procure the undelivered material/ equipment and/or complete the balance works from elsewhere giving notice to the supplier and to recover any extra expenditure incurred thereby for having to procure these materials and works at higher price, at the risk and responsibility of the Supplier; or

(b) Cancel the contract wholly or in part and to complete the works at the full risk and cost of the Supplier and forfeit the security deposit.

(c) Declare it as a "Contractual Failure" and act in accordance with ***SCC Clause* 6.17.0**.

6.17.0 CONTRACTUAL FAILURE

6.17.1. In the event of contractual failure of any respect on the part of the Supplier, the Purchaser shall be entitled to operate security deposit or any deposit or any payment due to supplier irrespective of whether his default relates to the particular orders or not towards the Purchaser's claim for damages arising out of the failure. In addition, the Purchaser may black-list or bans the "Supplier" or pending enquiry, suspend him or take any other steps considered suitable.

6.18.0 ARBITRATION

6.18.1. If at any time, any question, disputes or differences whatsoever shall rise between the Purchaser and the Supplier, upon or in relation to or in connection with the contract, either party may forthwith give notice to the other in writing of the existence of such question of dispute or difference and the same shall be referred to the adjudication of three Arbitrators, one to be nominated by the Purchaser the other by the Supplier and the third by the President of the Institution of Engineers, India/ Retired or Sitting Judge not below the status of a retired Judge of High Court of India. If either of the parties fail to appoint its arbitrators within 60(sixty) days after receipt of notice of the appointment of arbitrators then the President of the Institution of Engineers /retired or sitting Judge of India, as the case may be, shall have the power at request of either of the parties, to appoint an Arbitrator. A certified copy of the "President" making such an appointment shall be furnished to both parties

6.18.2. The arbitration shall be conducted as per provisions of the Indian Arbitration Act, shall be held at Guwahati or any other place as may be decided by the Purchaser. The decision of the majority of Arbitrators shall be final & binding upon the parties and the expenses of the arbitration shall be paid as may be determined by the Arbitrator. However, any dispute arising out of this contract will first be discussed and settled bilaterally between Purchaser and the Supplier.

Section - 7

Contract Forms

(This Section contains the Letter of Acceptance, the Contract Agreement and Appendices to the Contract Agreement which, once completed, will form the Contract along with the Section 4 and Section 5. The Bidder should note that this Section shall be completed fully at the time of Contract signing)

Notification of Award

[AEGCL's letter head]

Letter of Acceptance

Supply of Goods and Related Services

[date]

To: [Name and address of the Supplier]

This is to notify you that your Bid dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data] for the Contract Price in the aggregate of [amounts in numbers and words] [name of currency] (as per Price Schedule-1), as corrected and modified in accordance with the Instructions to Bidders is hereby accepted, and it is decided to award on you the 'Supply and Delivery Contract' covering inter-alia Ex-works supply and Delivery of all Goods including Related Services.

You are requested to furnish the Performance Security within seven (7) days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section 8 (Contract Forms) of the Bidding Document

[Authorized Signature]

[Name and Title of Signatory]

Assam Electricity Grid Corporation Limited

Attachment: Contract Agreement

1. Contract Agreement

THIS AGREEMENT made the _____ day of _____, _____,

BETWEEN

Assam Electricity Grid Corporation Limited (herein after referred to as AEGCL), a corporation incorporated under the laws of Company Act, 1956 and having its registered office at First Floor, BijuliBhawan, Paltanbazar, Guwahati-781001, Assam and [***name of Supplier***], a firm/company incorporated under the laws of Company Act, 1956 and having its principal place of business at [***address of Supplier***] (hereinafter called "the Supplier"). [***in case of JV insert name and address of the Lead Partner as well as other Partners]***

WHEREAS AEGCL desires to engage the Supplier to the 'Supply and Related Service Contract'covering "Supply of Power & Control Cables of 1.1KV Class for various sub-stations in Assam under PSDF" Cables" with all accessories and delivery to various Substation Sites of AEGCL and Related Services, as detailed in the Contract Document, and the Supplier has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1

Contract Documents

1.1 **Contract Documents** (Reference SCC Clause 6.1.0)

The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:

(a) This Contract Agreement and the Appendices hereto
(b) Letter of Price Bid and Price Schedules submitted by the Supplier
(c) Letter of Technical Bid and Technical Proposal submitted by the Supplier
(d) Special Conditions of Contract
(e) General Conditions of Supply and Erection.
(f) Specification (Purchaser's Requirements)
(g) Other completed Bidding Forms submitted with the Letters of Technical and Price Bids
(h) Guaranteed and other Technical Particulars (as submitted with the Bid).
(i) Any other documents (if necessary) shall be added here

1.2 **Order of Precedence** (Reference SCC Clause 6.1.0)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 **Definitions** (Reference SCC Clause 15840233446.0.0)

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the SCC.

Article 2

Contract Price and Terms of Payment

2.1 **Contract Price** (Reference SCC Clause 6.6.0)
The Purchaser hereby agrees to pay to the Supplier the Contract Price in consideration of the performance by the Supplier of its obligations hereunder. The Contract Price shall [. . . ***amounts inrupees in words*** . . .], [. . . ***amounts in figures***. . .] as specified in Price Schedule No. 3 (Grand Summary).
The Contract Price is FIXED for entire period of the Contract.

2.2 **Terms of Payment** (Reference SCC Clause 6.7.0)
The terms and procedures of payment according to which the Purchaser will pay the Supplier are given in the Appendix (Terms and Procedures of Payment) hereto.

Article 3

Commencement Date and Completion Time

3.1 **Commencement Date** (Reference SCC Clause 6.5.1)

The Commencement Date upon which the period until the Time for Completion of the total scope under the Contract shall be counted from is the date of acceptance of LOA.

3.2 **Completion Time** (Reference SCC Clause 6.5.2)

The whole scope under this Contract shall be completed within **04 months** from Contract Commencement Date with following schedule:

Article 4. Appendices

5.1 The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.

5.2 Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Purchaser and the Supplier have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Purchaser

[***Signature***]

[***Title***]

in the presence of

[***Signature***]

[***Title***]

Signed by, for and on behalf of the Supplier

[***Signature***]

[***Title***]

in the presence of

[***Signature***]

[***Title***]

APPENDICES

Appendix 1 - Terms and Procedures of Payment

Appendix 2 - Time Schedule

Appendix 3 - Performance Security.

Appendix 4– Price Schedules.

Appendix 5– Guaranteed and Other Technical Particulars.

Appendix 1 – Terms and Procedure of Payment

In accordance with the provisions of SCC Clause 6.7.0 (Terms of Payment), the Purchaser shall pay the Supplier in the following manner and at the following times, on the basis of the Price Breakdown given in the section on Price Schedules.

Appendix 2 - Time Schedule

(Bidders shall furnish with bids a construction schedule in form of bar chart. The time schedule should match with the completion time mentioned elsewhere in the Bidding Document)

Appendix 3 - Form of Performance Security

Bank Guarantee

(To be stamped in accordance with Stamp Act)

To: _____ *[name of Purchaser]*

_____ *[address of Purchaser]*

*WHEREAS*_____ *[name and address of Supplier/Manufacturer]* has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Supplier/Manufacturer and brief description of Scope]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Supplier/Manufacturer shall furnish you with a Bank Guarantee by a recognized/scheduled bank for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Supplier/Manufacturer such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible *to* you, on behalf of the Supplier/Manufacturer, up to a total of _____ *[amount of Guarantee]*[1] _____ *[in words],* such sum being payable inthe currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum orsums within the limits of _____ *[amount of Guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Supplier/Manufacturer before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the scope to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the date, 30 days beyond the Warranty Period as per the Contract.

Signature and Seal of the Guarantor _____

Name of Bank _____

Address _____

Date _____

1

An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.

Appendix 4 – Guaranteed and other Technical Particulars