NEPAL ELECTRICITY AUTHORITY

(An Undertaking of Government of Nepal)

Distribution and Consumer Services Directorate

NATIONAL COMPETATIVE BIDDING (NCB)

Contract Identification NO: NRO-074/075-33KVBay&Line-01

BIDDING DOCUMENTS

FOR

SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF BAY EXTENSION AT TIKAPUR S/S AND UPGRADATION OF 11KV TIKAPUR KAILALI - RAJAPUR, BARDIYA LINE TO 33KV

Volume I

December, 2017

Nepal Electricity Authority
Distribution and Consumer Services Directorate
Nepalgunj Regional Office , Nepalgunj
Phone: +0977-081-523419
Fax: +0977-081-523508

Abbreviations

BD ... . Bidding Document

BDF ... . Bidding Forms

BDS ... . Bid Data Sheet

BOQ ..... Bill of Quantities

COF ... . Contract Forms

DP ... . Development Partners

DoLIDAR ..... Department of Local Infrastructure Development and Agricultural Roads

ELI ..... Eligibility

EQC ..... Evaluation and Qualification Criteria

EXP ... . Experience

FIN ..... Financial

GCC ..... General Conditions of Contract

GoN ... . Government of Nepal

ICC ... . International Chamber of Commerce

IFB ..... Invitation for Bids

ITB ..... Instructions to Bidders

JV ..... Joint Venture

LIT ..... Litigation

NCB ..... National Competitive Bidding

PAN ... . Permanent Account Number

PPA ..... Public Procurement Act

PPMO ... . Public Procurement Monitoring Office

PPR ..... Public Procurement Regulations

PL ... . Profit & Loss

SBD ... . Standard Bidding Document

SCC ... . Special Conditions of Contract

TS ... . Technical Specifications

VAT ..... Value Added Tax

WRQ ..... Works Requirements

Table of Contents

Invitation for Bids I

Part - I Bidding Procedures ..... ……I-1 to IV-20

Section - I Instructions to Bidders ... ……..…I-1 to I-20
Section - II Bid Data Sheet…….……...…II-1 to II-4
Section - III Evaluation and Qualification Criteria……III-1 to III-15
Section – IV Bidding Forms…… IV-1 to IV-20

Part - III Conditions of Contract and Contract Forms .....VII-1 to IX-7
Section - VII General Conditions of Contract…….……VII-1 to VII-27
Section - VIII Special Conditions of Contract……..VIII-1 to VIII-20
Section - IX Contract Forms ……..…IX-1 to IX-7

Section - VI Bill of Quantities……..……VI-1 to VI-3

Invitation for Bids
Nepal Electricity Authority
Nepalgunj Regional Office, Nepalgunj
First date of publication: 18 Dec 2017
National Competitive Bidding
Sealed tenders are invited for the following Schemes of Nepal Electricity Authority, Nepalgunj Regional Office, Nepalgunj.

S.N	Works/Jobs	Tender No :	Sale of Tender Documents till date (Office time)	Last Date of Bid Submission, Opening Time and Place	Cost of Tender Documents (Bank Deposit)	Bid Security/ Bid Bond (Bank Deposit/Bank Guarentee)	Bank A/C No
1	Supply, Delivery, Installation, Testing and Commissioning of Bay Extension at Tikapur S/s and upgradation of 11kV Tikapur, Kailali-Rajapur,Bardiya Line to 33KV	NRO/2074/075-33KV Bay&Line-01	16 Jan ,2018	17 Jan ,2018 at or before 12:00 noon and 14:00 Hrs Respectively at NEA, Nepalgunj Regional Office	NRS. 3,000.00	NRs. 210,000.00 valid for 120 Days.	Bank of Kathmandu ,Nepalgunj , AC No: 010500000354

For the further details and downloading of tender documents please visit our website http//www.nea.org.np and http//www.e-nea.org.np or Contact Tel No: 081-523419/526783

Part - I

BIDDING PROCEDURES

Table of Clauses

Section - I Instructions to Bidders ……..I-1 to I-20

A. General ……...I-1
1. Scope of Bid I-1
2. Source of Funds I-1
3. Fraud and Corruption I-2
4. Eligible Bidders I-4
5. Eligible Materials, Equipment and Services I-6

B. Contents of Bidding Document I-6
6. Section of Bidding Document I-6
7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting I-6
8. Amendment of Bidding Document I-7
C. Preparation of Bids I-8
9. Cost of Bidding I-8
10. Language of Bid I-8
11. Documents Comprising the Bid I-8
12. Letter of Bid and Schedules I-8
13. Alternative Bids I-8
14. Bid Prices and Discounts I-9
15. Currency of Bid and Payment I-10
16. Documents Comprising the Technical Proposal I-10
17. Documents Establishing the Qualifications of the Bidder I-10
18. Period of Validity of Bids I-10
19. Bid Security I-11
20. Format and Signing of Bid I-12

D. Submission and Opening of Bids ……..... I-12
21. Sealing and Marking of Bids I-12
22. Deadline for Submission of Bids I-12
23. Late Bids I-13
24. Withdrawal, and Modification of Bids I-13
25. Bid Opening I-13

E. Evaluation and Comparison of Bids…….... I-14.
26. Confidentiality I-14
27. Clarification of Bids I-14
28. Deviations, Reservations, and Omissions I-14
29. Determination of Responsiveness I-15
30. Nonconformities, Errors, and Omissions I-15

31. Correction of Arithmetical Errors I-16
32. Evaluation of Bids I-16
33. Comparison of Bids I-17
34. Qualification of the Bidder I-17
35. Employer's Right to Accept Any Bid, and to Reject Any or All Bids... .....I-17

F. Award of Contract I-18

36. Award Criteria I-18
37. Letter of Intent to Award the Contract/ Notification of Award I-18
38. Performance Security I-18
39. Signing of Contract I-18
40. Complain and Review I-19
41. Provisions of PPA and PPR…….I-20

Section - II Bid Data Sheet II-1

A. General II-1
B. Bidding Document II-2
C. Preparation of Bids II-2
D. Submission and Opening of Bids II-3
E. Evaluation and Comparison of Bids II-3
F. Special Instructions to Bidders for e-Bidding……...II-4

Section - III Evaluation and Qualification Criteria III-1

1. Evaluation III-1
   1.1 Adequacy of Technical Proposal III-1
   1.2 Multiple Contracts III-1
   1.3 Completion Time III-1
   1.4 Alternative Technical Solutions III-1
   1.5 Quantifiable Nonconformities, Errors and Omissions III-1
   1.6 Functional Guarantees of the facilities……... III-1

2. Qualification III-3
   2.1 Power of Attorney…….III-3
   2.2 Legal Status……..III- 3
   2.3 Eligilibility……..... III-4
   2.4 Pending Litigation……... ..III-5
   2.5 Financial Situation……... III-6
   2.6 Quality of Goods…….. III-7
   2.7 Experience……III-8
   2.8 Manufacturer's Experience……. III-11
   2.9 Miscellaneous……. III-14
   2.10 Personnel ..... …….. III-14
   2.11 Equipment III-15

Section - IV Bidding Forms IV-1
Letter of Bid IV-2
Bid Security IV-4
Manufacturer's Authorization..... IV-5
Technical Proposal Format IV-6
Personnel IV-7
Form PER-1: Proposed Personnel IV-7
Form PER-2: Resume of Proposed Personnel IV-8
Equipment IV-9
Bidder's Information and Qualification Format IV-10
Bidder's Qualification IV-11
Form ELI - 1: Bidder's Information Sheet IV-11
Form ELI - 2: JV Information Sheet IV-12
Form LIT - 1: Pending Litigation IV-13
Form FIN - 1: Financial Situation IV-14
Form FIN - 2: Average Annual Construction Turnover IV-15
Form FIN - 3: Financial Resources IV-16
Form FIN- 4: Current Contract Commitments / Works in Progress IV-17
Form EXP - 1: General Construction Experience IV-18
Form EXP - 2(a): Specific Construction Experience IV-19
Form EXP - 2(b): Specific Construction Experience in Key Activities IV-20

SECTION - I

Instructions to Bidders

A. General	
1. Scope of Bid	1.1 In connection with the Invitation for Bids indicated in the Bid Data Sheet (BDS), the Employer, as indicated in the BDS, issues this Bidding Document for the procurement of Works as specified in Section V (Works Requirements). The name, identification, and number of Contracts of the National Competitive Bidding (NCB) are provided in the BDS. 1.2 Throughout this Bidding Document: (a) the term "in writing" means communicated in written form and delivered against receipt; (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and (c) "day" means calendar day.
2. Source of Funds	2.1 GoN Funded: In accordance with its annual program and budget, approved by the GoN, the implementing agency indicated in the BDS plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or Public Entities' own Resource Funded: In accordance with its annual program and budget, approved by the public entity, the implementing agency indicated in the BDS plans to apply a portion of the allocated budget to eligible payments under the contract(s) for which this Bidding Document is issued. Or DP Funded: The GoN has applied for or received financing (hereinafter called "funds") from the Development Partner (hereinafter called "the DP") indicated in the BDS toward the cost of the project named in the BDS. The GoN intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued. 2.2 DP Funded: Payment by the DP will be made only at the request of the GoN and upon approval by the DP in accordance with the terms and conditions of the financing agreement between the GoN and the DP (herein after called the "Loan/Grant Agreement"), and will be subject in all respects to the terms and conditions of that

	Loan/Grant Agreement. No party other than the GoN shall derive any rights from the Loan Agreement or have any claim to the funds. 2.3 Public Entities' own Resource Funded

3. Fraud and Corruption	3.1 The Government of Nepal (GoN) requires that the Procuring Entities as well as bidders, suppliers and contractors and their sub-contractors under GoN/DP-financed contracts, shall adhere to the highest standard of ethics during the procurement and execution of such contracts. In this context, the Employer; (a) defines, for the purposes of this provision, the terms set forth below as follows: (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party; (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party. (v) "Obstructive practice" means: (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a GoN/DP investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the GoN's/DP's inspection and audit rights provided for under sub-clause 3.5 below. (b) will reject bid(s) if it determines that the bidder has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question; (c) will sanction a firm or individual, including declaring ineligible, for a stated period of time, to be awarded a GoN/ DP-financed contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competition for , or in executing, - a GoN/DP – financed Contract

3.2 The Bidder shall not carry out or cause to carry out the following acts with an intention to influence the implementation of the procurement process or the procurement agreement :

(a) give or propose improper inducement directly or indirectly,
(b) distortion or misrepresentation of facts,
(c) engaging in corrupt or fraudulent practice or involving in such act,
(d) interference in participation of other competing bidders,
(e) coercion or threatening directly or indirectly to cause harm to the person or the property of any person to be involved in the procurement proceedings,
(f) collusive practice among bidders before or after submission of bids for distribution of works among bidders or fixing artificial/uncompetitive bid price with an intention to deprive the Employer the benefit of open competitive bid price,
(g) contacting the Employer with an intention to influence the Employer with regards to the bids or interference of any kind in examination and evaluation of the bids during the period from the time of opening of the bids until the notification of award of contract.

3.3 PPMO, on the recommendation of the Procuring Entity may blacklist a Bidder for a period of one (1) to three (3) years for its conduct including on the following grounds and seriousness of the act committed by the bidder:

(a) if convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract,
(b) if it is established that the contract agreement signed by the Bidder was based on false or misrepresentation of Bidder's qualification information,
(c)if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for, or in executing,- a GoN/DP-financed contract.

3.4 A bidder declared blacklisted and ineligible by the GoN, Public Procurement Monitoring Office (PPMO) and/or the DP in case of DP funded project, shall be ineligible to bid for a contract during the period of time determined by the GoN, PPMO and/or the DP.

3.5 The Contractor shall permit the GoN/DP to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the GoN/DP, if so required by the GoN/DP.

3.6 DP Funded: In pursuance of the fraud and corruption policy, the DP.

(a) will reject a proposal if it determines that the bidder recommended for award has directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or

	obstructive practices in competing for the contract in question; (b) will cancel the portion of the loan/ credit/ grant allocated to a contract if it determines at any time that representative(s) of the GoN or of a beneficiary of the fund engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the GoN having taken timely and appropriate action satisfactory to the DP to remedy the situation.
4.Eligible Bidders	4.1 A Bidder may be a natural person, private entity, or government - owned entity—subject to ITB 4.5—or any combination of them in the form of a Joint Venture (JV) under an existing agreement, or with the intent to constitute a legally-enforceable joint venture. In the case of a JV: (a) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. Maximum number of JV shall be as specified in the BDS. The qualification requirement of the parties to the JV shall be as specified in Section III Evaluation and Qualification Criteria, and (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution. 4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of any country or eligible countries mentioned in the BDS. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed Sub-Contractors or suppliers for any part of the Contract including related services. 4.3 A Bidder shall not have a conflict of interest. A Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process, if: (a) they have controlling partners in common; or (b) they receive or have received any direct or indirect subsidy from any of them; or
	(c) they have the same legal representative for purposes of this bid; or (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Employer

	regarding this bidding process; or (e) a Bidder participates in more than one bid in this bidding process either individually or as a partner in a joint venture. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the party is involved. However, this does not limit the inclusion of the same sub Contractor in more than one bid; or (f) a Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Contract that is the subject of the Bid; or (g) a Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Employer as Engineer for the Contract. 4.4 A firm that is under a declaration of ineligibility by the GoN/DP in accordance with ITB 3, at the date of the deadline for bid submission or thereafter, shall be disqualified. 4.5 Enterprises owned by Government shall be eligible only if they can establish that they are legally and financially autonomous and operate under commercial law, and that they are not a dependent agency of the GoN. 4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request. 4.7 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders. 4.8 Firms shall be excluded in any of the cases, if (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, Nepal prohibits any import of goods or Contracting of works or services from that country or any payments to persons or entities in that country. (b) DP Funded: as a matter of law or official regulation, Nepal prohibits commercial relations with that country, provided that the DP is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required;
	(c) DP Funded: a firm has been determined to be ineligible by the DP in relation to their guidelines or appropriate provisions on preventing and combating fraud and corruption in projects financed by them. 4.9 The Domestic Bidder who has obtained Permanent Account Number (PAN) and Value Added Tax (VAT) Registration Certificate(s) and Tax Clearance Certificate from the Inland Revenue Office or proof of submission of audited PL report to the Inland Revenue Office shall only be eligible. The foreign bidder submitting the documents indicated in the BDS at the

	time of bid submission and a declaration to submit the document(s) indicated in the BDS at the time of contract agreement shall only be eligible.
5. Eligible Materials, Equipment and Services	5.1 The materials, equipment and services to be supplied under the Contract shall have their origin in any source countries as defined in ITB 4.2 above and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services. 5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.
B. Contents of Bidding Documents	
6. Sections of Bidding Document	6.1 The Bidding Document consist of Parts I, II, and III, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8. PART I Bidding Procedures Section I Instructions to Bidders (ITB) Section II Bid Data Sheet (BDS) Section III Evaluation and Qualification Criteria (EQC) Section IV Bidding Forms (BDF) PART II Requirements Section V Works Requirements (WRQ) Section VI Bill of Quantities (BOQ) PART III Conditions of Contract and Contract Forms Section VII General Conditions of Contract (GCC) Section VIII Special Conditions of Contract (SCC) Section IX Contract Forms (COF) 6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Document. 6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids. 6.4 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.
7. Clarification of Bidding Document, Site	7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Employer's address indicated in BDS or raise any question or curiosity during

Visit, Pre-Bid Meeting	the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer shall be required to make available as soon as possible the answer to such question or curiosity in writing to any request for clarification, provided that such request is received as mentioned in ITB 7.5. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer 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 8 and ITB 22.2. 7.2 The Bidder is encouraged to visit and examine the Site of Works and its surroundings and obtain for itself, on its own risk and responsibility, all information that may be necessary for preparing the bid and entering into a Contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense. 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer 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 Employer 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. 7.4 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.
	7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer as mentioned in BDS. 7.6 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 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting. 7.7 Non attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
8. Amendment of Bidding Document	8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing agenda. 8.2 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 Employer in accordance with ITB 6.3.
C. Preparation of Bids	
9. Cost of Bidding	9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
10. Language of Bid	10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. 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 in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.
11. Documents Comprising the Bid	11.1 The Bid shall comprise the following: (a) Letter of Bid; (b) completed Schedules, in accordance with ITB 12 and 14, or as stipulated in the BDS; (c) Bid Security, in accordance with ITB 19; (d) alternative bids, at Bidder's option and if permissible, in accordance with ITB 13; (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2; (f) documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the Contract; (g) Technical Proposal in accordance with ITB 16; (h) In the case of a bid submitted by a JV, the JV agreement, or letter of intent to enter into a JV including a draft agreement, indicating at least the parts of the Works to be executed by the respective partners; and (i) Any other document required in the BDS.
12. Letter of Bid and Schedules	12.1 The Letter of Bid, Schedules, and all documents listed under ITB 11, shall be prepared using the relevant forms in Section 4 (Bidding Forms), if so provided. 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.
13. AlternativeBids	13.1 Unless otherwise indicated in the BDS, alternative bids shall not be considered. 13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion. 13.3 When specified in the BDS pursuant to ITB 13.1, and subject to ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements

	of the Bidding Document must first price the Employer's design as described in the Bidding Document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer. 13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section V (Works Requirements). The method for their evaluation will be stipulated in Section III (Evaluation and Qualification Criteria).
14. Bid Prices and Discounts	14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Schedules shall conform to the requirements specified below. 14.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section IV(Bidding Forms). In case of Unit Rate Contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities. 14.3 The price to be quoted in the Letter of Bid shall be the total price of the Bid, excluding any discounts offered. 14.4 Unconditional discounts, if any, and the methodology for their application shall be quoted in the Letter of Bid, in accordance with ITB 12.1. 14.5 If so indicated in ITB 1.1, bids are invited for individual Contracts or for any combination of Contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 14.4, provided the bids for all Contracts are submitted and opened at the same time. 14.6 Unless otherwise provided in the BDS and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Table of Adjustment Data in Section IV (Bidding Forms) and the Employer may require the Bidder to justify its proposed indices and weightings. 14.7 The bidder is subject to local taxes such as VAT, social charges or income taxes on nonresident international personnel, and also duties, fees, levies on amounts payable by the employer under the Contract. All duties, taxes, and other levies payable by the Contractor under

	the Contract, or for any other cause, as of the date 30 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the Bidder.
15. Currency of Bid and Payment	15.1 The currency of the bid and payment shall be in Nepalese Rupees.
16. Documents Comprising the Technical Proposal	16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
17. Documents Establishing the Qualifications of the Bidder	17.1 To establish its qualifications to perform the Contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section IV (Bidding Forms).
18. Period of Validity of Bids	18.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer 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 19, it shall also be extended 30 days beyond the deadline of the extended validity 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.

19. Bid Security	19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its bid, in original form, a bid security as specified in the BDS. In the case of a bid security, the amount shall be as specified in the BDS. 19.2 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms: (a) Original copy of an unconditional bank guarantee from "A" class commercial bank or; (b) Original copy of cash deposit voucher in the Employer's Account as specified in BDS. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV (Bidding Forms) or in another Form acceptable to the employer. The form must include the complete name of the Bidder. The bid security shall be valid for minimum thirty (30) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2. 19.3 The bid security issued by any foreign Bank outside Nepal must be counter guaranteed by an "A" class commercial Bank in Nepal. 19.4 Any bid not accompanied by an enforceable and substantially compliant bid security, if required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive. 19.5 The bid security of unsuccessful Bidders shall be returned within three days, once the successful bidder has furnished the required performance security and signed the Contract Agreement pursuant to ITB 38.1and 39.1. 19.6 The bid security shall be forfeited if: (a) a Bidder requests for withdrawal or modification of its bid during the period of bid validity specified by the Bidder on the Letter of Bid, except as provided in ITB 18.2 (b) a bidder does not accept the correction of arithmetical errors pursuant to clause 31.1 ; (c) a bidder changes the prices or substance of the bid while providing information pursuant to clause 27.1; (d) a bidder involves in fraud and corruption pursuant to clause 3.1; (e) the successful Bidder fails to: (i) furnish a performance security in accordance with ITB 38.1; or (ii) sign the Contract in accordance with ITB 39.1 19.7 The Bid Security of a JV shall be in the name of the JV that submits the bid. If the JV has not been legally constituted at the time of bidding, the Bid Security shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.

20. Format and Signing of Bid	20.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it ORIGINAL". Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the bid in the number specified in the BDS, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail. 20.2 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, except for un amended printed literature, shall be signed or initialed by the person signing the bid. 20.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

D. Submission and Opening of Bids	
21. Sealing and Marking of Bids	21.1 Bidders may always submit their bids by mail or by hand or by courier. When so specified in the BDS, bidders shall have the option of submitting their bids electronically. Procedures for submission, sealing and marking are as follows: (a) Bidders submitting bids by mail, by hand or by courier i. Bidders shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL", "ALTERNATIVE" and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope. ii. The inner and outer envelopes shall: (aa) bear the name and address of the Bidder; (bb) be addressed to the Employer as provided in BDS 22.1; (cc) bear the specific identification of this bidding process indicated in BDS 1.1; and (dd) bear a warning not to open before the time and date for bid opening. iii. If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid. (b) Bidders submitting bids electronically shall follow the electronic bid submission procedures specified in the BDS.
22. Deadline for Submission of	22.1 Bids must be received by the Employer at the address and no later

Bids	than the date and time indicated in the BDS. 22.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
23. Late Bids	23.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
24. Withdrawal, and Modification of Bids	24.1 A Bidder may withdraw, or modify its bid after it has been submitted by sending a written notice in a sealed envelope, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2. The corresponding modification of the bid must accompany the respective written notice. All notices must be: (a) prepared and submitted in accordance with ITB 20 and ITB 21,and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "MODIFICATION;" and (b) received by the Employer prior to the deadline prescribed for submission of bids, in accordance with ITB 22. 24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders after completion of the bid opening. 24.3 No bid may be withdrawn, 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 Bid or any extension thereof.
25. Bid Opening	25.1 The Employer shall open the bids in public at the address, date and time specified in the BDS in the presence of Bidders` designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as specified in the BDS. 25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be Permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening. Only envelopes that are opened and read out at bid opening shall be considered further.
	25.3 All other envelopes shall be opened one at a time, reading out: the name of the Bidder; the Bid Price(s), including any discounts and alternative bids and indicating whether there is a modification; the

	presence of a bid security and any other details as the Employer may consider appropriate. Only discounts and alternative offers read out at bid opening shall be considered for evaluation. No bid shall be rejected at bid opening except for late bids, in accordance with ITB 23.1. The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, or modification; the Bid Price, per Contract if applicable, including any discounts and alternative offers; and the presence or absence of a bid security. 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.
E. Evaluation and Comparison of Bids	
26. Confidentiality	26.1 Information relating to the examination, evaluation, comparison, and post-qualification of bids and recommendation of Contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders. 26.2 Any attempt by a Bidder to influence the Employer in the evaluation of the bids or Contract award decisions may result in the rejection of its bid. 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.
27. Clarification of Bids	27.1 To assist in the examination, evaluation, and comparison of the bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids, in accordance with ITB 31 27.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid may be rejected.
28. Deviations, Reservations, and Omissions	28.1 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.

29. Determination of Responsiveness	29.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11. 29.2 A substantially responsive 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 Works specified in the Contract; or (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer'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. 29.3 The Employer shall examine the technical aspects of the bid submitted in accordance with ITB 16, Technical Proposal, in particular, to confirm that all requirements of Section V (Works Requirements) have been met without any material deviation, reservation or omission. 29.4 If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
30. Nonconformities, Errors, and Omissions	30.1 Provided that a bid is substantially responsive, the Employer may waive any non-conformities in the bid. 30.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the bid. Failure of the Bidder to comply with the request may result in the rejection of its bid. 30.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price may 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 methods indicated in Section III (Evaluation and Qualification Criteria). 30.4 If minor discrepancies are found such as in technical specification, description, feature which does not make the bid to be rejected, then the cost, which is calculated to the extent possible due to

	such differences, shall be included while evaluating the bid. 30.5 If the value of such non-conformities is found to be more than fifteen percent of the quoted amount of the bidder on account of minor discrepancies pursuant to ITB 30.4, such bid shall be considered ineffective in substance and shall not be involved in evaluation.
31. Correction of Arithmetical Errors	31.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis: (a) only for unit price Contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected; (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; 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 arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. 31.2 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 shall be forfeited.
32. Evaluation of Bids	32.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted. 32.2 To evaluate a bid, the Employer shall consider the following: (a) the bid price, excluding Value Added Tax , Provisional Sums, and the provision, if any, for contingencies in the Summary Bill of Quantities**,** for Unit Rate Contracts, or Schedule of Prices for lump sum Contracts, but including Day work items, where priced competitively; (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1; (c) price adjustment due to discounts offered in accordance with ITB 14.4; (d) adjustment for nonconformities in accordance with ITB 30.3; (e) application of all the evaluation factors indicated in Section III (Evaluation and Qualification Criteria); 32.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.

	32.4 If this Bidding Document allows Bidders to quote separate prices for different Contracts, and to award multiple Contracts to a single Bidder, the methodology to determine the lowest evaluated price of the Contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III (Evaluation and Qualification Criteria). 32.5 If the bid for an Unit Rate Contract, which results in the lowest Evaluated Bid Price, is seriously unbalanced, front loaded or substantially below updated estimates in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analysis, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder as mentioned in BDS to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
33. Comparison of Bids	33.1 The Employer shall compare all substantially responsive bids in accordance with ITB 32.2 to determine the lowest evaluated bid.
34. Qualification of the Bidder	34.1 The Employer shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid meets the qualifying criteria specified in Section III (Evaluation and Qualification Criteria). 34.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1. 34.3 An affirmative determination of qualification shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Employer shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.
35. Employer's Right to Accept Any Bid, and to Reject Any or All Bids	35.1 The Employer 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.

F. Award of Contract	
36. Award Criteria	36.1 The Employer 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 qualified to perform the Contract satisfactorily.

37. Letter of Intent to Award the Contract/Notification of Award	37.1 The Employer shall notify the concerned Bidder whose bid has been selected in accordance with ITB 36.1 within seven days of the selection of the bid, in writing that the Employer has intention to accept its bid and the information regarding the name, address and amount of selected bidder shall be given to all other bidders who submitted the bid. 37.2 If no bidder submits an application pursuant to ITB 40 within a period of seven days of the notice provided under ITB 37.1, the Employer shall, accept the bid selected in accordance with ITB 36.1 and Letter of Acceptance shall be communicated to the selected bidder prior to the expiration of period of Bid validity, to furnish the performance security and sign the contract within fifteen days.
38. Performance Security	38.1 Within Fifteen (15) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security from A class Commercial Bank in accordance with the conditions of Contract using Sample Form for the Performance Security included in Section IX (Contract Forms), or another form acceptable to the Employer. The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by an "A" class commercial Bank in Nepal. 38.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security. In that event the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily. The process shall be repeated according to ITB 37.
39. Signing of Contract	39.1 The Employer and the successful Bidder shall sign the Contract Agreement within the period as stated ITB 38.1. 39.2 At the same time, the Employer shall affix a public notice on the result of the award on its notice board and make arrangement for causing such notice to be affixed on the notice board also of the District Development Committee, District Administration Office and District Treasury and Controller Office. The Employer may make arrangements to post the notice into its website, if it has; and if it does not have, into the website of the Public Procurement Monitoring Office, identifying the bid and lot numbers and the

	following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at Bid Opening; (iii) name and evaluated prices of each Bid; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the Price it offered, as well as the duration and summary scope of the Contract awarded. 39.3 Within thirty (30) days from the date of issuance of notification pursuant to ITB 37.1 unsuccessful bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, requests for debriefing within 30 days of publication of the Contract award.
40. Complaint and Review	40.1 If a Bidder is dissatisfied with the Procurement proceedings or the decision made by the Employer in the intention to award the Contract, it may file an application to the Chief of the Public Entity within Seven (7) days of providing the notice under ITB 37.1 by the Public Entity, for review of the proceedings stating the factual and legal grounds. 40.2 Late application filed after the deadline pursuant to ITB 40.1 shall not be processed. 40.3 The chief of Public Entity shall, within five (5) days after receiving the application, give its decision with reasons, in writing pursuant to ITB 40.1: (a) whether to suspend the procurement proceeding and indicate the procedure to be adopted for further proceedings; or (b) to reject the application. The decision of the chief of Public Entity shall be final for the Bid amount up to the value as stated in 40.4. 40.4 If the Bidder is not satisfied with the decision of the Public Entity in accordance with ITB 40.3, or the decision by the Employer is not given within five (5) days of receipt of application pursuant to ITB 40.1, it can, within seven (7) days of receipt of such decision, file an application to the Review Committee of the GoN, stating the reason of its disagreement on the decision of the chief of Public Entity and furnishing the relevant documents, provided that its Bid amount is more than Rupees Twenty Million (Rs. 20,000,000). The application may be sent by hand, by post, by courier, or by electronic media at the risk of the Bidder itself. 40.5 Late application filed after the deadline pursuant to ITB 40.4 shall not be processed. 40.6 Within three (3) days of the receipt of application from the Bidder, pursuant to ITB 40.4, the Review Committee shall notify the concerning Public Entity to furnish its procurement proceedings, pursuant to ITB 40.3.

	40.7 Within three (3) days of receipt of the notification pursuant to ITB 40.6, the Public Entity shall furnish the copy of the related documents to the Review Committee. 40.8 The Review Committee, after inquiring from the Bidder and the Public Entity, if needed, shall give its decision within one (1) month of the receipt of the application filed by the Bidder, pursuant to ITB 40.4. 40.9 The Bidder, filing application pursuant to ITB 40.4, shall have to furnish a cash amount or Bank guarantee from "A" class commercial bank equivalent to zero point five percent (0.5%) of its quoted Bid amount with the validity period of at least ninety (90) days from the date of the filing of application pursuant to ITB 40.4. 40.10 If the claim made by the Bidder pursuant to ITB 40.4 is justified, the Review Committee shall have to return the security deposit to the applicant, pursuant to ITB 40.9, within seven (7) days of decision made.
41. Provisions of PPA and PPR	41.1 If any provisions of this document are inconsistent with Public Procurement Act (PPA), 2063 or Public Procurement Regulations (PPR), 2064, the provision of this document shall be void to the extent of such inconsistency and the provision of PPA and PPR prevail.

SECTION - II

Bid Data Sheet

A. General	
ITB 1.1	The number of the Invitation for Bids is: NRO/2074/075-33KV Bay&Line-01
	The Employer is: **Nepal Electricity Authority** **Distribution and Consumer Services Directorate** **Nepalgunj Regional Office,Nepalgunj** **33KV Bay and Line for 33/11 kV, 6/8 MVA substation project, Rajapur, Bardiya**
	The number and identification of lots comprising this bidding process is: **N/A** Following is the addition of the new definitions: (a) "Bidder" shall mean a legally registered entity submitting the Bid proposal. The entity may be a supplier or manufacturer of the tendered Goods or contractor or any combination of them in the form of a Joint Venture as specified in Qualification Requirements. (b) "Joint Venture" shall mean a legally enforceable association constituted by legally registered entities with the purpose of committing the obligations required by the Bid. (c) "Goods" shall mean equipment, plant, goods, materials, etc. to be supplied and installed for the completion of the work as particularly described in the specifications.
ITB 2.1	**The name of the Project is:** Supply, Delivery, Installation, Testing and Commissioning of Bay Extension at Tikapur S/s and upgradation of 11kV Tikapur, Kailali-Rajapur,Bardiya Line to 33KV. The DP is: **Not Applicable** The implementing agency is: **Nepal Electricity Authority (NEA)** GoN Funded or DP Funded: **GoN Funded**
ITB 4.1 (a)	Maximum number of partner in a joint venture shall be : 3 (three) The qualification requirement of the parties to the JV shall be : Lead partner – at least 40% Other partners – at least 25% Overall (Lead partner plus other partners) – 100 %

ITB 4.2	Eligible Countries - **All Countries**
B. Bidding Document	
ITB 7.1	For clarification purposes only, the Employer's address is: Attention: **Project Manager** Address: **Nepal Electricity Authority** **Distribution and Consumer Services Directorate** **Nepalgunj Regional Office , Nepalgunj** **33KV Bay and Line for 33/11 kV, 6/8 MVA substation project, Rajapur, Bardiya** Telephone: **081-523419** Facsimile number: **081-523508** Electronic mail address: **technical.nro@gmail.com**
ITB 7.4	A Pre-Bid meeting **"shall not"** be held. A site visit shall not be organized by the Employer.
ITB 7.5	Time for request: Requests for clarification should be received by the Employer no later than 10 days prior to the deadline for submission of bids.
C. Preparation of Bids	
ITB 10.1	The language of the bid is: **English**
ITB 11.1 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced Bill of Quantities for Unit Rate Contracts and Schedule of Prices for lump sum contracts: **N/A**
ITB 11.1 (i)	The Bidder shall submit with its bid the following additional documents: **Two**
ITB 13.1	Alternative bids "shall not be" permitted.
ITB 13.2	Alternative times for completion "shall not be" permitted.
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: None
ITB 14.6	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 18.1	The bid validity period shall be: **90 days.**
ITB 19.1	The Bidder shall furnish a bid security, from "A" class commercial bank

	with a minimum of NRs. **2,10,000.00**, which shall be valid for 30 days beyond the validity period of the bid.
ITB 19.2 (b)	Account Name: **Nepal Electricity Authority** Bank Name: **Bank of Kathmandu** Bank Address: **Nepalgunj , Nepal** Account Number: **010500000354**
ITB 20.1	In addition to the original of the bid, the number of copies are: 2 (Two)
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall indicate: (a) The name and description of the documentation required to demonstrate the authority of the signatory to sign the Bid such as a Power of Attorney; and (b) In the case of Bids submitted by an existing or intended JV, an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.
D. Submission and Opening of Bids	
ITB 21.1	Bidders "shall" have the option of submitting their bids electronically.
ITB 22.1	For bid submission purposes only, the Employer's address is : **Nepal Electricity Authority** **Distribution and Consumer Services Directorate** **Nepalgunj Regional Office , Nepalgunj** Telephone: **081-524271** Facsimile number: **081-523508** Electronic mail address: **technical.nro@gmail.com** The deadline for bid submission is : Date : **17 Jan, 2018** Time : **On or Before 12:00 noon.**
ITB 25.1	The bid opening shall take place at : **Nepal Electricity Authority** **Distribution and Consumer Services Directorate,** **Nepalgunj Regional Office , Nepalgunj** Address : **Nepalgunj Regional Office , Nepalgunj** Date : **17 Jan, 2018** Time : **At 14:00 hours**

E. Evaluation and Comparison of Bids	
ITB 32.5	The amount of the performance security be increased by Eight (8) percent of the quoted bid price.

F. Special Instructions to Bidders for e-Bidding

A) Bid submission procedures through electronically (e-submission) only:

i. Interested eligible bidders shall, either purchase the hard copy of the bidding document directly from the Employer's office as specified in the Invitation for Bid (IFB) or may download the necessary parts of the bidding documents from e-procurement section in NEA's web site http://www.e-nea.org.np. In case, the bidders choose to download the bidding documents, prepare the bids on downloaded documents, and submit their bids electronically. The Bidders shall be required to deposit the non refundable fee for the bidding document (as specified in the bid notice) in the bank account specified in the IFB and electronic scanned copy (*.pdf format) of the bank deposit voucher shall also be submitted along with the electronic bid files.

ii. The Bidder shall fill the following documents and forms (in hard copy of issued bid documents), signed by the authorized representative with seal of the company.

a) Bill of Quantity (BOQ) with rate, amount, b) Forms of Bid, Qualification Information

The Bidder shall then scan the completed original documents, forms in PDF formats with appropriate filename shown if the table below.

S. No.	Document	PDF File name	Requirement	Remarks
1	Form of Bid	Bid form -1	Mandatory	
2	Bid Security (Bank Guarantee)	Bid security-2	Mandatory	
3	Company registration,	Company reg-3	Mandatory	All firms in case of JV
4	VAT/PAN registration,	VAT reg-4	Mandatory for National firms	All firms in case of JV
5	Tax clearances certificate,	Tax-5	Mandatory for National firms	All firms in case of JV
6	Power of Attorney of Bid signatory	Power of att-6	Mandatory	
7	Joint venture agreement	JV doc-7	Mandatory	In Case of JV
8	Qualification Information	Qualifications-	Mandatory	
9	BOQ with rate, amount and total amount	BOQ-9	Mandatory	

10	Manufacturers Authorization	Authorization - 10	Mandatory	
11	Technical Data Sheet	TDS-11	Mandatory	
12	Certification Documents	Certifications-12	Mandatory	Like ISO Certification Doc
13	Declaration Form	Declaration-13	Mandatory	

Note: **Mandatory** *means the mentioned files shall be included in e-submission and non-submission of such file shall be considered as non-responsive bid.*

iii. For e-submission purpose the Bidder shall, at first, register in the e-procurement section NEA's web site http://www.e-nea.org.np .

iv. After preparing all the required bidding documents in PDF, scan the files as specified in (ii).

v. The Bidder shall upload the PDF bid files and submit the complete bid online through e-procurement section of NEA's website http://www.e-nea.org.np within the specified date and time.

vi. The e-procurement system will accept the e-submission of bid from the date after publishing of notice and will automatically disallow the e-submission of bid after the deadline for submission of bid, as specified above.

vii. The standard time for e-submission is Nepalese Standard Time as set out in the server of IT Department of NEA.

viii. When a bidder submits his bid in hard copy, the e-procurement section does not allow the bidder to submit his Substitution or Modification or Withdrawal through e-procurement section of NEA's web site.

ix. Bidders may submit his Substitution or Modification or Withdrawal either in hard copy or through e-submission.

x. For Substitution of Bid, the Bidder shall follow similar steps as specified in ITB Clause - 22 with a Substitution letter in PDF file.

xi. For Modification or Withdrawal of bid, the Bidder is required to submit PDF scan copy of their Modification or Withdrawal letter and a written Power of Attorney of the signatory for Modification/ Withdrawal, duly signed by Authorized Representative/s of the Firm / all authorized Joint Venture partners.

xii. When a Bidder submits electronic bid by downloading the bidding documents from the NEA's webpage it is assumed that the Bidder prepares his bid by studying and examining all the Bidding documents including specifications and conditions of contract.

xiii. In case the Bidder choose to download the bidding documents and deposit the cost of bidding documents (as specified in the bid notice), such deposited amount shall be

verified by the office during bid evaluation process. The bid shall be considered as non-responsive and shall not be evaluated if the specified cost for bidding document is not deposited in the Employer's Revenue account.

xiv. Proposed facility for submission of bid electronically through e-submission is to increase transparency, non-discrimination, equality of access, and open competition. The Bidders shall be fully responsible to use the e-submission facility in e-procurement section of NEA's website http://www.e-nea.org.np in specified procedures and in no case the Employer shall be held liable for Bidder's inability to use this facility.

B) Requirements and Conditions for e-submission of bid:

i. The Bidder shall submit his bid electronically in PDF files in the manner as specified above, and additional submission of hard copy of "original plus one copy of bid" is not mandatory.

ii. In case, if both the electronic bid and original bid in hard copy are submitted to the Employer within the bid submission deadline, the Bidder's electronic bid and original bid in hard copy will be accepted for evaluation provided the facts and figures in hard copy confirm to the PDF files in electronic bid. If there is any discrepancy in fact and figures between the electronic bid and original bid in hard copy, it will be treated as two separate bids from one Bidder and hence, both the electronic bid and original bid in hard copy shall be disqualified.

iii. However, for electronically submitted bid in PDF files, the Bidder shall be required to submit documents/clarifications for verification purpose upon notification to do so from the Employer within 3 days. Non-submission of such documents by the Bidder within specified period may cause forfeiture of Bid Security.

iv. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying with the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.

v. In addition to electronically submitted PDF files, the Bidder shall be required to submit documents and clarifications as required by the Employer. Non-submission of such documents and or clarifications by the Bidder within specified time may cause forfeiture of Bid Security.

vi. In case of major discrepancy found between electronically submitted PDF bid files and documents/ clarifications provided by the Bidder, the bid shall not be considered for further evaluation.

vii. The Bidder shall attach the Bid Security Guarantee in the format attached in the Bid Document. The Bid Security may be forfeited

a. if the Bidder does not respond to and/or submit the documents and or clarifications when requested by the Employer.

b. if major discrepancy is found between e-submitted bid information and documents/clarifications provided by the Bidder during verification process as requested by the Employer.

C) Bid Opening process for e-submitted bid

i. Electronically submitted bid shall be opened first at the Bid opening time.

ii. The e-procurement system allows the Employer to download and open the e-submitted bid files from the bidders only after the time for opening the bids.

iii. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying with the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.

iv. After opening of e-submitted bids files, all files shall be printed and recorded at the time of bid opening.

v. In case of "WITDRAWAL" or "MODIFICATION" or "SUBSTITUTION" by the Bidder through e-submission, the e-submitted PDF files under "WITDRAWAL" or "MODIFICATION" or "SUBSTITUTION" shall be opened and read out first. Bids for which acceptable notice of "WITDRAWAL" or "SUBSTITUTION" has been submitted pursuant to ITB Clause shall not be opened.

D) Bid Evaluation and Comparison process for e-submitted bid

i. In case of e-submitted bids, the Employer evaluates the bid based on the information as per electronically submitted bid files. For clarification/ verification purpose, the Employer may request the Bidder to submit documents/ clarifications.

ii. In case, the Bidder could not substantiate or provide evidence to prove the information provided in e-submitted bid through documents/clarifications, the bid shall not be considered for further evaluation and respective ITB Clause for forfeiture of bid security shall be applicable.

iii. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying with the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.

E) Qualification Information

In case of e-Bidding, the Bidder is required to submit the documents to prove minimum qualification requirements only and not the detail documents.

F) Bid Security Format

Form of Bid security shall include the provision as 'This Bank Guarantee shall not be withdrawn or released merely upon return of the original Guarantee by the Bidder unless notified by the Employer for the release of the Guarantee'.

Nepal Electricity Authority

Declaration Form (for E-bidding)

S.No.	Description		Status			
			Issued to (as applicable)	**Issued by (as applicable)**	**Date of Issue**	**No. of Pages**
1	Notarized Power of Attorney from the Company to Sign on Company's behalf (For Single Bidder)					
2	Joint Venture Agreement; ***If any***					
3	Notarized Power of Attorney to Sign the Bid on Company's behalf (Each Partner in case of JV)					
4	Notarized Power of Attorney to Sign the Bid (On Behalf of JV)					
5	Registration Certificate of the Bidder (and each partners in case of JV)					
6	Bid Security					
7	Price Schedule					
8	Bid Form					
9	Qualification Forms					
10	Complete Certified Audited Report of the Bidder (and each partner in case of JV)	Year 1				
		Year 2				
		Year 3				

11	Performance (or user) Certificate/s (Bidder)	1				
		2				
		3				
		4				
12	Manufacturer's Authorization/s	1				
		2				
		3				
		4				
13	Power of Attorney from the Company to Issue the Manufactures Authorization					
14	Business License of Manufacturer/s	1				
		2				
		3				
		4				
15	User Certificate/s (Manufacturer)	1				
		2				
		3				
		4				
16	ISO Certificate	1				
		2				
		3				
		4				
17	Type Test Report/s (if required as per	1				
		2				

	specification)	3				
		4				
18	Technical Data Sheet	1				
		2				
		3				
		4				
19	Other Certification (as per requirements)	1				
		2				
		3				
		4				

SECTION - III

Evaluation and Qualification Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders by post-qualification exercise. **GoN**/DP requires bidders to be qualified by meeting predefined, precise minimum requirements. The method sets pass-fail criteria, which, if not met by the bidder, results in disqualification. In accordance with ITB 32 and ITB 34, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Section IV (Bidding Forms).

1. Evaluation

In addition to the criteria listed in ITB 32.2 (a) - (e) the following criteria shall apply:

Note:

Use the evaluation criteria listed below as appropriate and required for the project.

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity, to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section V (Works Requirements).

1.2 Multiple Contracts (Not Applicable)

1.3 Completion Time

Time to complete the plant and services from the effective date for determining time for completion of pre-commissioning activities is: 6 **months**. Earlier Completion will be appreciable.

1.4 Alternative Technical Solutions (Not Applicable)

1.5 Quantifiable Nonconformities, Errors and Omissions

Pursuant to ITB 30, the cost of all quantifiable nonmaterial nonconformities or omissions (minor omissions or missing items) shall be evaluated. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of bids.

1.6 Functional Guarantees of the facilities: (Not Applicable)

Capitalization of Transformer Losses

When evaluating the individual bid received from Bidders, the bid price shall be evaluated for the cost of transformer loss values (no-load losses and load losses) based on the following loss capitalization formula:

a.) For Power Transformers:

$$P_E = P_b + K_L * L_L + K_{NL} * L_{NL}$$

P_E = Evaluated Price
P_b = Bid Price
K_L = Value of Load Loss
L_L = Guaranteed load losses at rated current (Maximum MVA base)
K_{NL} = Value of no load Loss
L_{NL} = Guaranteed no load losses

The transformer losses shall be capitalized as follows:

Value of No Load Loss = US$ 4,684 per KW
Value of Load Loss = US$ 1,180 per KW

Any transformer shall be rejected if losses exceed the guaranteed value by an amount in excess of the following

Total losses: 10%
Component losses: 15% (unless the total loss exceeds 10 %)

b.) For Station Transformers:

Any transformer shall be rejected if losses exceeds the following prescribed values.

For 33/0.4/0 .23 kV

S.N.	*Rating*	*No Load Loss (watts)*	*Load Loss (watts)*
1.	50 kVA, 3-ph	140	800
2.	100 kVA, 3-ph	290	1800

2. Qualification

Failure to fulfill any of the requirements specified in Qualification Requirements given below from 2.1 to 2.11 shall result in disqualification of the Bid.

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.1 **Power of Attorney**					
The Bid shall include a notarized power of attorney authorizing the signatory of the bid to	must meet requirement	not applicable	must meet requirement	must meet requirement	Document attachment
2.2 **Legal Status**					
i) For the Bidder which is not a Joint-Venture: The Bidder shall be a manufacturer or a contractor legally registered in their home country for at least five (5) years. A notarized copy of legal registration certificate shall be submitted along with the Bid.	must meet requirement	not applicable	not applicable	not applicable	Document attachment
ii) For the JV Bidder: (a) Original of joint venture agreement legally binding on all JV partners shall be included in the Bid. The joint venture agreement shall bear the seal of the entity and signatures of personnel authorized by the respective entities forming	must meet requirement	not applicable	must meet requirement	must meet requirement	

the joint venture. All such authorization documents shall also be included in the Bid. These Authorization document shall be on the original letterhead of the respective entity with stamp/seal of the entity. (b) The number of joint venture partners shall not exceed three (3). (c) Partners of the JV shall be a manufacturer or contractor legally registered for at least five (5) years. (d) Notarized copies of legal registration certificates for each JV partners shall be submitted along with the Bid.					

2.3 Eligibility

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.3.1 Nationality					
Nationality in accordance with ITB 4.2	must meet requirement	existing or intended JV must meet requirement	must meet requirement	must meet requirement	Forms ELI – 1, with attachments
2.3.2 Conflict of Interest					
No conflicts of interest in accordance with ITB Sub-Clause 4.3.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	must meet requirement	Letter of Bid

2.3.3 Government-owned Entity					
Bidder required to meet conditions of ITB Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	must meet requirement	Forms ELI – 1, ELI - 2, with attachments
2.3.4 UN Eligibility					
Not having been declared ineligible based on a United Nations resolution or Employer's country law, as described in ITB Sub-Clause 4.8.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	must meet requirement	Letter of Bid
2.3.5 Other Eligibility					
Copy of Firm Registration Certificate	must meet requirement	not applicable	must meet requirement	must meet requirement	Document attachment
Copy of Business Registration Certificate	must meet requirement	must meet requirement	must meet requirement	must meet requirement	Document attachment
Copy of VAT and PAN Registration certificate ***(only for domestic bidders)***	must meet requirement	not applicable	must meet requirement	must meet requirement	Document attachment
Copy of Tax Clearance Certificate/Tax return submission evidence for the **F/Y2073/074.*(Only for domestic bidders)***	must meet requirement	not applicable	must meet requirement	must meet requirement	Document attachment

2.4 Pending Litigation

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.4.1 Pending Litigation					
All pending litigation shall be	must meet requirement	not applicable	must meet requirement	must meet requirement	Form LIT – 1

treated as resolved against the Bidder and so shall in total not represent more than 50 percent of the Bidder's net worth.	by itself or as partner to past or existing JV				

2.5 Financial Situation

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.5.1 Historical Financial Performance					
Submission of audited balance sheets and income statements, for the last **3(Three)** years to demonstrate the current soundness of the Bidder's financial position. 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	must meet requirement	Form FIN - 1 with attachments
2.5.2 Average Annual Construction Turnover					
Minimum average annual construction turnover of NRs **41, 65,000.00** calculated as total certified payments received for construction contracts in progress or completed, over the last three consecutive years.	must meet requirement	must meet requirement	must meet 25 % of the requirement	must meet 40 % of the requirement	Form FIN - 2
2.5.3 Financial Resources					

Using Forms FIN - 3 and FIN - 4 in Section IV (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 following cash-flow requirement, at least NRs **47,20,000.00**	must meet requirement	must meet requirement	must meet 25 % of the requirement	must meet 40 % of the requirement	Form FIN - 3 and Form FIN - 4
2.6 Quality of Goods					
i. In case the Bidder is not the manufacturer of Goods offered, the Bidder shall submit manufacturer's certificate authorizing the Bidder to supply the manufacturers' Goods. This certificate shall bear details of the Goods that the manufacturer will be supplying under the authorization. The authorization shall be on the manufacturer's original letter head with seal/stamp of the manufacturer. (ii) The manufacturer of Goods to be supplied under this Bid shall hold valid quality ISO certificate as required by the specifications and a copy of ISO certificate shall be included in the Bid. (iii) Type test certificate, if applicable, shall be included in the Bid and shall bear a date that is not earlier than five (5) years from the last date of Bid submission unless otherwise stated in the Technical specifications. The					

type test certificate shall have been issued by a reputed independent laboratory accredited by International Laboratory Accreditation Corporation (ILAC) or International Accreditation Forum (IAF) or other reputed accreditation agencies. In case the Type test certificate is not as per the requirement, the bidder shall, upon award of the Contract, undertake to carry out the required Type tests from an independent laboratory qualified as above or in the laboratory owned or nominated by the Client / Employer before delivery of the corresponding equipment at no extra cost to the Client / Employer.					

2.7 Experience

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.7.1 General Construction Experience					
Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last **5** (**five) years** prior to the applications submission deadline.	must meet requirement	not applicable	must meet requirement	must meet requirement	Form EXP - 1

2.7.2 Specific Construction Experience					
(a) Contracts of Similar Size and Nature					
Participation as Prime contractor, management contractor, or subcontractor, in at least **one (1)** contract within the last ten (10) years, substantially completed for Supply,Delivery,Installation/ Erection,Testing and Commissioning of similar projects. The similarity shall be based on the physical size, complexity, methods, technology or other characteristics as described in Section V, Works Requirements.	must meet requirement	must meet requirement	must meet requirement	must meet requirement	Form EXP - 1

(b)Construction Experience in Key Activities					
For the above or other contracts executed during the period stipulated in 2.8.4.2(a) above, a minimum construction experience in the following key activities :	must meet all requirement	must meet all requirements	must meet all requirements	must meet all requirements	Form EXP - 2(b)
The bidder shall have successfully executed as a prime contractor of supply and installation or rehabilitation of a substation involving design, supply or manufacturing, erection, testing and commissioning of at least one (1) sub-station project of 33/11 kV or above voltage class with a Power Transformer capacity of at least 3 MVA within last 10 years as of the last date of bid submission. B) To substantiate the above qualification, the bidder must submit certificate from clients (end-user certificates) for all number of projects specified as above.	must meet requirement	must meet requirement	Design,Supply or manufacturing, ,Installation/ Construction, Testing and Commissioning of at least 3 MVA,33/11 kV substations or above voltage class within last 10 years as of the last date of bid submission.	Design,Supply or manufacturing, ,Installation /Construction, Testing and Commissioning of at least 3 MVA, 33/11 kV substations or above voltage class within last 10 years as of the last date of bid submission.	Form EXP - 2(b)

2.8 Manufacturer's Experience

Manufacturers for the following major items of supply or services must meet the following minimum criteria, herein listed for that item:

Item No.	Description of Item	Minimum Criteria to be met
1.	Power transformer (33kV or higher voltage)	i) Must have manufacturing experience of at least 10(Ten) years. ii) Must have successfully completed the supply of power transformer of capacity 3 MVA or higher capacity, 33kV or higher Voltage Class, at least twice the bid quantity as a main supplier over last five (5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One(1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.
2.	12 kV switchgear	i) Must have manufacturing experience of at least 10 (Ten) years. ii) Must have successfully completed the supply of 12kV switchgear, at least twice the bid quantity as a main supplier over last five (5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One (1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.

3.	36 kV outdoor switchgear	i) Must have manufacturing experience of at least 10(Ten) years. ii) Must have successfully completed the supply of 36kV outdoor switchgear, at least twice the bid quantity as a main supplier over last five (5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One (1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.
4.	Disconnecting switch (DS), instrument transformer (CT & PT), lightning arrestor (LA)	i) Must have manufacturing experience of at least 10(Ten) years. ii) Must have successfully completed the supply of Disconnecting switch (DS), Instrument transformer (CT & PT), Lightning Arrestor (LA), at least twice the bid quantity as a main supplier over last five(5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One(1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.
5.	33 kVControl & relay panel (C&RP)	i) Must have manufacturing experience of at least 10(Ten) years. ii) Must have successfully completed the supply of Control & Relay Panel (C&RP), at least twice the bid quantity as a main supplier over last five (5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least

		One (1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.
6.	Battery and Charger	i) Must have manufacturing experience of at least 10 (Ten) years. ii) Must have successfully completed the supply of Battery and Charger, at least twice the bid quantity as a main supplier over last five(5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One(1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item.

7.	XLPE Cable (12kV or higher voltage class)	i) Must have manufacturing experience of at least 10(Ten) years. ii) Must have successfully completed the supply of XLPE Cable of 12kV or higher Voltage class, at least twice the bid quantity as a main supplier over last five (5) years period ending on the last date of bid submission. Out of supplied quantity, a minimum of half the bid quantity shall have been in operation satisfactory to the end users for at least One(1) year. iii) Must submit the type test report carried out by independent testing laboratory for the offered item or higher voltage class and capacity.

2.9 Miscellaneous

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Others Partner	Lead Partner	
2.8.2 Miscellaneous					
The Bidder or any of the Joint Venture partners shall not be on the blacklist circulated by Public Procurement Monitoring Office, Government of Nepal or Nepal Electricity Authority.	must meet requirement	not applicable	must meet requirement	must meet requirement	Form LIT – 1

2.10 Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements:

No.	Position	Academic Qualification *[When position demands]*	Total Work Experience [Years]	Experience in Similar Works [years]
1.	**Project Manager**		**6**	**4**
2.	**Electrical engineer**		**5**	**3**
3.	**Civil engineer**		**5**	**3**
4.				
5.				

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Information Forms included in Section IV (Bidding Forms).

2.11 Equipment

The Bidder must demonstrate that it has the key equipment listed hereafter:

No.	Equipment Type and Characteristics	Min. Number Requirement
1.	Insulation tester	2
2.	Oil filtering machine	1
3.	Relay injection & test equipment	2
4.	Earth Test Instrument	2
5.	Stand by Generator	1

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV (Bidding Forms)

SECTION - IV

Bidding Forms

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

Letter of Bid

The Bidder must accomplish the Letter of Bid in its letterhead clearly showing the Bidder's complete name and address.

Date: .....

Name of the contract: .....

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) Clause 8;
(b) We offer to execute in conformity with the Bidding Documents the following Works:

(c) The total price of our Bid, excluding any discounts offered in item (d) below is:

(d) The discounts offered and the methodology for their application are:

(e) Our bid shall be valid for a period of ***[insert validity period as specified in ITB 18.1]*** 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;

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

(g) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from eligible countries or any countries [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a consortium or association, and the nationality of each Subcontractor and Supplier];

(h) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3;

(i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.3, other than alternative offers submitted in accordance with ITB 13;

(j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any

part of the contract, has not been declared ineligible, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;

(k) We are not a government owned entity/We are a government owned entity but meet the requirements of ITB 4.5.1

(l) 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;

(m) We declare that, we have no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or business.

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

(o) If awarded the contract, the person named below shall act as Contractor's Representative:

(p) We agree to permit the Employer/DP or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by the Employer.

Name: .....

In the capacity of .....

Signed ……...

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

Date ……..

Bid Security
Bank Guarantee

Bank's Name, and Address of Issuing Branch or Office
(On Letter head of the 'A' class Commercial Bank)

Beneficiary: ..... name and address of Employer …….

Date: ……...

Bid Security No.: .....

We have been informed that . ……. .[insert name of the Bidder] (herein after called "the Bidder") intends to submit its bid (hereinafter called "the Bid") to you for the execution of ……... name of Contract . …… 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 or modifies 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 Employer 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.
(d) is involved in fraud and corruption in accordance with the ITB

This guarantee will remain in force up to and including the date ……number……days after the deadline for submission of Bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not letter than the above date.

This Bank guarantee shall not be withdrawn or released merely upon return of the original guarantee by the Bidder unless notified by you for the release of the guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

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

Note:

The bid security of ……. has been counter guaranteed by the Bank ……..…...…… on ……..... (Applicable for Bid Security of Foreign Banks).

Manufacturer's Authorization Letter

[This letter of authorization should be on the letterhead of the manufacturer and should be signed by the person with the proper authority to sign documents that are binding on the manufacturer]

Date: _____

IFB No.: _____

To:_____

WHEREAS_____ who are official manufacturers of _____ having factories at _____ do hereby authorize _____ exclusively to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is exclusively to provide the following Goods, manufactured by us _____and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 27 of the General Conditions of Contract, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

Name _____

In the capacity of: _____

Signed _____

Duly authorized to sign the Authorization for and on behalf of _____

Date __

Technical Proposal Format

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Personnel

Form PER - 1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements for each of the positions listed in Section III (Evaluation and Qualification Criteria). The data on their experience should be supplied using the Form below for each candidate.

No.	Name	Position*	Academic Qualification	Total Work Experience [Years]	Experience in Similar Works [years]
1.					
2.					
3.					
4.					
5.					

* As listed in Section III (Evaluation and Qualification Criteria).

Form PER - 2: Resume of Proposed Personnel

The Bidder shall provide all the information requested below. Fields with asterisk (*) shall be used for evaluation.

Position*		
Personal Information	**Name**	**Date of Birth**
	Professional qualifications	
Present employment	**Name of employer**	
	Address of employer	
	Telephone	**Contact (manager/personnel officer)**
	Fax	**E-mail**
	Job title	**Years with present employer**

Summarize professional experience over the last twenty years in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From*	**To***	**Company, Project, Position and Relevant Technical and Management Experience***

Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields with asterisk (*) shall be used for evaluation.

Type of Equipment*		
Equipment Information	**Name of manufacturer**	**Model and power rating**
	Capacity*	**Year of manufacture**
Current Status	**Current location**	
	Details of current commitments	
Source	**Indicate source of the equipment** **🗀 Owned 🗀 Rented 🗀 Leased 🗀 Specially manufactured**	

The following information shall be provided only for equipment not owned by the Bidder.

Owner	**Name of owner**	
	Address of owner	
	Telephone	**Contact name and title**
	Fax	**email**
Agreements	**Details of rental / lease / manufacture agreements specific to the project**	

Bidder's Information and Qualification Format

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

Bidder's Qualification

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

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of JV, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
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, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm or JV named in above, in accordance with ITB 20.2. 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITB 4.5.	

Form ELI - 2: JV Information Sheet

Each member of a JV must fill in this form

JV / Specialist Subcontractor Information	
Bidder's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following original documents.	
1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and 4.2. 2. Authorization to represent the firm named above, in accordance with ITB 20.2. 3. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.	

Form LIT - 1: Pending Litigation

Each member of a JV must fill in this form

Pending Litigation			
🗀 No pending litigation in accordance with Criteria 2.8.2 of Section III (Evaluation and Qualification Criteria) 🗀 Pending litigation in accordance with Criteria 2.8.2 of Section III (Evaluation and Qualification Criteria)			
Year	**Matter in Dispute**	**Value of Pending Claim in NRS**	**Value of Pending Claim as a Percentage on Net Worth**

Form FIN - 1: Financial Situation

Each Bidder or member of a JV must fill in this form

Financial Data for Previous 3 Years [in NRS]		
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			
Profit Before Tax			
Profit After Tax			

- Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last three or above 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 auditor.
- 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).

Form FIN - 2: Average Annual Construction Turnover

Each Bidder or member of a JV must fill in this form

The information supplied should be the Annual Turnover of the Bidder or each member of a JV in terms of the amounts billed to clients for each year for work in progress or completed to NRs at the end of the period reported.

Annual Turnover Data for the Last 3 Years	
Year	**Amount Currency**

- **Average Annual Turnover**

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 construction cash flow demands of the subject contract or contracts as indicated in Section III (Evaluation and Qualification Criteria).

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

Note :

The letter from the Bank must be unconditional.

Form FIN- 4: Current Contract Commitments / Works in Progress

Bidders and each partner to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments									
No.	**Name of Contract**	**Name of the Contractor/s**	**Employer's Contact Address, Tel, Fax**	**Contract Amount**	**Contract Date**	**Contract Duration**	**Value of outstanding works [NRS]**	**Estimated Completion Date**	**Average Monthly Invoicing [NRS/month]**
1									
2									
3									
4									
5									
6									

Form EXP - 1: General Project Experience

Each Bidder or member of a JV must fill in this form.

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

Form EXP - 2(a): Specific Project 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**	🗀 **Management Contractor**	🗀 **Subcontractor**
Total Contract Amount	🗀 **NRS ……..**		
If Partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**	
Employer's Name **Address** **Telephone/Fax Number** **E-mail**			
Description of the similarity in accordance with Criteria 2.4.2 (a) of Section III			
Note : ***The Employer should insert here contract size, complexity, methods, technology, or other characteristics as described in Section V (Work Requirements) against which the bidder demonstrates similarity in the box on the right-hand-side.***			

Form EXP - 2(b): Specific Project Experience in Key Activities

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**	🗀 **Management Contractor**	🗀 **Subcontractor**
Total Contract Amount	🗀 **NRS ……...**		
If Partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**	
Employer's Name **Address** **Telephone/Fax** **Number** **E-mail**			
Description of the similarity in accordance with Criteria 2.4.2 (a) of Section III			
Note : *The Employer should insert here production rate(s) for the key activity (activities) subject contract against which the bidder demonstrates in the box on the right-hand-side production rates achieved by him on previous contracts.*			

SECTION - VI

Bill of Quantities[1]

Preamble of Bill of Quantities

A. General

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Project Manager and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Project Manager may fix within the terms of the Contract.

3. For any item for which measurement is based on records made before or during construction the records shall be prepared and agreed between the Engineer and the Contractor. Should the Contractor carry out such work without the prior agreement of the Engineer, the Engineer may request the Contractor to carry out investigations to confirm the extent of the work and the quantity of work certified for payment shall be solely at the Engineer's discretion. The cost of any such investigation shall be borne by the Contractor.

4. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

5. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

6. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

7. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities. The Specification Clause references where given in the item description of the Bills of Quantities are for the convenience of bidders and generally refer to the principal relevant-specification clause but do not necessarily represent the whole of the specification requirements for the work required within the item. The presence of a Specification clause reference shall not in any way reduce the Bidders obligation to complete work in accordance with all the requirements of the Specification.

[1]In lump sum contracts, delete "Bill of Quantities" and replace with "Schedule of Activities" throughout this section.

8. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager in accordance with the Conditions of Contract.

9. The method of measurement of completed work for payment shall be in accordance with the Specifications.

10. The abbreviations and symbols used in this Bill of Quantities are:
[Insert as applicable]

NEPAL ELECTRICITY AUTHORITY
Distribution & Consumer Services Directorate
Nepalgunj Regional Office
Nepalgunj

Summary of BOQ for Supply, Delivery, Installation, Testing and Commisioning of Bay at Tikapur S/s and 11kV Line upragadation to 33 KV

FY 2074/075

S.No.	Description	Total Amount (NRs)	In Words	Remarks
1. Electrical Part				
A.	Supply, Delivery, Installation, Testing and Commissioning of Bay			
B.	Supply, Delivery and Construction of 33KV Line.			
C.	33KV Transmission Line Rehab			
	Total (Electrical Part) (A+B+C)			
	VAT 13%			
	Total Amount (Electrical Part) with VAT			
2. Civil Construction Part				
2.1	Construction of 33 KV Bay Extension at Tikapur SS Kailali Tikapur			
	VAT 13%			
	Total(Civil Part) with VAT			
	Grand Total (Electrical + Civil) (NRs.) with VAT			

In Words:

Note: N/A = Not Applicable

Name of Bidder:

Seal/Stamp of Firm

Date:

Duly Authorized to sign the Bid for and on behalf of:

NEPAL ELECTRICITY AUTHORITY
Distribution & Consumer Services Directorate
Nepalgunj Regional Office
Nepalgunj

BOQ for Supply, Delivery, Installation, Testing and Commisioning of Bay at Tikapur S/s and 11kV Line upragadation to 33 KV

FY 2074/075

S.No.	Description	Unit	Qty	Cost of Supply and Delivery at Site		Installation/Erection/Stringing, Testing and Commissioning Work		Total Amount	Remarks
				Unit Rate	In Words	Unit Rate	In Words		
A. Supply, Delivery, Installation, Testing and Commissioning of Bay									
1	Supply, Delivery, Installation, Testing and Commissioning of 33 KV, 800 A, Incoming Vacuum Circuit Breaker at Tikapur S/s.	Set	1						
2	Supply, Delivery, Installation, Testing and Commissioning of 33 KV Control and Relay Panel with all accessories for system operation at Tikapur S/s.	Set	1						
3	Supply, Delivery, Installation, Testing and Commissioning of 33 KV, 800 A Disconnecting Switch (Isolator) with Earth Switch for system operation at Tikapur S/s.	Set	2						
4	Supply, Delivery, Installation, Testing and Commissioning of 30 KV Lightning Arrestor for system operation at Tikapur S/s.	Set	1						
5	Supply, Delivery, Installation, Testing and Commissioning of 33 KV, 600/400/200/5A Current Transformer for system operation at Tikapur S/s.	Set (1 Set = 3 Nos)	1						
6	0.1 Sq.inch (Dog) Conductor, Insulators and others required hardwares and accecories	Lot	1			**N/A**			
	Sub-Total								
	(A)Total without VAT								
B. Supply, Delivery and Construction of 33KV Line.									
1	Supply, Delivery and Erection of 11m PSC Pole at construction site near Tikapur S/s.	Nos							
2	Supply and Delivery of 33KV Pin Insulator with spindle at Construction Site near Tikapur S/s.	Nos				**N/A**			
3	Supply and Delivery of Galvanized Short-T Channel (100*50*50*6.4*2250mm)	Nos				**N/A**			
4	Supply and Delivery of Galvanized Short-T (E-Type) Pole Clamp	Nos				**N/A**			
5	Supply, Delivery of 6" Nut Bolts at construction site near Tikapur S/s.	Kg				**N/A**			

NEPAL ELECTRICITY AUTHORITY
Distribution & Consumer Services Directorate
Nepalgunj Regional Office
Nepalgunj
BOQ for Supply, Delivery, Installation, Testing and Commisioning of Bay at Tikapur S/s and 11kV Line upragadation to 33 KV

6	Supply, Delivery and Stringing of 3-Wires, 0.1 Sq. inch (Dog) Conductor with all required accecories at construction site near Tikapur S/s.	Km							
7	Supply, Delivery and Installation of 33KV Stay Set (Complete Set) at construction site near Tikapur S/s.	Set							
	(B) Sub-Total without VAT								
C. 33KV Transmission Line Rehab									
1	Replacement of 11KV Pin Insulator with 33KV Pin Insulator with Spindle	Nos				**N/A**			
2	Replacement of 11 KV T/Channel with 33KV Galvanized Short T Channel (100*50*50*6.4*2250mm)	Nos				**N/A**			
3	Addition of 33KV Disc with one dead end clamp, Heavy duty 3 bolts	Set				**N/A**			
4	Dismentalling of 11KV 3-Wires, 0.05 Sq. Inch Conductor, 11KV T/Channel and 11KV Pin Insulator and transport it to NEA Store, Nepalgunj	Km		**N/A**					
4	Supply, Delivery and Stringing of 3-Wires, 0.1 Sq. inch (Dog) Conductor with all required accecories	Km							
	(C) Sub-Total without VAT								
	Sub-Total without VAT (A+B+C)								

NEPAL ELECTRICITY AUTHORITY
Distribution & Consumer Services Directorate
Nepalgunj Regional Office
Nepalgunj

BOQ for Civil Construction part

Job: Construction of 33 KV Bay Extension at Tikapur SS kailali Tikapur

S. No	Description of works	Unit	Quantity	Unit rate		Amount	Remarks
				In Figure	In Words		
1	**Equipment supports pedestals**						
1.01	Site cleaning and stripping top soil all over sub-	Sqm	80.00				
1.02	Galvanized Steel structures for post beam (Gantry), equipment supporting frame etc. with all neccessory accessories and fittings all complete as per site condition and as directed	MT	3.20				
1.03	E/W excavation in gravel boulder mixed soil in foundation of various structures as per site condition, specification and as directed by the site engineer	Cum	55.26				
1.04	Flat Brick soling works at foundation.	Sqm	23.84				
1.05	P.C.C. 1: 3: 6 for P.C.C. work in foundation bed as per site condition, specification and as directed by the site engineer	Cum	1.79				
1.06	P.C.C. 1: 1.5: 3 for R.C.C. work in various structures as per site condition, specification and as directed by the site engineer	Cum	18.37				
1.07	Supply cutting, bending and fixing in position of MS Reinforcement bar as per drawing, specification and as directed by site engineer.	MT	2.88				

1.08	Fixing of formwork with approprate material (local wood) to hold the concrete in position for casting as per drawing, specification and as directed by the site engineer.	Sqm	96.98				
1.09	Earth backfilling work with compaction in foundation etc. as per site condition, specification and as directed by the site	Cum	35.10				
1.10	15 cm thick Crushed stone filling as per site condition and as directed by the site engineer.	Cum	12.00				
	Sub Total:(1)						
2	**Conduit Trench**						
2.01	E/W excavation in gravel boulder mixed soil in foundation of various structures as per site condition, specification and as directed by the site engineer	Cum	75.60				
2.02	P.C.C. 1: 3: 6 for P.C.C. work in foundation bed as per site condition, specification and as directed by the site engineer	Cum	9.45				
2.03	as per site condition, specification and as directed by the site engineer	Cum	8.40				
2.04	P.C.C. 1:1.5:3 in R.C.C. Precast slab work as per site condition, specification and as directed by the	Cum	6.30				
2.05	Supply cutting, bending and fixing in position of MS Reinforcement bar as per drawing, specification and as directed by site engineer.	MT	1.73				
2.06	Fixing of formwork with approprate material (local wood) to hold the concrete in position for casting as per drawing, specification and as directed by the site engineer.	Cum	147.00				
2.07	Supply and fixing of cable holding bracket as per drawing	Rm	84.00				
	Sub Total:(2)						
	Grand Total For Civil WorksTotal:(1+2)						

Part - III

CONDITIONS OF CONTRACT
AND CONTRACT FORMS

Table of Clauses

Section - VII General Conditions of Contract .....VII-1 to VII-26

A. General VII-2

1. Definitions VII-2
2. Interpretation VII-4
3. Language and Law VII-5
4. Project Manager's Decisions VII-5
5. Delegation VII-5
6. Communications VII-5
7. Subcontracting VII-5
8. Other Contractors VII-5
9. Personnel and Equipment VII-5
10. Employer's and Contractor's Risks VII-6
11. Employer's Risks VII-6
12. Contractor's Risks VII-6
13. Insurance VII-6
14. Site Investigation Reports VII-7
15. Contractor to Construct the Works VII-7
16. The Works to Be Completed within intended Completion Date VII-7
17. Design by contractor andApproval by the Project Manager VII-7
18. Safety, securities and Protection of the Environment VII-7
19. Discoveries VII-7
20. Possession of the Site VII-8
21. Access to the Site VII-8
22. Instructions, Inspections and Audits VII-8
23. Dispute Settlement VII-8
24. Appointment of the Adjudicator/ DRC Members VII-8
25 Procedures for Disputes VII-9

B. Time Control ..... VII-9 to VII-11
26. Program VII-9
27. Extension of the Intended Completion Date VII-10
28. Acceleration VII-10
29. Delays Ordered by the Project Manager VII-10
30. Management Meetings VII-10
31. Early Warning VII-11

C. Quality Control VII-11

32. Identifying Defects VII-11
33. Tests VII-11
34. Correction of Defects VII-11
35. Uncorrected Defects VII-12

D. Cost Control ..... VII-11 to VII-20

36. Contract Price VII-12
37. Changes in the Contract Price VII-12
38. Variations VII-12
39. Cash Flow Forecasts VII-13
40. Payment Certificates VII-14
41. Payments VII-14
42. Compensation Events VII-15
43. Tax VII-16
44. Currency VII-16
45. Price Adjustment VII-16
46. Retention VII-19
47. Liquidated Damages VII-19
48. Bonus VII-20
49. Advance Payment VII-20
50. Securities VII-20
51. Day works VII-21
52. Cost of Repairs VII-21

E. Finishing the Contract ..... VII-21 to VII-28

53. Completion VII-21
54. Taking Over VII-21
55. Final Account VII-21
56. Operating and Maintenance Manuals VII-22
57. Termination VII-22
58. Fraud and Corruption VII-23
59. Black Listing VII-24
60. Payment upon Termination VII-24
61. Property VII-25
62. Release from Performance VII-25
63. Suspension of DP Loan/Credit/ Grant VII-25
64. Project Manager Duties and Authorities VII-25
65. Quarries and Spoil Dumps VII-25
66. Local Taxation VII-26
67. Value Added Tax VII-26
68. Income Taxes on Staff VII-26
69. Duties, Taxes and Royalties VII-26
70. Member of Government, etc, not Personally Liable VII-27
71. Approval of Use of Explosives VII-27
72. Compliance with Regulations for Explosives VII-27
73. Permission for Blasting VII-27
74. Records of Explosives VII-27
75. Traffic Diversion VII-27

Section - VIII Special Conditions of Contract .....VIII-1 to VIII-19

A. General ... .…VIII-2
B. Time Control VIII-5
C. Quality Control VIII-6
D. Cost Control VIII-6
E. Finishing the Contract VIII-15

Annex-1 Table of Price Adjustment Data [SCC …… VIII-19

Table of Price Adjustment Data [SCC 45.7] …….. VIII-20

Section - IX Contract Forms ..... IX-1 to IX-6

Letter of Intent IX-2
Letter of Acceptance ..... … IX-3
Contract Agreement IX-4
Performance Security IX-5
Advance Payment Security IX-6

SECTION - VII

General Conditions of Contract

General Conditions of Contract

A. General	
1. Definitions	1.1 Boldface type is used to identify defined terms. (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects. (b) **The Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events. (c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.2 hereunder. (d) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid. (e) **Compensation Events** are those defined in GCC 42 hereunder. (f) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 53.1. (g) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below. (h) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer. (i) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer. (j) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract. (k) **Days** are calendar days; months are calendar-months. (l) **Day works** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant. (m) A **Defect** is any part of the Works not completed in accordance with the Contract. (n) The **Defects Liability Certificate** is the certificate issued

	by Project Manager upon correction of defects by the Contractor. (o) The **Defects Liability Period** is the period calculated fromthe Completion Date where the Contractor remains responsible for remedying defects. (p) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract. (q) The **Employer** is the party who employs the Contractor to carry out the Works, as specified in the **SCC.** (r) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works. (s) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party. (t) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance. (u) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the **SCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order. (v) **Letter of Intent** is the letter of the Employer expressing his intention to award the contract. (w) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the contract at the date of acceptance. (x) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works. (y) **"Party"**means the Employer or the Contractor, as the context requires. (z) **SCC** means Special Conditions of Contract (aa) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function. (bb) The **Project Manager** is the person named in the **SCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the

	execution of the Works and administering the Contract. (cc) **Retention Money**means the aggregate of all monies retained by the Employer pursuant to GCC 46.1. (dd) The **Site** is the area defined as such in the **SCC**. (ee) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.
	(ff) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager. (gg) The **Start Date** is given in the **SCC.** It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates. (hh) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site. (ii) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works. (jj) A **Variation** is an instruction given by the Project Manager which varies the Works. (kk) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the **SCC.**
2. Interpretation	2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC. 2.2 If sectional completion is specified in the **SCC,** references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works). 2.3 The documents forming the Contract shall be interpreted in the following order of priority: (a) Contract Agreement, (b) Letter of Acceptance,

	(c) Contractor's Bid, (d) Special Conditions of Contract, (e) General Conditions of Contract, (f) Specifications, (g) Drawings, (h) Bill of Quantities (or Schedules of Prices for lump sum contracts), and (i) Any other document listed in the **SCC** as forming part of the Contract.
3. Language and Law	3.1 The language of the Contract and the law governing the Contract are stated in the **SCC.**
4. Project Manager's Decisions	4.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
5. Delegation	5.1 The Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
6. Communications	6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
7. Subcontracting	7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.
8. Other Contractors	8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the SCC. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.
9. Personnel and Equipment	9.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the Works, or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid. 9.2 If the Project Manager asks the Contractor to remove a

	person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
10. Employer's and Contractor's Risk	10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
11. Employer's Risks	11.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks: (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor. (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed. 11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to (a) a Defect which existed on the Completion Date, (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or (c) the activities of the Contractor on the Site after the Completion Date.
12. Contractor's Risks	12.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.
13. Insurance	13.1 The Contractor shall provide insurance in the joint names of the Employer and the Contractor from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the **SCC** for the following events which are due to the Contractor's risks: (a) loss of or damage to the Works, Plant, and Materials; (b) loss of or damage to Equipment;

	(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and (d) Personal injury or death.
	13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the proportions of Nepalese Rupees required to rectify the loss or damage incurred. 13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due. 13.4 Alterations to the terms of insurance shall not be made without the approval of the Project Manager. 13.5 Both parties shall comply with any conditions of the insurance policies.
14. Site Investigation Reports	14.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the **SCC,** supplemented by any information available to the Bidder.
15. Contractor to Construct the Works	15.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
16. The Works to Be Completed within intended Completion Date	16.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them within the Completion Date specified in **SCC.**
17. Design by contractor and Approval by the Project Manager	17.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, for his approval. 17.2 The Project Manager's approval shall not alter the Contractor's responsibility for design of temporary works.
18. Safety	18.1 The Contractor shall be responsible for the safety of all activities on the Site.
19. Discoveries	19.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the

	Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
20. Possession of the Site	20.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the SCC, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
21. Access to the Site	21.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
22. Instructions, Inspections and Audits	22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located. 22.2 The Contractor shall permit the GoN/DP and/or persons appointed by the GoN/DP to inspect the Site and/or the accounts and records of the Contractor and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the GoN/DP if required by the GoN/DP. The Contractor's attention is drawn to Sub-Clause 58.2 which provides, inter alia, that acts intended to materially impede the exercise of the GoN's/DP's inspection and audit rights provided for under this Sub-Clause constitute a obstructive practice subject to contract termination.
23. Dispute Settlement	23.1 The Employer and the Contractor shall attempt to settle amicably by direct negotiation any disagreement or dispute arising between them under or in connection with the Contract. 23.2 Any dispute between the Parties as to matters arising pursuant to this Contract which cannot be settled amicably within thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be referred to the Adjudicator or Dispute Resolution Committee (DRC) by either Party as specified in the SCC within 15 days after the expiration of amicable settlement period.
24. Appointment of the Adjudicator/ DRC Members	24.1 The adjudicator shall be as specified in **SCC** if identified and agreed by the Employer and the Contractor during the contract agreement. If not identified in the SCC, the adjudicator shall have to be agreed and appointed whenever the dispute arises; by the consensus of the Employer and the Contractor. If the parties cannot reach an agreement on the appointment of the Adjudicator, either party may request the

	Appointing Authority designated in the **SCC**, to appoint the Adjudicator within 15 days of receipt of such request. 24.2 DRC shall be formed which comprise of three members. Each Party shall appoint one member each and the third member who shall act as the Chairman shall be appointed by the two members appointed by the Parties.
25 Procedures for Disputes	25.1 If a dispute is referred to the Adjudicator or the DRC then the adjudicator or the DRC shall give a decision in writing within 30 days of receipt of a reference of the dispute. 25.2 Either party may refer a decision of the Adjudicator or DRC to an Arbitrator within 30 days of the Adjudicator's or DRC's written decision. If either party refers the dispute to arbitration within the above 30 days, the Adjudicator's or the DRC's decision shall be final and binding. 25.3The Adjudicator or the DRC Members shall be paid by the hour at the rate specified in the **SCC,** together with reimbursable expenses of the types specified in the **SCC**, and the cost shall be divided equally between the Client and the Contractor, whatever decision is reached by the Adjudicator or DRC. Either party may refer a decision of the Adjudicator or DRC to an Arbitrator within 30 days of the Adjudicator's or DRC's written decision. If either party refers the dispute to arbitration within the above 30 days, the Adjudicator's or the DRC's decision shall be final and binding. 25.4 In case of arbitration, the arbitration shall be conducted in accordance with the arbitration procedures published by the Nepal Council of Arbitration (NEPCA) at the place given in the **SCC.**
B. Time Control	
26. Program	26.1 Within the time stated in the SCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule. 26.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities. 26.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than

	the period stated in the SCC. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the SCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall Provide an updated Activity Schedule within 15 days of being instructed to by the Project Manager. 26.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.
27. Extension of the Intended Completion Date	27.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost. 27.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information at least 7 days prior to the intended completion date. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
28. Acceleration	28.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor. 28.2 If the Contractor's priced proposals for acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
29. Delays Ordered by the Project Manager	29.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
30. Management Meetings	30.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The

	business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure. 30.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
31. Early Warning	31.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible. 31.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.
C. Quality Control	
32. Identifying Defects	32.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
33. Tests	33.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
34. Correction of Defects	34.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the **SCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

	34.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
35. Uncorrected Defects	35.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.
D. Cost Control	
36. Contract Price	36.1 In the case of a Unit Rate contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item. 36.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.
37. Changes in the Contract Price	37.1 In the case of an Unit Rate contract: (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 2 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. (b) The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer. (c) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities. 37.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.
38. Variations	38.1 All Variations shall be included in updated Programs,

	and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.
	38.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered. 38.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs. 38.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event. 38.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning. 38.6 In the case of an Unit Rate contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in GCC 37.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.
39. Cash Flow Forecasts	39.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include as defined in the Contract in Nepalese Rupees.

40. Payment Certificates	40.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously. 40.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor within 30 days of submission by contractor. 40.3 The value of work executed shall be determined by the Project Manager. 40.4 The value of work executed shall comprise: (a) In the case of an Unit Rate contract, the value of the quantities of work in the Bill of Quantities that have been completed; or (b) In the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule. 40.5 The value of work executed shall include the valuation of Variations and Compensation Events. 40.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
41. Payments	41.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest as indicated in the **SCC** on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing. 41.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute. 41.3 Items of the Works for which no rate or price has been entered in BOQ shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

42. Compensation Events	42.1 The following shall be Compensation Events: (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 20.1. (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract. (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time. (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects. (e) The Project Manager unreasonably does not approve a subcontract to be let. (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site. (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons. (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor. (i) The advance payment is delayed. (j) The effects on the Contractor of any of the Employer's Risks. (k) The Project Manager unreasonably delays issuing a Certificate of Completion. 42.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended. 42.3 As soon as information demonstrating effect of each

	Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event. 42.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
43. Tax	43.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 30 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 45.
44. Currency	44.1 The currency of Contracts shall be Nepalese Rupees.
45. Price Adjustment	45.1 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the **SCC.** If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due. 45.2 **Adjustment Formulate[1]:** "The adjustment to the Interim Payment Certificates in respect of changes in cost and legislation shall be determined from separate formulae for each of the types of construction work to be performed and Plant to be supplied. The formulae will be of the following general type: = + — + — + — + . Where: **pn** is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Sub-

[1] For complex Works involving several types of construction work with different inputs, a family of Formulae will be necessary. The various items of Day work may also require different formulae, depending on the nature and source of the inputs.

	Clause 41; **A** is a constant, specified in the Bidding Forms- Table of Price Adjustment data, representing the nonadjustable portion in contractual payments;[2] **b, c, d,** etc., coefficients representing the estimated proportion of each cost element (labor, materials, equipment usage, etc.) in the Works or sections thereof, net of Provisional Sums, as specified in the SCC; **Ln, Mn, En,** etc., are the current cost indices or reference prices of the cost elements for month "n," determined pursuant to Sub-Clause 45.4, applicable to each cost element; and **Lo, Mo, Eo,** etc., are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 45.4
	45.3 **Sources of Indices and Weightings:** The sources of indices shall be those listed in the Bidding Forms- Table of Price Adjustment data, as approved by the Project Manager and stated in SCC. Indices shall be appropriate for their purpose and shall relate to the Contractor's proposed source of supply of inputs on the basis of which his Contract shall have been computed. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightings and Source of Indices in the Bidding Forms, which shall be subject to approval by the Project Manager. 45.4 **Base, Current and Provisional Indices:** The base cost indices or prices shall be those prevailing on the day 30 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 30 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Project Manager will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available. 45.5 **Adjustment after Completion:** " If the Contractor fails to complete the Works within the time for completion prescribed under Clauses 1.1 (u), adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer, provided that if an extension of time is granted pursuant to Clause 27, the above provision shall apply only to adjustments made after the expiry of such extension of time." 45.6**Weightings:** The weightings for each of the factors of cost given in the Bidding Forms shall be adjusted if, in

[2] Insert a figure for factor A only where there is a part of the Contractors' expenditures which will not be subject to fluctuation in cost or to compensate for the unreliability of some indices. A should normally be 0.15. The sum of A, b, c, d, etc., should be one.

	the opinion of the Project Manager, they have been rendered unreasonable, unbalanced or inapplicable as a result of varied or additional work already executed or instructed under Clause 38 or for any other reason. 45.7 **Subsequent Legislation:** If, after the date 30 days prior to the latest date for submission of bids for the Contract, there occur changes to any National Statute, Ordinance, Decree, or other Law or any regulation or by-law of any local or other duly constituted authority, or the introduction of any such Statute, Ordinance, Decree, Law, regulation or by-law which causes additional or reduced cost to the Contractor, other than under the preceding sub-clauses of this clause, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Project Manager and shall be added to or deducted from the Contract Price and the Project Manager shall notify the Contractor accordingly, with a copy to the Employer. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same shall already have taken into account in the indexing of any inputs to the Price Adjustment Formulae in accordance with the provisions of Sub-Clauses 45.2
	45.8 Where, price adjustment provision is not applicable pursuant to Sub-clause 45.1 then the Contract is subject to price adjustment only for construction material in accordance with this clause. If the prices of the construction materials stated in the contract is increased or decreased in an unexpected manner in excess of ten (10%) percent in comparison to the base price construction material stated in Section –IV, Bidding Forms-Table of Price Adjustment Data, then the price adjustment for the increase or decrease of price of the construction material beyond 10% shall be made by applying the following formulas: For unexpected increase in price $P = [R_1 - (R_0 \times 1.10)] \times Q$ For unexpected decrease in price P $= [R_1 - (R_0 \times 0.90)] \times Q$ Where: "P" is price adjustment amount "R_1" is the present price of the construction material (Source of indices shall be those listed in the Bidding forms)

	"R_0" is the base price of the construction material "Q" is quantity of the construction material consumed in construction during the period of price adjustment consideration If the Base price and source is to be proposed by the Bidder as per the provision made in Section –IV, Bidding Forms-Table of Price Adjustment Data then the Base price and source filled by Bidder for the construction material stated in the Bidding Form shall be subject to the approval of the Project manager and shall be as stated in SCC.. 45.9 The Price Adjustment amount shall be limited to a maximum of 25% the initial Contract Amount as specified in the **SCC.** 45.10 The Price Adjustment provision shall not be applicable for delayed period if the contract is not completed in time due to the delay caused by the contractor or the contract is a Lump sum Contract or a Fixed Budget Contract.
46. Retention	46.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the SCC until Completion of the whole of the Works. 46.2 Upon the issue of a Defects Liability Certificate by the Project Manager, in accordance with GCC 55.1, half the total amount retained shall be repaid to the Contractor and half when the Contractor has submitted the Tax evidence document issued by the concerned Internal Revenue Office that the contractor has submitted his Income Returns . On completion of the whole works,the Contractor may substitute retention money with an "on demand" bank guarantee.
47. Liquidated Damages	47.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the **SCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the **SCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

	47.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC.41.1
48. Bonus	48.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the **SCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.
49. Advance Payment	49.1 The Employer shall make advance payment to the Contractor of the amounts stated in the SCC by the date stated in the SCC, against provision by the Contractor of an unconditional bank guarantee from 'A' class commercial Bank in a form and by a bank acceptable to the Employer in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.
	49.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager. 49.3 The advance payment shall be repaid by deducting proportionate amounts, as stated in SCC, from payments otherwise due Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.
50. Securities	50.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter

	of Acceptance and shall be issued in an amount specified in the SCC, by a'A' class commercial bank acceptable to the Employer, and denominated in Nepalese Rupees. The Performance Security shall be valid until a date 30 days from the date of issue of the Defect Liability Certificate in the case of a bank guarantee. 50.2 The performance security issued by any foreign Bank outside Nepal must be counter guaranteed by an "A" class commercial Bank in Nepal.
51. Day works	51.1 If applicable, the Day works rates in the Contractor's Bid shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way. 51.2 All work to be paid for as Day works shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done. 51.3 The Contractor shall be paid for Day works subject to obtaining signed Day works forms.
52. Cost of Repairs	52.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.
E. Finishing the Contract	
53. Completion	53.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.
54. Taking Over	54.1 The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a certificate of Completion.
55. Final Account	55.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 60 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 60 days a schedule that states the scope of the corrections or additions that are necessary. If the

	Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.
56. Operating and Maintenance Manuals	56.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the **SCC.** 56.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the SCC** pursuant to GCC 55.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the SCC** from payments due to the Contractor.
57. Termination	57.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. 57.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following : (a) the Contractor stops work for 30 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager; (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 30 days; (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation. (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 90 days of the date of the Project Manager's certificate; (e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager; (f) the Contractor does not maintain a Security, which is required; and (g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the **SCC.** (h) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 58.1. 57.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC 57.2 above, the Project Manager shall decide whether the breach is fundamental

	or not. 57.4 Notwithstanding the above, the Employer may terminate the Contract for convenience. 57.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.
58. Fraud and Corruption	58.1 If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 56shall apply as if such expulsion had been made under Sub-Clause 56.5 [Termination by the Employer]. 58.2 Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with Clause 9. 58.3 Without prejudice to any other rights of the Employer under this Contract, GoN may blacklist the Contractor for its conduct up to three (3) years on the following grounds and seriousness of the act committed by the Contractor: (a) If it is established that the Contractor has committed substantial defect in implementation of the Contract or has or has not substantially fulfilled its obligations under the Contract. For the purposes of this Sub-Clause; (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party. (ii) "fraudulent practice" [8] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "collusive practice"[9] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party; (iv) "coercive practice"[10] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

	(v) "obstructive practice" is (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (bb) acts intended to materially impede the exercise of the GON's/DP's inspection and audit rights provided for under Sub-Clause 22.2.
59. Black Listing	59.1 Without prejudice to any other rights of the Employer under this Contract, GoN, Public Procurement Monitoring Office (PPMO), on the recommendation of procuring entity, may blacklist a Bidder for its conduct for a period of one (1) to three (3) years on the following grounds and seriousness of the act committed by the bidder. (a) if it is established that the Contractor has committed substantial defect in implementation of the contract or has not substantially fulfilled its obligations under the contract or the completed work is not of the specified quality as per the contract.
60. Payment upon Termination	61.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the SCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer. 61.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for

8a "party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

9"parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

10a "party" refers to a participant in the procurement process or contract execution.

	the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
61. Property	62.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
62. Release from Performance	63.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.
63. Suspension of DP Loan/Credit/Grant	63.1 In the event that the Donor Agency suspends the loan/ credit/grant to the Employer from which part of the payments to the Contractor are being made: a. the Employer is obligated to notify the Contractor of such suspension within 7 days of having received the Donor Agency's suspension notice; and b. if the Contractor has not received sums due him within the 30 days for payment provided for in Sub-Clause 41.1, the Contractor may immediately issue a 15-day termination notice.
64. Project Manager's Duties and Authorities	64.1 The Project Manager's duties and authorities are restricted to the extent as stated in the SCC.
65. Quarries and Spoil Dumps	65.1 Any quarry operated as part of this Contract shall be maintained and left in a stable condition without steep slopes and be either refilled or drained and be landscaped by appropriate planting. Rock or gravel taken from a river shall be removed over some distance so as to limit

	the depth of material removed at any one location, not disrupt the river flow or damage or undermine the river banks. The Contractor shall not deposit excavated material on land in Government or private ownership except as directed by the Project Manager in writing or by permission in writing of the authority responsible for such land in Government ownership, or of the owner or responsible representative of the owner of such land in private ownership, and only then in those places and under such conditions as the authority, owner or responsible representative may prescribe.
66. Local Taxation	66.1 The prices tendered by the Contractor shall include all taxes that may be levied in accordance to the laws and regulations in being in Nepal on the date 30 days prior to the closing date for submissions of Bids on the Contractor's equipment, plant and materials acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from his responsibility to pay any tax that may be levied in Nepal on profits made by him in respect of the Contract.
67. Value Added Tax	67.1 The Contract is not exempted from value added tax. An amount specified in the schedule of taxes shall be paid by the Contractor in the concerned VAT office within time frame specified in VAT regulation.
68. Income Taxes on Staff	68.1 The Contractor's staff, personnel and labor will be liable to pay personal income taxes in Nepal in respect of their salaries and wages, as are chargeable under the laws and regulations for the time being in force, and the Contractor shall perform such duties in regard to such deductions as may be imposed on him by such laws and regulations. 68.2 The issue of the Final Account Certificate pursuant to clause 55 shall be made only upon submittal by the Contractor of a certificate of income tax clearance from the Government of Nepal.
69. Duties, Taxes and Royalties	69.1 Any element of royalty, duty or tax in the price of any goods including fuel oil, and lubricating oil, cement, timber, iron and iron goods locally procured by the Contractor for the works shall be included in the Contract rates and prices and no reimbursement or payment in that respect shall be made to the Contractor. 69.2 The Contractor shall familiarize himself with GON the rules and regulations with regard to customs, duties, taxes, clearing of goods and equipment, immigration and the like, and it will be necessary for him to follow the required procedures regardless of the assistance as may be provided by the Employer wherever possible.

	69.3 The Contractor shall pay and shall not be entitled to the reimbursement of cost of extracting construction materials such as sand, stone/boulder, gravel, etc. from the river beds or quarries. Such prices will be levied by the local District Development Committee (DDC) as may be in force at the time. The Contractor, sub-contractor(s) employed directly by him and for whom he is responsible, will not be exempted from payment of royalties, taxes or other kinds of surcharges on these construction materials so extracted and paid for to the DDC.
70. Member of Government, etc, not Personally Liable	70.1 No member or officer of GoN or the Employer or the Project Manager or any of their respective employees shall be in any way personally bound or liable for the act or obligations of the Employer under the Contract or answerable for any default or omission in the observance or performance of any of act, matter or thing which are herein contained.
71. Approval of Use of Explosives	71.1 No explosives of any kind shall be used by the Contractor without the prior consent of the Employer in writing and the Contractor shall provide, store and handle these and all other items of every kind whatsoever required for blasting operations, all at his own expense in a manner approved in writing by the Employer.
72. Compliance with Regulations for Explosives	72.1 The Contractor shall comply with all relevant ordinances, instructions and regulations which the Government, or other person or persons having due authority, may issue from time to time regarding the handling, transportation, storage and use of explosives.
73. Permission for Blasting	73.1 The Contractor shall at all times maintain full liaison with and inform well in advance, and obtain such permission as is required from all Government authorities, public bodies and private parties whatsoever concerned or affected, or likely to be concerned or affected by blasting operation.
74. Records of Explosives	74.1 Before the beginning of the Defects Liability Period, the Contractor shall account to the satisfaction of the Project Manager for all explosives brought on to the Site during the execution of the Contract and the Contractor shall remove all unused explosives from the Site on completion of works when ordered by the Project Manager.
75. Traffic Diversion	75.1 The Contractor shall include the necessary safety procedures regarding and pedestrian traffic diversion that is needed in execution of the works. The Contractor shall include in his costing of works, any temporary works or

	diversion that are needed during the construction period. All traffic diversion should be designed for the safety of both the motoring public and the men at work. It shall ensure the uninterrupted flow of traffic and minimum inconvenience to the public during the period concerned. As such, adequate warning signs, flagmen and other relevant safety precautionary measures shall be provided to warn motorists and pedestrians well ahead of the intended diversion as directed by the Project Manager. All traffic devices used shall be designed in accordance with the instruction of Project Manager.

SECTION - VIII

Special Conditions of Contract

The following Special Conditions of Contract shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC

Special Conditions of Contract

A. General	
GCC 1.1 (q)	The Employer is: **Nepal electricity Authority,** **Distribution and Consumer services Directorate** **Nepalgunj Regional Office , Nepalgunj** **33KV Bay and Line for 33/11 kV, 6/8 MVA substation project, Rajapur, Bardiya**
GCC 1.1 (u)	The Intended Completion Date for the whole of the Works shall be 6 months.
GCCs 1.1 (bb) & 4.1	The Project Manager is: **Regional Chief**
GCC 1.1 (dd)	The Site is located at Tikapur, Kailali to Rajapur, Bardiya
GCC 1.1 (gg)	The Start Date shall be: The effective date, upon which the period until the time for completion of the facilities shall be counted from, is the date when all of the following conditions have been fulfilled: (a) This Contract Agreement has been duly executed for and on behalf of the Employer and the Contractor; (b) The Contractor has submitted to the Employer the performance security. (c) The Employer has paid the Contractor the advance payment. Each party shall use its best efforts to fulfill the above conditions for which it is responsible as soon as practicable.
GCC 1.1 (kk)	The Works consist of Supply, Delivery, Installation, Testing and Commissioning of Bay Extension at Tikapur S/s and upgradation of 11kV Tikapur, Kailali-Rajapur,Bardiya Line to 33KV on turnkey basis as defined in the bidding data and scope of work.
GCC 1.1 (kl)	***Add the following terms and definitions after 1.1 (kk).*** The terms "Facilities" and "Works" are used interchangeably. The terms "Final Acceptance Certificate" and "Defect Liability Certificate" are used interchangeably. ***Add new definition as follows:*** Final Acceptance means the acceptance by the Employer of the facilities, which certifies the Contractor's fulfillment of the entire contract. The "Final Acceptance Certificate" shall be issued to the Contractor after the expiry of the last Defect Liability Period provided the Contractor has also fulfilled all its

<table>
<tr><td></td><td>obligation towards the Income Tax Department and the Customs Department of Government of Nepal.</td></tr>
<tr><td>GCC 2.2</td><td>Sectional Completions are: None</td></tr>
<tr><td>GCC 2.3(i)</td><td>The following documents also form part of the Contract:
(a) Minutes of Meeting as agreed upon
(b) Value Added Tax (VAT) Certificate
(c) PAN Certificate
(d) Tax clearance Certificate</td></tr>
<tr><td>GCC 3.1</td><td>The language of the contract is ENGLISH
The law that applies to the Contract is the LAW OF NEPAL</td></tr>
<tr><td>GCC 8.1</td><td>Schedule of other contractors: None</td></tr>
<tr><td>GCC 13.1</td><td>The minimum insurance covers shall be:
(a) <u>Cargo Insurance:</u>
Covering loss or damage occurring, while in transit from the supplier's or manufacturer's works or stores until arrival at the Site, to the Facilities (including spare parts therefore) and to the construction equipment to be provided by the Contractor or its Subcontractors.
<table>
<tr><td>Amount</td><td>Deductible Limits</td><td>Parties Insured</td><td>From</td><td>To</td></tr>
<tr><td>110 % of CIP Cost</td><td>(*)</td><td>Contractor</td><td>Dispatch Certificate</td><td>Arrival to Site</td></tr>
</table>
(*) Excess 5% of claimed amount subjected to minimum of NRs. 20,000 for normal and NRs. 80,000 for act of God/major perils and collapse.

(b) <u>Installation All Risk Insurance:</u>
Covering physical loss or damage to the Facilities at the Site, occurring prior to completion of the Facilities, with extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the defect liability period while the Contractor is on the Site for the purpose of performing its obligation during the defect liability period.
<table>
<tr><td>Amount</td><td>Deductible Limits</td><td>Parties Insured</td><td>From</td><td>To</td></tr>
<tr><td>110% of Contract Value</td><td>(*)</td><td>Contractor</td><td>Dispatch Certificate</td><td>Final Acceptance Value</td></tr>
</table>
(*) Excess 5% of claimed amount subjected to minimum of NRs. 10,000 for normal period and NRs. 30,000 for testing period.

(c) <u>Third Party:</u>
Covering bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities that have been</td></tr>
</table>

accepted by the Employer) occurring in connection with the supply and installation of the Facilities.

Amount	Deductible Limits	Parties Insured	From	To
NRs. 1 Million	As in (b) above	Contractor's Employees	Commencement of Works	Defect Liability Certificate
NRs. 1 Million	As in (b) above	Employer's Personnel	Commencement of Works	Defect Liability Certificate
NRs. 4 Million	As in (b) above	Third Party Personnel	Commencement of Works	Defect Liability Certificate

Automobile Liability Insurance:

Covering use of all vehicles used by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities. Comprehensive insurance in accordance with statutory requirements.

Worker's Compensation:

In accordance with the statutory requirements applicable in any country where the Facilities or any part thereof is executed.

Employer's Liability:

In accordance with the statutory requirements applicable in any country where the Facilities or any part thereof is executed.

Other Insurances:

The Contractor is also required to take out and maintain at its own cost the following insurances:

Details: None

Amount	Deductible Limits	Parties Insured	From	To

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor except for the third party liability,Workers' Compensation and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insured's under all insurance policies taken out by the Contractor, except for the Cargo, Worker's Compensation and Employer's Liability Insurances. All insures's rights of subrogation against such co-insured's for losses or claims arising out of the performance of the Contract shall be waived under such policies.

The minimum cover for personnel injury or death insurance shall, however, be not less than as per requirement of the Labor Act of Nepal.

GCC 14.1	Site Investigation Reports are: **To be submitted by the Contractor**
GCC 16.1	The completion date shall be Refer SCC 1.1
GCC 17.1	The following shall be designed by the Contractor: As applicable
GCC 20.1	The Site Possession Date (s) shall be: as agreed during Contract signing
GCC 23.2	A dispute of the procurement contract having contract price valuing up to one hundred million Rupees shall be resolved by the adjudicator and a dispute of the procurement contract having contract price more than that shall be resolved by a three-member dispute resolution committee.
GCC 24.1	Appointing Authority for the Adjudicator: Nepal Council of Arbitration (NEPCA)
GCC 24.2	Note: If the adjudicator is identified an agreed during the contract agreement, insert the name of the Adjudicator or DRC Members. If not identified, the Adjudicator or DRC Members shall have to be agreed and appointed whenever the dispute arises.
GCC 25.1	Delete the Sub-Clause 25.1 and replace it with the following: *If any dispute of any kind whatsoever shall arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the Facilities - whether during the progress of the Facilities or after their completion and whether before or after the termination, abandonment or breach of the Contract- the parties shall seek to resolve any such dispute or difference by mutual consultation, then the dispute shall be referred in writing by either party to the DRB, with a copy to the other party.*
GCC 25.2	Add the following at the end of 25.2: *If the DRB has done so, and no notice of intention to commence arbitration has been given by either the Employer or the Contractor within fifty-six (56) days of such reference, the decision shall become final and binding upon the Employer and the Contractor. Any decision that has become final and binding shall be implemented by the parties forthwith.*
GCC 25.3	Institution whose arbitration procedures shall be used: Council of Arbitration (NEPCA) Sub-Clause 25.3: Any dispute between the Employer and the Contractor arising in connection with the present Contract shall be referred to arbitration in accordance with the rule of Nepal Council of Arbitration. The place of arbitration shall be: Kathmandu, Nepal.
B. Time Control	
GCC 26.1	The Contractor shall submit for approval a Program for the Works within

	30 days from the date of the Letter of Acceptance.
GCC 26.3	The period between Program updates is 60 days. The amount to be withheld for late submission of an updated Program is: All due bills shall be withheld.
GCC 27.3	Add this new Sub-Clause: If the Contractor intends to apply for an extension of the Time for Completion, the Contractor shall give notice to the Employer's Representative of such intention as soon as possible and in any event within 14 days of the start of the event giving rise to delay. Within 28 days of the start of the event giving rise to the delay, the Contractor shall submit full supporting details of his application.
C. Quality Control	
GCC 33.1	***Add following before Clause 32.1*** 1. The inspections and tests may be conducted on the premises of the Contractor of its subcontractor(s), at point of delivery, and/or at the Good's final destination. If conducted on the premises of the Contractor or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Employer. 2. Should any inspected or tested Goods fail to conform to the Specifications, the Employer may reject the Goods, and the Contractor shall either replace the rejected Goods or make alternations necessary to meet specification requirements free of cost to the Employer. 3. The Employer's right to inspect, test and, where necessary, reject the Goods after the Goods arrival in Nepal shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Employer or its representative prior to the Goods shipment from the country of origin. Nothing in Clauses here above shall in any way release the Contractor from any warranty or other obligations under this Contract.
GCC 34.1	The Defects Liability Period is: 365 days
D. Cost Control	
GCC 37.1(d)	***Add this new sub-clause:*** The quantities entered in the Price Schedule are only estimated quantities. After detailed site investigation and design, the Contractor shall prepare a final Price Schedule within 3 months from the date of Contract Signing and submit to the Project Manager for approval. The Contractor shall agree to make no claims to anticipated profit or alleged losses because of any difference between the

	quantities actually furnished and erected and the estimated quantities from Contract. NEA reserves the right at the time of award of contract or within six months from the effective date of contract to increase or decrease the quantities of the Price Schedule by up to fifteen percent (15%) of the contract price. Taking this into consideration, the Bidder shall present a fairly balanced price on Bill of Quantities.
GCC 41	***Delete sub-clause 41.1, 41.2 and 41.3 and replace with the following:*** **General** Payments for plant & equipment, insurance, clea0ring, forwarding and transportation up to site, construction and installation shall be made only in local currency, i.e. in Nepali Rupees. ***Advance Payment:*** Ten percent (10%) of the total Contract amount shall be paid as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The Employer's Representative shall issue an Interim Payment Certificate after (i) execution of the Form of Agreement by the parties hereto (ii) provision by the Contract of the Performance Security and (iii) provision by the Contractor of an unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. Such Interim Payment Certificates shall be for an amount of ten percent (10 %) of the Contract Price for both Plant and Materials Supply and Construction & Installation works in the currency stated in the price schedules. The advance payment guarantee shall certify that such payment shall unconditionally be refunded upon receipt of an advice from the Employer's Representative. **In case, the Supplier fails to submit the Advance Payment Guarantee within 15 days of signing of Contract or does not require Advance Payment, the Contract shall be effective 15 days after the signing of Contract.** Advancement Payment security shall be in the sample form specified in the Contract. The advance payment security shall be valid up to the validity of the Contract Period or an extension thereof. Such advance payment shall be deducted at an amount of Ten percent (10%) from each progress payment as an advance recovery deduction till the full advance payment is repaid. ***Payment for Plant and Materials:***

	i. Fifty Five percent (55%) of the Contract Price for supply portion will be paid against delivery of Plant and Materials at the Site along with submission of shipping documents comprising of clean on-board bill of loading for goods supplied from outside the country or delivery list/truck receipt for goods supplied from within the Country, detailed invoice, inspection and test certificates issued by the Employer's inspector/nominated inspection agency (where applicable), factory test report, packing list, insurance certificate, certificates of origin, manufacturer's or supplier's warranty certificate and certificate issued by the Employer's Representative evidencing delivery of Plants and Materials at Site. The provisions of advance recovery deduction and retention as specified below under this clause shall also be taken into account during such payments. ii. Balance Forty Five percent (45%) of the price of Plant and materials shall be paid after testing and commissioning of equipment and issuance of taking over certificate. The provisions of advance recovery deduction and retention as specified below under this clause shall be taken into account during such payments. ***Payments for Construction and Installations*** i. Ninety percent (90%) of the price for construction and Installations works shall be paid against progress bill according to the progress report, approved by the employer. The provisions of advance recovery deduction and retention as specified below under this clause shall be also taken into account during such payments. Progress payments shall be made only after the completion of works under any construction unit complete as mentioned in BOQ as per standard drawing, specification and as directed by the Manager. i. Balance Ten percent (10%) of the price for Construction and Installations works shall be paid against issuance of Completion

	Certificate or taking over certificate by the Employer's Representative as mentioned here under. The provisions of advance recovery deduction and retention as specified below under this clause shall also be taken into account during such payment. **Retention Amount** Five percent (5%) from each progressive and final payment for supply of Plant and Materials; Insurance, Clearing, Forwarding and Inland Transportation to Site; and Construction and Installation works shall be retained. The following conditions shall be fulfilled for the payment of such retained amount: (a) 5% retention amount shall be paid against issuance of Defect Liability Certificate. This certificate shall be issued upon receipt of income tax clearance certificates by the Government of Nepal (GoN), Internal Revenue Department (IRD) and custom clearance documents showing the re-export of all the returnable items or tax payment certificate for items disposed in the Country including fulfillment of all outstanding obligations. If the Contractor fails to clear all the required taxes, custom clearances and all outstanding obligations as mentioned above, such money shall be deducted from this portion of the Retention money. The Employer shall pay the Contractor the amounts certified by the Manager within 45 days from the date of approval of each certificate. **Income Tax Deduction** From each progressive bill, an amount, as determined by the prevalent rules and regulation of GOVERNMENT OF NEPAL, shall be deducted and deposited with the concerned Tax Department in the country as a deposit towards Contractor's income tax.
GCC 42.1	***Delete sub-clause 42.1 (e),(f), (g) & (i)***
GCC 43	***Delete sub-clause 43.1 and replace with the following:*** **1. In the country of Origin**

	The prices bid by the Contractor shall include all taxes, duties and other charges imposed outside the Employer's country on the production, manufacture, saler and transport of the Contractor's Equipment, Plant, Materials and supplied to be used on or furnished under the Contract, and on the services performed under the Contract. **2. In Nepal** **General:** (a) Unless otherwise specifically declared in the contract documents, the prices bid by the Contractor and its suppliers and subcontractors shall include business taxes and other taxes that may be levied in accordance with the laws and regulations in force or in effect in Nepal as of 28 days prior to the closing date for submission of tenders in the Employer's country on the Equipment, Plant, Materials and Supplies (permanent, temporary and consumables) acquired for the purpose of Contract and on the services performed under the Contract. Whatsover provisions made in the Contract document shall not relieve the Contractor, its suppliers and subcontractors from their responsibility to pay income tax that may be levied in the Employer's country on profits made by the Contractor, its suppliers and subcontractors in respect of the Contract. (b) Value Added Tax (VAT): if not included in the costs while submitting bids by the contractor, subcontractor or its nominated sub contractor, shall be eligible for refund on all imported equipment and materials to be supplied and delivered exclusively for use in the Project. (c) In the event that the origin of any of the contractor's or its subcontractor's or the nominated subcontractor's plant, equipment and materials is India or third country, the provisions for the exemption of customs duties and VAT as per regulation of GoN, as mentioned in this clause shall be applied. For such provision, the Contractor must submit the request for the Custom, VAT exemption along with all su[porting documents as required by GoN. (d) The Employer will bear custom duty, VAT, any license fee and

contribution levied by the Tax Department of GOVERNMENT OF NEPAL on above imported Plant and VAT (13%) on Plant procured directly from local manufacturers.

(e) Thirteen percent (13%) VAT will be levied on Construction and Installation. The Employer will pay this VAT to the Contractor on each bill and the Contractor shall be responsible for payment of the same to the concerned tax authority in the Country.

Failure to comply with this regulation may result in imposition of full customs duties, VAT etc. as per prevalent rules and regulations of GOVERNMENT OF NEPAL. In such case, the additional taxes and duties, including VAT, shall be borne by the Contractor.

Staff Income Tax:

The Contractor's staff, personnel and laborers, and those of its subcontractors, will be liable to pay personal income tax in the Employer's country, irrespective of whether they are local or foreign nationals on income earned including salaries and wages as applicable under the laws and regulation of Nepal. The Contractor shall perform such duties in regard to Tax Deduction at Source (TDS) thereof as may be applicable by such laws and regulations.

Import License:

The Contractor shall inform the Employer and the project Manager in writing the details of the equipment and materials to be imported into Nepal for use on the Works at least 56 days prior to arrival of shipment at disembarkation port, and shall submit a formal written request for assistance from the Employer for importation processing. The Employer will assist the Contractor to obtain necessary permits for import of such equipment and materials into Nepal. Import license fees or any other charges shall be at the cost of the Contractor. The Contractor shall be responsible for transport from the Port of disembarkation to the Site or location of the Works. The Contractor shall be fully responsible to determine these rates and the amount payable at the time of preparing tender document and include such costs in its bids. In failing to do so, the Employer shall not be liable to pay such costs and the Contractor

shall pay such charges as local or any customs authorities' en-route may impose will not be an eligible item for refund from the Employer.

Duties on Equipment, Plant, Materials and Supplies:

(a) Notwithstanding the provisions of this document, the Contractor's plant and Equipment, including essential tools thereof, imported for the sole purpose of executing the Contract on condition of re-export upon completion of the works, shall be exempted from payments of custom duties, VAT and applicable taxes. However, the Contractor shall deposit the amount or provide a Bank Guarantee to the GoN Customs office equal to amount of custom duties and other taxes as per the prevailing laws, rules and regulations of Nepal for those imported equipment, plant, materials and supplies at the Time of import. Such deposited amounts shall be refunded, or the Bank guarantee cancelled by the Custom Offices after Re-export of those import equipment, plant, materials and supplies.

(b) Any plant, materials or supplies imported by the Contractor for the performance of the works but not incorporated in the Works shall be taken out of Nepal within 90 (Ninety) days from the date of issuance of the Performance Certificate. If the Contractor disposes off or consumes any equipment, spare parts, materials or supplies within Nepal, it shall pay all custom duties, VAT, income tax on the sales proceeds and taxes applicable on such items under the laws and regulation of Nepal in force.

(c) Equipment, plant, materials and supplies, imported by the Contractor for execution of the Works, shall be subjected to payment of customs duty at a special rate of one percent (1%) of CIP or Customs entire point value. This customs duty shall be paid by the Contractor at the time of import and will be reimbursed by the Employer.

(d) VAT shall be exempted on all imported materials & equipment purchased for the use in the Works (shall be reimbursed by the

	Employer in case the Employer is unable to avail exempt facility.) (e) VAT applicable on plant & equipment supplied directly from manufacturing plant in the Employer's country shall be reimbursed. (f) The Contractor shall maintain records satisfactory to the Employer documenting use of all Plant, Materials and Supplies imported into and/or procured for the performance of the Works. If any of such Plant, Materials and/or supplies, imported into Nepal or otherwise supplied to the project at a special or preferential rate of Custom duties or taxes, are misused or found to be used or appropriated for any purpose other than the Project, the Contractor shall be held fully responsible, and liable to pay customs duties, VAT and other taxes and/or penalties as may be imposed in accordance with the prevailing laws and regulations of Nepal. (g) Income tax assessed in accordance with the prevailing Income tax Act of Nepal and as per the provision of any specific Double Taxation Agreement, shall be imposed on the Contractor, its subcontractors and nominated subcontractors. An advance income tax as per the prevailing Income Tax Act and Finance Act shall be deducted from the monthly progress payment of the Contractor. (h) The Contractor shall pay all duties, taxes, fees and contributions levied in Nepalese Rupees as directed by the relevant governmental department or office, or any other local statutory agency or body in accordance with the relevant rules and regulations. (i) The provisions of this clause shall apply equally to foreign subcontractors or nominated subcontractors of the Contractor employed for the Works. (j) The Contractor and any foreign subcontractors or nominated subcontractors employed on the Works, if not already registered in Nepal, shall be required to get registered with the Inland Revenue Department (IRD) for the purpose of the contract, which shall be undertaken within 28 days after signing of the Contract Agreement. The Contractor, sub-contractor or the nominated subcontractor shall submit

	certificate copies of the Registration Certificate(s) to the Manager within 14 days of registration. (k) Other local fees and charges (toll taxes) shall be applied in accordance with the prevailing laws and regulations of Nepal. The Contractor shall pay all applicable customs & taxes and the Employers shall reimburse the same at the earliest. Locally available goods, construction materials including fuel, lubricating oil, cement, timber, iron and steel goods etc. shall be procured locally. All taxes for such goods procured from the local market shall be included in the Contract Rates and Prices and no reimbursement or payment in that respect shall be made to the Contractor.
GCC 44	Payments shall be made in Nepalese Currencies.
GCC 45.2	The Contract… subject to price adjustment in accordance with GCC Clause 45, and the following information regarding coefficients … Apply**. [Not Applicable]**
GCC 45.9	**[Not Applicable]**
GCC 46.1	The proportion of payments retained is: **5 (FIVE) PERCENT**
GCC 47.1	The liquidated damages for the whole of the Works are 0.05 PERCENT of the final Contract Price per day. The maximum amount of liquidated damages for the whole of the Works is 10 PERCENT of the final Contract Price.
GCC 48.1	The Bonus for the whole of the Works is 0% per day. The maximum amount of Bonus for the whole of the Works is 0% of the final Contract Price.
GCC 49.1	The Advance Payments shall be limited to Ten percent (10%) of the initial Contract price excluding the provisional sums, day works and VAT and shall be made to the Contractor upon submission of acceptable Bank Guarantee for advance payment.
GCC 49.3	The Advance Payment will be recovered as follows: Deduction will be at the rate of at least 10% of respective invoices until such time as the advance payment has been repaid.
GCC 50.1	The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price: Five percent (5%) (Clause ITB 38.1) and an additional amount of 8% of the Contract price if the Employer has increased the Performance Security amount pursuant to ITB Sub Clause ITB 32.5.

	The Standard form(s) of Performance Security acceptable to the Employer shall be "an Unconditional Bank Guarantee" acceptable to the Employer of the type presented in section IX of the Bidding Documents.
E. Finishing the Contract	
GCC 53.1	Replace the whole clause with the following: The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, after completion of the Works in accordance with the Contract, including Tests on Completion. A pre-requisite for such request is that the entire Work has been subjected to normal operating stresses for at least two (2) weeks and that no defects or elements of danger have developed during this period (except for minor outstanding work that does not affect the use of the Works or Section for their intended purpose). The Employer's right to subject part of the Work to normal operating stresses during the course of execution is not affected by the provisions of this article. When the Employer/Employer's Representative is satisfied that the whole Works have been completed and has established that the individual components are impeccable in all respects and fulfill the stipulated conditions, and after any defects that may have come to light have been remedied, a Taking-Over Certificate will be issued by the Employer's Representative with copy to the Employer. The right to determine whether or not the whole Work is completed rests with the Employer/Employer's Representative. If the Works are divided into Sections, the Contractor shall be entitled to apply for a Taking-Over Certificate for each Section. The issuance of the Taking-Over Certificate marks the beginning of the Defect Liability Period. The Employer can reject the application, giving his reason and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued: the Contractor shall then complete such work before issuing a further notice under this Sub-Clause.
GCC 56.1	The date by which operating and maintenance manuals are required is: Prior to the issuance of the Certificate of Completion. The date by which "as built" drawings are required is: Prior to Completion Certificate. Moreover, should any change is required in the "as-built" drawings because of rectification of any defects within the Defects Liability Period, such changes shall be incorporated and "as-built" drawing shall be updated accordingly before issuance of the Final Acceptance Certificate.
GCC 56.2	The amount to be withheld for failing to produce "as built" drawings and/or Operating and Maintenance manuals by the date required in GCC 58.1 is: Full value of last invoice.
GCC 57.2 (g)	The maximum number of days is: 200
GCC 61.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is: 50%

GCC 64	The Manager has to obtain the specific approval of the Employer for taking any of the following actions: a. Approving subcontracting of any part of the work under General Conditions of Contract Clause 7; b. Certifying additional costs determined under General Conditions of Contract Clause 42; c. Determining the extension of the intended Completion Date under General Conditions of Contract Clause 27; d. Issuing a Variation under General Conditions of Contract Clause 1 and 38, except in an emergency situation, as reasonably determined by the Manager; emergency situation may be defined as the situation when protective measures must be taken for the safety of life or of the works or of adjoining property. e. There shall be no changes in unit rates quoted by the contractor pursuant to clause 37 of General Conditions of Contract. Add the Clause 64 in GCC with the following Sub Clauses: **64.1 Inspection and Tests** (A) general The quality, workmanship and performance of all items and the Works or Equipment (raw materials, components, intermediate assemblies and end products) shall be subject to inspections and tests by the Employer/Employer's Representative to the extent practicable, at the relevant locations and in any event prior to Taking Over. Unless otherwise directed, testing and inspection shall be done according to the best commercial method for the particular type and class of work. The Employer/Employer's Representative shall be entitled at all reasonable times before and during the periods of design, manufacture, shipment, site erection, commissioning and guarantee period to inspect, examine and test the design work, materials and workmanship of all work and equipment to be supplied under the Contract, and if part of the Work or equipment is being manufactured on other premises, the Contractor shall obtain for the Employer/Employer's representative permission to inspect, examine and test as if the said Works or equipment were being manufactured on the Contractor's premises. The inspection, examination or testing, if made, shall not release the Contractor from any responsibility and obligation under the Contract. Work and equipment not manufactured or erected in accordance with the Contract shall be removed by the Contractor at his

own expense.

Inspectors and other properly authorized representatives of the Employer/Employer's Representative shall be free at all times to perform their duties and any intimidation or attempted intimidation of any one of them by the Contractor or by any of his employees or Sub-Contractor shall be sufficient reason, if the Employer so decides, for the termination of Contract.

The Contractor shall furnish all reasonable aid and assistance required by the Employer/Employer's Representative, or inspectors, for the proper inspection and examination of the Work and all parts thereof. For tests on the premises of the Contractor or of any Sub-Contractor or at Site (unless otherwise stated in the Specifications), the Contractor shall provide at his expense such as means of access, space, vehicles, machine, labor, materials, electricity, fuel, stores, apparatus and instruments, as well as make availability the use of all Contractor's facilities as may be required and as may be demanded reasonably to perform these tests efficiently.

The Contractor shall analyze and test all materials and equipment, which the Employer/Employer's Representative requires to be analyzed or tested. Selection of samples for testing material or equipment shall be made by the Employer/Employer's Representative. The Contractor shall analyze and test these materials and equipment in the manner and at the time and place stated in the Contract Documents or required by the Employer/Employer's Representative in accordance with the provisions of the Contract.

Under completion of manufacture at the factory, the Employer will depute his personnel to the Contractor's factory to witness the fabrication, assembly and testing of any or all parts of the equipment and materials as specified in Sub-Clause 64.2 of SCC.

Unless waived in writing by the Employer/Employer's Representative or unless otherwise stated in Specifications, all inspections and tests shall be made in the presence of the Employer / Engineer or inspector authorized by the Employer. Only those materials and parts of the Work and equipment, which have been approved by the Employer/Engineer shall be used and shipped.

(B) Cost of tests borne by the Contractor

Unless otherwise specified, all costs related to the fabrication, assembly and test or tests shall be arranged and borne by the

Contractor at its own cost. This shall apply to tests performed at the Site or elsewhere.

(C) Dates for inspection and testing

The Contractor shall agree with the Employer/Employer's Representative the date on and the place at which any Work will be ready for testing as provided in the Contract and if the Employer/Employer's Representative fails to attend at the place so named on the date agreed the Contractor may proceed with the tests, which shall be deemed to have been made in the Employer/Employer's Representative presence, and shall forthwith forward to the Employer/Engineer duly certified copies of the test readings.

(D) Facilities for testing

Where the Contract provides for tests on the premises of the Contractor or of any Sub-Contractor the Contractor shall provide such assistance, labor, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such tests efficiently.

(E) Rejection

If as a result of such inspection, examination or test of the Work the Employer/Employer's Representative shall decide that such Work is defective or not in accordance with the Contract he shall notify the Contractor accordingly stating in writing his objection and reasons therefore, the Contractor shall with all speed make good the defect free or ensure that the Work complies with the Contract.

Thereafter, if required by the Employer/Employer's Representative, the tests shall be repeated under the same terms and conditions and all expenses borne by the Contractor.

All costs incurred by the Employer by the repetition of the tests or false calls shall borne by the Contractor. Any delay in delivery due to retest or false call shall not constitute a release of the Contractor for his responsibilities for delay.

(F) Commissioning

Commissioning shall be defined as those parts of the tests on completion which include the trial runs and operational tests to be carried out in order to put equipment into service under real operating conditions. Commissioning shall take place in accordance with instructions of the manufacturers of the relevant parts of equipment.

	64.2 Inspection and Test at Factory Whenever the Contractor is ready to carry out any such test and inspection, it shall give reasonable advance notice, including the place and time, to the Employer. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer or its designated representative to attend the test / or inspection. Upon Contractor's such notification, the Employer shall notify the Contractor in writing of the identity of any representatives retained for these purposes. The Employer shall bear all its own costs and expenses incurred in connection with such attendance including, but not limited to, travelling and board and lodging expenses. Inspection Schedule shall be finalized during Contract Negotiation. Following plant, equipment and material shall be witnessed and tested by the Employer's representatives at the manufacturer's factory before dispatching it to the Site. 33 kV Circuit Breaker Control and Relay Panel Disconnecting Switch and LA Instrument Transformers

Annex-1

Table of Price Adjustment Data
[SCC 45.1]

Code	Index Description	Source of Index*	Base Value and Date	Employer's Proposed Weighting Range (coefficient)	Bidder's Proposed Weighting (coefficient)**
1	2	3	4	5	6
	Non - adjustable (A)			0.15	0.15
	Labor (b)				
	Materials (c)				
	Equipment usage (d)				

		Total			**1.00**

Note: Base value and Bidder's proposed weighting coefficient to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed value and weighting coefficient.

+Table of Price Adjustment Data

[SCC 45.7]

Code	**Construction Material***	**Unit**	**Base Price (NRs/Unit) ** (Ex-factory)**	**Source (Factory)****
1	**2**	**3**	**4**	**5**

** For the purpose of calculation of price adjustment, the Ex-factory price of the same source mentioned in the table shall be taken into consideration.

Note: Base Price and source to be filled as per "Bid Form of Table of Price Adjustment Data" in Bidding Forms (Section-IV) after verification by the Employer in case of the alternative provision of Bidder proposed source and base price.

SECTION - IX

Contract Forms

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Table of Forms

1) Letter of Intent…….....IX-2
2) Letter Of Acceptance…….IX-3
3) Contract Agreement……..IX-4
4) Performance Security….....IX-5
5) Advance payment Security……..…IX-6

Letter of Intent

[on letterhead paper of the Employer]

Date: ... ……

To: .....name and address of the Contractor .....

Subject: ... . Issuance of letter of intent to award the contract .....

This is to notify you that, it is our intention to award the contract ..... .[insert date] .....for execution of the ... . [insert name of the contract and identification number, as given in the Contract Data/SCC] to you as your bid price ..... [insert amount in figures and words in Nepalese Rupees] as corrected and modified in accordance with the Instructions to Bidders is hereby selected as substantially responsive lowest evaluated bid.

Authorized Signature: ……

Name: ... ……..

Title: ……..

CC:
[Insert name and address of all other Bidders, who submitted the bid]

[Notes on Letter of Intent
The issuance of Letter of Intent is the information of the selection of the bid of the successful bidder by the Employer and for providing information to other unsuccessful bidders who participated in the bid as regards to the outcome of the procurement process. This standard form of Letter of Intent to Award should be filled in and sent to the successful Bidder only after evaluation and selection of substantially responsible lowest evaluated bid.]

Letter of Acceptance

[on letterhead paper of the Employer]

Date: ……..

To:..... ... name and address of the Contractor ……...

Subject: ..... Notification of Award

This is to notify that your Bid dated .....date ……..for execution of the……..name of the contract and identification number, as given in the Contract Data/SCC …….... for the Contract price of Nepalese Rupees [insert amount in figures and words in Nepalese Rupees], as corrected in accordance with the Instructions to Bidders is hereby accepted in accordance with the Instruction to Bidders.

You are hereby instructed to contact this office to sign the formal contract agreement within 15 days with Performance Security as specified in the SCC consisting of a Bank Guarantee in the format included in Section IX (Contract Forms) of this Bidding Document.

The Employer shall forfeit the bid security, in case you fail to furnish the Performance Security and to sign the contract within specified period.

Authorized Signature: ……...

Name and Title of Signatory: ……

Contract Agreement

THIS AGREEMENT made the .....day of …….. between…… name of the Employer …….. (hereinafter "the Employer"), of the one part, and ……name of the Contractor ……(hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as …….... name of the Contract .....should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects in the sum of NRs ….....…..[insert amount of contract price in words and figures including taxes] (hereinafter "the Contract Price").

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement.
   (a) the Letter of Acceptance;
   (b) the Letter of Bid;
   (c) the Addenda Nos ..... insert addenda numbers if any ……
   (d) the Special Conditions of Contract;
   (e) the General Conditions of Contract;
   (f) Bills of Quantities (BOQ);
   (g) the Specification;
   (h) the Drawings;
   (i) the Activity Schedules; and
   (j) Table of Price Adjustment Data
   (k).....[Specify if there are any other document]

3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Nepal on the day, month and year indicated above.

Signed by …….	Signed by……..
for and on behalf the Contractor in the presence of	for and on behalf of the Employer in the presence of
Witness, Name Signature, Address, Date	Witness, Name, Signature, Address, Date

Performance Security

(On letterhead paper of the 'A' class commercial Bank)

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

Beneficiary: ..... Name and Address of Employer …….....

Date: .....

Performance Guarantee No.:…….

We have been informed that ... ... [insert name of the Contractor] (hereinafter called "the Contractor") has been notified by you to sign the Contract No. .. .. [insert reference number of the Contract] for the execution of ... .. [insert name of contract and brief description of Works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guaranteeis required.At the request of the Contractor, we ... . [insert name of the Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of ..... [insert name of the currency and amount in figures*] (... .. insert amount in words) such sum being payable in Nepalese Rupees, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the ... . Day of ... . **, and any demand for payment under it must be received by us at this office on or before that date.

……

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

* The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract in Nepalese Rupees.

** Insert the date thirty days after the date specified for the Defect Liability Period. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee".

Advance Payment Security

(On letterhead paper of the 'A' class commercial Bank)

..... *Bank's Name, and Address of Issuing Branch or office*.....
Beneficiary: ..... *Name and Address of Employer*
.....
Date: .....
Advance Payment Guarantee No.:.....

We have been informed that . . . . . ***name of the Contractor***. . . . . (hereinafter called "the Contractor") has entered into Contract No. . . . . ***reference number of the Contract***. . . . . dated . . . . .with you, for the execution of . . . . . ***name of contract and brief description of Works***. . . . .(hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum . . . . . ***name of the currency and amount in figures****. . . . . (. . . . . ***amount in words***. .. . .) is to be made against an advance payment guarantee. At the request of the Contractor, we . . . . . ***name of the Bank***. . . . . hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . . . . . ***name of the currency and amount in figures****. . . . . (. . . . . ***amount in words***. . . . .) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number . .. . . ***Contractor's account number***. . . . . at . . . . . ***name and address of the Bank***. . . . . .

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the . . . day of . . . . . , ...**, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

. . . . . .

Seal of Bank and Signature(s)

Note:

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

* The Guarantor shall insert an amount representing the amount of the advance payment in Nepalese Rupees of the advance payment as specified in the Contract.

** Insert the date Thirty days after the expected completion date. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be

made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee".

NEPAL ELECTRICITY AUTHORITY

(An Undertaking of Government of Nepal)

Distribution and Consumer Services Directorate

NATIONAL COMPETATIVE BIDDING (NCB)

Contract Identification NO: NRO-074/075-33KVBay&Line-01

BIDDING DOCUMENTS

FOR

SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF BAY EXTENSION AT TIKAPUR S/S AND UPGRADATION OF 11KV TIKAPUR KAILALI - RAJAPUR, BARDIYA LINE TO 33KV

Volume II

December, 2017

Nepal Electricity Authority
Distribution and Consumer Services Directorate
Nepalgunj Regional Office , Nepalgunj
Phone: +0977-081-523419
Fax: +0977-081-523508

Part - II Requirements .....V-1 to VI-124

Section - V Works Requirements ……...…. V-1 to V-124

Part - II

REQUIREMENTS

Table of Clauses

Section - V Works Requirements .....V-1 to V-124

Scope of Work ……...V-2

Technical Specification (Electrical Equipment)……...V-26

Technical Data Sheet……...V-79

Specification of Civil and Building Works……...V-93

Inspection, Testing and Commissioning……...V-114

Drawings……....V-124

SECTION - V

Works Requirements

This Section contains the Specification, the Drawings, and supplementary information that describe the Works to be procured.

Scope of Work

1. Description of the Project:

1.1 General:

The main components of the **33 kV Bay and Line Project** include **"Supply, Delivery, Installation/Erection, Testing and commissioning of Bay Extension at Tikapur S/s and upgradation of 11kV Tikapur, Kailali-Rajapur,Bardiya Line to 33KV "** The scope of supply of plants and related services under this Project, but not limited to, are given below:

1.2 This Tender Document covers the construction of Bay and Line works and all the necessary civil, structural, mechanical and electrical works, including the design, supply, manufacturing, delivery, erection, construction, commissioning, trial operation and test of the equipment, works and materials as specified or referred to in the technical specifications of this Tender Document.

1.3 If any discrepancies in the specifications and drawing are found, shall be discussed and rectified before or at the time of final approval of drawings.

1.4 The bidders are requested to visit site(s) at its own to get the general idea about substation location and quote the price accordingly.

1.5 The Contractor shall have adequate manpower to execute the works at site(s) to complete the work within the scheduled time.

1.5.1 Equipment and Materials:

The Contractor to his designated store area shall deliver all equipment and materials. Such materials shall be delivered, unloaded and placed in stores in an acceptable manner and approved by the Employer or his authorized representative.

1.5.2 Erection:

When the Bay and Line has been completed and accepted by the Employer, the Contractor will make an inventory of the assemblies erected, and submit it to the Employer for approval and final payment.

Before the Taking-Over of the works, the Contractor shall clean up all areas in which he has worked, place all unused materials in the designated stores and settle any claims, which may have resulted from his work and occupancy of the area. He shall then remove all equipments, vehicles, manpower and facilities, which, he has brought in except those which may be specifically exempt by the Employer.

1.6 Contract Scope:

This section outlines all major work to be carried out by the Contractor all the new and existing Bay and Line works. All engineering design and materials shall be subject to the Employer/Employer's Representative approval.

2. Special Requirements of the Project

2.1 General

2.1.1 This specification covers the general requirements for design, manufacture, assembly, shop test, delivery, field, test, dismantling and installation commissioning of works for 33KV Bay and 33 KV Line equipment.

2.1.2 Any deviation from this specification or the Technical Specification shall be clearly stated with reasons.

2.2 Conditions of Service

2.2.1 All plant and equipment supplied under this Contract shall be suitable for the following system and site conditions.

(a) System electrical parameters

	(1)	System voltage	33kV and 11kV
	(2)	Number of phase	3
	(3)	Frequency	50Hz

(b) Climatic conditions

(1)	Ambient temperature		
	-	Maximum	55 deg. C
	-	Minimum	0 deg. C
	-	Annual average	32 deg. C
(2)	Wind velocity		
	-	Maximum	34.4m/sec
(3)	Relative humidity		
	-	Maximum	100%
	-	Minimum	20%
(4)	Monsoon season		June-August
(5)	Precipitation		
	-	Maximum	1,000 mm/month
	-	Minimum	Zero/month

(c) Altitude of site — Less than 1000m from sea level

(d) Seismic force — O.15G

(e) Isokeraunic level 50

The information in this Sub-Clause is given solely for the general assistance of Bidders and no responsibility for it will be accepted nor will any claim based on this article be considered. The Bidder is advised to survey the Sites covered under this Contract to acquaint himself with site conditions.

2.2.2 The Contractor shall be responsible for surveying, borings, geologic and subsoil conditions for all foundations, and for the precise location of each work in the project.

2.2.3 All necessary soil tests to determine the earth resistivity, the design of the ground grid and all foundations shall be performed by the Contractor at the Bay and Line site.

2.2.4 The Contractor shall locate, and record on the construction drawings, all interfacing utility lines or other obstructions.

Damage to existing line equipment and structures shall be repaired by the Contractor at his expense.

2.3 Codes and Standards

2.3.1 All plants and equipment supplied under this Contract shall conform to or be of higher quality than the latest applicable standard as listed in the following:

IEC - International Electrotechnical Commission

ANSI - American National Standard Institute

BS - British Standard

NEMA - National Electrical Manufacturers Association

IEEE - Institute of Electrical and Electronics engineers

ASTM - American Society of Testing and Materials

ASME - American Society of Mechanical Engineers

IPCEA - Insulated Power Cable Engineers Association

ISO - International Organization for Standardization

ASCE - American Society of Civil Engineers

ACI - American Concrete Institute

NEC - National Electrical Code (ANSI CI)

ISI - Indian Standard Institute

2.3.2 If the Specifications contained in this Contract conflict in any way with any of the reference standards, the Specifications shall take precedence. If there are conflicts between different specified reference standards covering the same material or equipment, the standard which will provided the highest quality and most suitable application as determined by the Employer/Employer's Representative shall prevail.

2.3.3 References to standards or to equipment of a particular manufacturer shall be regarded as followed by the words "or equivalent" except as otherwise noted. The Contractor may propose alternative standards, or equipment, which shall be equal to those, specified. If the Contractor for any reason proposes alternatives to or deviations form the above standards, or desires to use equipment not covered by the above standards, the Contractor shall state the exact nature of the change, the reason for making the change, and shall submit, for the approval, relevant specifications of the equipment in the original language, and in case that these specifications are written in language other than English, the English version shall be attached and shall govern. The decision of the Employer/Employer's Representative in the matter of equality will be final.

2.4 Scope of Works

2.4.1 The scope of works under this Contract shall include manufacture, shop test, delivery to the site in the Contract, receiving, assembly, erection, installation VCB, CR Panel, CT, Isolators, and Line Stringing, equipments field test, all civil work, and commissioning of all equipment necessary for complete operation of each work. The work includes but is not limited to the following:

(a) Lattice type steel structures for transmission line incoming/outgoing, supporting structures, all nuts, bolts and miscellaneous steel required for mounting and installation of all the equipment and materials furnished.

Support structure for 33 kV Air Break (Disconnecting switch) shall be the part of the switch itself. That is to say extra payment shall not be made.

Support structure of 33kV vacuum circuit breaker (VCB) shall also be the part of the circuit breaker. No extra payment shall be made for this.

Steel structure excluding above items shall cover under heading of galvanized steel structure for gantry and support as mentioned in the price schedule. Any specifically mentioned items shall not come under this steel structure.

(b) Outdoor type 33kV VCB, switchgears including circuit breakers, disconnecting switches, power fuse, instrument transformers, lighting arresters, insulators and bus materials complete with all fittings and connectors.

(c) All panels for control, metering, relaying, alarms, recording of events, etc. required for operation and protection of the entire substation.

(d) All civil works including, foundation and cable duct..

2.4.2 The Contractor shall submit detailed drawings, instruction and maintenance books, and spare parts lists with recommended stock quantities for the equipment furnished, prepare and submit detailed engineering, design and construction drawings pertaining to all mechanical and electrical equipment and installations in each substation. The drawings to

be furnished by the Contractor for each individual substation shall include, but not be limited to the following:

(a) Single line and three-line diagram for existing substation and proposed up-gradation

(b) General layout of substation and property plan layout

(c) 33kV electrical layout and elevations, plans and details

(d) Structural erection and fabrication drawings

(e) Substation grounding calculation, plans, elevations and details

(f) Foundation layouts, plans and elevations indicating top of foundations, details for anchor bolt installation, including all data required for civil works.

(g) Cable trench, duct and conduit layout plan, elevation and details

(h) One line diagram for AC and DC station service power supply

(I) Substation lighting and convenience outlet plan, elevation, and details

(j) Substation control building electrical equipment layout, plan, elevation and details, including cable trench, cable tray, wire gutters, conduits, and specifying location and installation details for equipment furnished.

(k) Detailed material list for each substation

(m) Elementary AC and DC diagram for control, metering, relaying, communication, alarm etc., required to describe in detail the operation of all systems in each substation. Wire numbers and terminal numbers for each device shall be clearly marked on all AC and DC elementary and schematic diagram.

(n) Interconnection diagram for all substation equipment. AC and DC station service equipment and all building equipment.

(o) Detailed cable schedule list and cable summary, specifying cable identification number, routing and length of each cable for each substation.

(p) Switchgear and panel board front and rear elevation drawings showing dimensions and identification of each device and complete nameplate schedule.

(q) Calculation and coordination of protection relays.

(r) Instruction books, spare parts lists, material lists and any other documents pertaining to each substation and required for construction, operation, maintenance and repair.

All the instructions, manuals and relevant information in the drawings must be in English.

Unless otherwise specifically mentioned, the drawings and data pertaining to the Works shall be according to this clause.

a) General

All drawings shall be prepared in AutoCAD and the Contractor shall submit 3 sets of such electronic drawing files in Compact Disc to the Employer and the Consultant.

b) The Contractor shall submit the drawings and data to the Employer for approval in the following manner and designated deadlines.

2.4.2.1 Drawings: Titles, scales and Sizes

The title of the drawing, Contract Number, the signature of the Contractor's engineer and the date shall appear in the bottom right-hand corner of each drawing in the following format:

Project Name:…….

Contract No…….

Name of the Substation …….

Item No…….

Brief Description ……

In general the scales of the drawings shall be 1:200. The Contractor, however, can prepare and submit drawing in any other appropriate scales with the prior approval of the Employer. The Contractor shall use any one of the following sizes for the preparation of drawings as appropriate:

A0	841 x 1189 mm	(33.11 x 46.81 in)
A1	594 x 841 mm	(33.39 x 33.11 in)
A2	420 x 594 mm	(16.54 x 23.39 in)
A3	297 x 420 mm	(11.69 x 16.54 in)
A4	210 x 297 mm	(08.27 x 11.69 in)

2.4.2.2 Employer's approval

The Employer will approve each drawing within thirty-five (35) days after receipt at his office. One print of each of the drawings submitted for approval will be returned by the Employer or Employer's Representative, marked either "APPROVED", "APPROVED EXCEPT AS NOTED", or "RETURNED FOR CORRECTION".

(a) The notations "APPROVED", or "APPROVED EXCEPT AS NOTED" will authorize the Contractor to proceed with the manufacturing drawings, subject to the corrections, if any indicated thereon. The notation "RETURNED FOR CORRECTION" shall require the Contractor to make the necessary revisions on the drawings and submit for approval within thirty-five (35) days in the same manner as before. Approval of the Contractor's drawings shall not in any way relieve the Contractor of any part of his obligation to meet all the requirements of the Contract or of the responsibility for the correction of the drawings.

(b) Reproducible: Reproducible of all final approved drawings shall be made on CDs.

(c) All final as-built drawings shall be supplied in CD-ROMs (three sets).

2.4.3 The Contractor shall provide spare parts and tools for each substation as specified in this specification.

2.4.4 Furnish qualified supervision and construction personnel for the installation, testing, commissioning and final system testing and checking out of the equipment listed above and detailed in the Schedule of Materials. The work shall be performed in close cooperation and collaboration with the Employer/Employer's Representative.

2.4.5 Coordination of the substation work with the installation of others shall be the responsibility of the Contractor. The Employer will furnish the information needed to coordinate the substation work with the other work.

2.5 Assistance by the Employer

The Employer will give assistance to the Contractor as much as possible in the following; this however will be without any obligations, legal or otherwise.

(a) Facilitating access to all locations involved in carrying out the works.

(b) General guidance to the Contractor for all negotiations with the Authorities in Nepal.

2.6 Variation in Quantities of Work

The Quantities listed in the Prices Schedules represent the estimated quantities for tender purpose only. The Contractor agrees to make no claim for anticipated profits or for alleged losses because of any difference between the quantities actually furnished and installed and the estimated quantities as indicated in these Tender Documents.

2.7 Time Schedule and Progress Report

2.7.1 Within 30 days from the date of signing of the Contract, the Contractor shall submit to the Employer/Employer's Representative a time schedule and progress chart covering work to be done at each manufacturing plant and installation at site. The Contractor shall show the several salient features of the work.

2.7.2 The proposed project period is as specified in the General Condition of Contract. Failure to meet these dates may result the Employer to enforce the provisions of "Liquidated Damages" to the Contractor. The Bidder shall submit the project schedule prepared by PERT/CPM with the Tender.

2.7.3 The Contractor shall submit the actual progress and the estimated earnings at the end of the month. Three (3) number of copies shall be furnished to the Employer/Employer's Representative with the monthly report.

2.7.4 The time schedule will be subject to review by the Employer/Employer's Representative for compliance with the Contract Documents and shall be revised if necessary by the Contractor to bring it into such compliance. The schedule shall be reviewed and revised if necessary at intervals not to exceed four weeks. In addition, the Employer/Employer's Representative shall be advised promptly of any proposed changes in the schedule.

2.7.5 The Contractor shall prepare and submit monthly to the Employer/Employer's Representative a report covering the progress on design, manufacturing and installation work at the Site during the month of record. The reports shall be accompanied by suitable illustrations and photographs and by copies or working schedules as necessary to effectively evaluated and document the progress of the work. The reports shall cover at least the following activities:

(a) Manufacturing status of equipment at each factory

(b) Shipping status

(c) Arrival of equipment and schedule for arrival of other required equipment

(d) Installation of Contractor's equipment at the Site

(e) Performance record of critical items of Contractor's equipment

(f) Quantitative progress on work at the Site

(g) Scheduled progress for work at the Site

(h) Description of conditions encountered that have affected the progress of the Works adversely and of action taken to alleviate the conditions and regain the anticipated progress.

(I) Description of matters, which the Contractor anticipates, will require contract interpretation, engineering decisions, or policy determinations.

(j) Numbers of employees in various categories at the Site and projected numbers for the following three months.

(k) Schedule showing the progress of planned and actual for each salient activities of the work.

The Contractor shall submit the report by end of the following month.

2.7.6 The employer has provided a time schedule for the execution of the work with this document. The contractor may revise the schedule of different items but the total completion time shall remain the same.

2.8 Drawings and Data

2.8.1 The Contractor shall prepare and furnish to the Employer/Employer's Representative such drawings, calculations, and data on materials and equipment (hereinafter in this provision called data) as are required for the proper control and completion of the work, including

but not limited to those drawings, data and calculations specifically required elsewhere in the Technical Specifications.

2.8.2 The Metric System shall be used and notations shall be in English. Drawings, calculations, and data shall be furnished as specified. All drawings and data will be subject to review by the Employer/Employer's Representative conformity with the Technical Specifications and Contract Drawings and upon meeting review requirements shall become Employer.

2.8.3 Within 30 days from the date of signing of the Contract, the Contractor shall prepare and furnish to the Employer/Employer's Representative a schedule for submission of all drawings and data. Each drawing to be submitted for the work of the Contract shall be listed on the schedule, and the schedule shall contain separate columns for scheduled submitted dates and actual submittal dates. The schedule will be reviewed by the Employer/Employer's Representative and the Contractor shall correct any defects noted therein. The schedule shall at all times present a complete plan for orderly submission of such drawings and data and shall be updated and resubmitted monthly showing actual submittal dates and revised scheduling. The Contractor shall promptly notify the Employer/Employer's Representative of any occurrence requiring substantial revision of the schedule giving a detailed explanation of the cause of the revision. Revised schedules will be revised and corrected in the same manner as the original schedule.

2.8.4 Neither the review nor lack of review of any drawings, calculation or data shall waive any of the specification or Contract drawings, or responsibility for correctness of the drawings, calculations or data and defective work, materials, and equipment may be rejected notwithstanding conformance with drawings, calculations and data reviewed by the Employer/Employer's Representative. The Employer/Employer's Representative shall have the right to require the Contractor to make any changes in the design which may be necessary, to make the apparatus conform to the requirements and intent of the specifications, with no additional cost to the Employer.

2.8.5 Any drawing changed by the Contractor during the development of his design after review by the Employer/Employer's Representative shall be submitted for approval.

2.9 Quality Control

2.9.1 The Contractor shall provide and maintain a Quality Control Plan (QCP) to ensure compliance with quality standards of the Technical specification, the Contractor shall furnish to the Employer/Employer's Representative six (6) copies of his complete quality control procedures, manual, and a description of the quality control organization.

2.9.2 The Employer/Employer's Representative will monitor the Contractor's methods, procedures and processes for compliance with the QAP and the quality standards of these specifications Failure of the Contractor to effectively maintain the quality control program throughout all phases of the work will be considered a failure to prosecute the work with the diligence required by the Contract Documents.

2.10 Painting

2.10.1 All sheet steel work shall be phosphated in accordance with the following procedure and in accordance with BS 2569 and BS 5493.

2.10.2 Oil, grease, dirt shall be thoroughly removed by emulsion cleaning.

2.10.3 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.

2.10.4 After phosphating, through rinsing shall be carried out with clean water, followed by final rinsing with dilute dichromate solution and even drying.

2.10.5 The phosphate coating shall be sealed by the application of two coats of stoving type zinc chromate primer. The first coat may be 'flash dried" while the second coat shall be stoved.

2.10.6 After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. Touch up shall be applied after completion of tests. All panels should have same color. The color for the finishing paint shall be approved by the Employer/Employer's Representative.

2.10.7 The final finished thickness of paint film on steel shall not be less than 100 microns.

2.10.8 Finished painted surface of panels shall present at aesthetically pleasing appearance free from runs and drips.

2.10.9 A small quantity of finishing paint shall be supplied for minor touching up required at site after the installation of the panels.

2.11 Packing and Shipment

2.11.1 The Contractor shall prepare all materials and equipment for shipment in such manner as to protect them from damage in transit and in storage prior to installation. Materials that might otherwise be lost shall be boxed or wired in bundles.

2.11.2 All finished surfaces or ferrous metals, including screw threads that will be exposed during shipment or while awaiting installation shall be cleaned and shall be given a heavy uniform coating of rust-preventive compound devices subject to damage shall be suitably wrapped or otherwise protected from damage.

2.11.3 Each complete field assembly shall be given an identification number or letter, and each part of each field assembly which is not permanently connected in shop assembly shall be legibly marked. Except on bolts and other small parts, all such marks shall be made with oil-resistant paints. Diagrams showing all such markings shall be supplied. Each place of subassembly separately packed for shipment shall be labeled or tagged with the specification number and the mark number of such piece or the numbers of the parts grouped in such subassembly, or contained in the package. The individual substation name shall be clearly and legibly marked on each package and crate.

2.11.4 The spare parts shall be packed separately from other articles. Packages of spare parts shall be clearly identified and shall be accompanied by a list of contents, which set forth directions for storing.

2.11.5 The Contractor shall prepare a packing list for each and every shipment made. In the case of several packages included in a single shipment, more than one package may be included on one packing list, providing all required information is shown for each package.

The following information shall be provided for each package:

(a) Description of package, i.e. box, crate, drum, bundle etc.

(b) Package number

(c) General description of contents corresponding to the invoice

(d) Equipment number where applicable

(e) Gross, tare and net weights in kilograms

2.12 Tools and Appliances

The Bidder shall supply complete, new and unused sets of all special tools or gages, which will be required for normal operation and maintenance. The Bidder shall furnish the list of tools and appliances in the Tender Document. To the Greatest extent possible, the tools for each specific operation shall be stored in a single, locked, portable, steel box suitably and clearly marked for convenient identification. These shall be the part of equipments.

2.13 Spare Parts

2.13.1 The Bidder shall propose recommended spare parts required for three years maintenance in addition to the spare parts specified in the price schedule of Tender Document and shall include a price list of these parts in a separate sheet of paper. The price of such spare parts proposed by the bidder shall not be taken into account for financial evaluation. Sufficient information shall be provided to permit the Employer/Employer's Representative to estimate spare parts requirements.

2.13.2 All spare parts supplied under the Contract shall be strictly interchangeable with the parts for which they are intended to be replaced and shall be treated and packed for long storage under the climatic conditions prevailing at the site. Each spare part shall be clearly marked or labeled on the outside of its packing with its description and purpose, and when more than one spare part is packed in a single case or other container, a general description of its

contents is to be shown on the outside of such cases or container and a detailed list enclosed inside. All cases, containers and other packages must be suitably marked and numbered for purpose of identification.

2.13.3 All cases, containers or other packages are liable to be opened at the site for such examinations as the Employer/Employer's Representative may consider necessary, and all such opening and subsequent repacking shall be at the expense of the Contractor.

2.13.4 All spare parts must be delivered to Site in advance of the trial operation. The Contractor shall ultimately prepare and deliver five (5) copies of the final consolidated spare parts list, arranged specifications-wise.

2.13.5 It shall be in the interest of the Contractor to organize the delivery and systematic storage of spare parts before the trial operation to obviate post erection difficulties and delays. Any spare part consumed by the Contractor before Performance Certificate shall be replaced without any cost to the Employer.

2.14 Technical Requirements

2.14.1 Electrical auxiliary power supply

The electrical auxiliary and control power source shall be as follows:

(a) AC auxiliary power source

- 3 phase, 4-wire, 50Hz. 400/230V
- 1 phase, 50Hz, 230V

(b) DC control power source: 110V

2.14.2 Wiring

The equipment to be provided as part of this Contract shall be fully wired in accordance with the following general requirement.

(a) All wiring shall be carried out in general purpose 600 volt grade PVC copper wire complying with the requirements of IEC. The wire core size shall not be less than 2.5sqmm. All wire cores shall be multi stranded and flexible.

(b) Wires shall be neatly bunched and adequately supported so as to prevent sagging and strain on termination.

(c) All inter panel wiring between panels that directly adjoin one another shall be made through suitable holes in the common panel side sheets. All inter panel wiring shall start and terminate on terminal blocks; direct wiring between other items of equipment will not be acceptable.

(d) Joints or splices in panel and inter panel wiring not be acceptable.

(e) The wiring of panels, cubicles or kiosks shall be identical.

(f) All wire termination shall be made with compression type connectors. Wires shall not be spliced or tapped between terminal points.

(g) Not more than two wires shall be connected to any terminal at each end. If necessary, a number of terminals shall be jumpered together to provide additional wiring points.

(h) Wiring leads and cable cores shall be permanently marked a both ends with an approved type of marking device having black letters and numbers impressed on a white background.

2.14.3 Terminal Blocks

(a) Multiway terminal blocks complete with screws, nuts, washers and marking strips for terminal identification shall be furnished for terminating the internal wiring and outgoing cables.

(b) Control terminals shall be washers head screw type, each suitable for connection of at least two numbers copper conductor cables of requisite cross-section at each end through compression type (solderless) lugs. Screw type terminals with screw directly impinging on conductor or any other of terminal, which does not accept compression type lugs, are not acceptable. The successful Bidder shall have to take

prior approval of the terminals to be used in the block from the Employer/Employer's Representative.

(c) Each terminal shall be marked with designations obtained from schematic diagrams.

At least 20% spare terminals shall be provided in the terminal blocks.

2.14.4 Nameplate

(a) Nameplates or rating plates shall be stainless steel and shall be engraved in English language. Instruction plates, warning signs and any marking whatever on the equipment and parts and accessories thereof shall be in English.

(b) The switch handles shall be carved with the function number or word colored in white.

(c) The details of the matters to be shown on the nameplates, etc. shall be indicated in the drawings for approval.

2.14.5 Switchyard Surface Cleaning:

The scope of works under this heading comes as following:

1. Taking out grass from its root, So that the chances of sprouting are minimized. The realignment and leveling of existing switchyard gravel.

2.14.6 Surface Dressing with Crushed Stone:

It covers the followings:

1. Filling up by gravel in the patch
2. Filling up the in the switchyard if it not.
3. Crushed stone to be used shall be 40 mm size and depth of 15 cm.

2.14.7 Switchyard Painting:

It shall cover the followings:

a. One coat of red oxide point and two coat of Aluminum point
b. The point shall be from reputed manufacturer. The contractor shall have to take the prior written acceptance from the owner for the manufacturer of the point.
c. Thinner shall not be used.
d. Painting of transformer and equipment shall be by spray gun.
e. Special care shall be taken to avoid spray on bushing and name plate
f. Painting shall be done on the followings:
g. Gantry / Steel Structure, Transformer and other equipment's.
h. Galvanized steel structure shall not be pointed.

2.14.8. Repairing of Cable Trench (out door):

It shall cover the followings:

a. Repairing / replacement of cable trench slab.
b. Repairing of any damaged or likely to be damaged part of cable trench.
c. Repairing of patch works.
d. Repairing / replacement of cable support tray or angle etc.
e. The repairing shall look line new one.

2.14.9 Repairing of Cable Trench (Indoor):

a. Same as in item No 2.14.8.
b. If there is no cover over the cable trench, it shall have to be supplied / constructed by the contractor

2 Construction and Installation Works:

It shall include construction, erection, assembly, installation, testing and commission of the equipments and steel structure. After the construction and installation works the equipments shall run trouble free and smooth.

3.1 Foundation Works:

It shall include the following:

a. Foundation works shall be per the specification provided in Section VII

3.2 Clamp:

Clamp to be used for fixing the channel to the pole shall be made of mild steel strip of 500mm x 5 mm section. This shall be hot dip galvanized. The zinc costing shall be 610 gram per square meter.

3.3 Trolley of V.C.B.:

This shall be the trolley of V.C.B. cubicle, complete with vacuum interrupter etc. It shall be purchased as spare.

3.4 Galvanization:

All the steel structures used as support to the equipments, gantry and column shall be galvanized through the process as prescribed in IS/ IEC standard but the zinc coating shall be 610 gram per square meter (85 micron).

3.5 Lightning Mast

The Lightning Mast shall be designed, supplied and installed as per the standard practices and as per the site conditions. The design details of the Lightning Mast shall be submitted to the owner for approval.

3.6 Minor Items and Works:

While reinforcing / constructing substations under this contract, minor items like shifting of switchyard lighting poles, shifting of gantry structure, dismantling of existing wall/ fence, equipment shifting and relocating the switch yard steel fencing, interconnection of new and old earthing system,

shifting of electrical equipment from one place to another inside and outside the switch yard or in control room etc. which are not mentioned in the price schedule shall have to be done for completing the substations electrically and mechanically sound. These items and works may include labour and materials. It is not practical to mention such minor items specifically in the price schedule. The cost of such items and works shall be included and spread up in the different items of construction and installation works as mentioned in the price schedule. No extra payment shall be made to the contractor for such minor items and works . So the bidders are requested to send an expert to each substation to assess the requirements of such items and works for completing the substation technically sound and to submit the bid accordingly.

4 Environmental Mitigation Measures

4.1 Physical Environment

The following mitigation measures shall be undertaken to reduce the adverse impacts on the physical environment during construction of the substation.

(i) Changes in land use and landscape: The construction activities will be planned properly. The construction material will be stored at the designated places and the haphazard dumping of the construction spoils will be strictly prohibited. Discharge of cement slurry, garbage and other solid wastes generated by the construction activities and workforce will be avoided where possible.

(ii) Disposal of the construction spoils: The excavated material will not be left haphazardly. It will be leveled on the ground. Further, the disposal material of substation will be carried out within the acquired land for substation.

(iii) Stockpiling of the construction materials: The Contractor will have to negotiate with the owner of the property for the use of their premises even if it is for the short period.

(iv) Nuisance to the nearby properties: Although some nuisances may be unavoidable, the Contractor will have to minimize such nuisance. The Contractor will have to work in close-coordination with the local community while working in the settlement areas.

(v) Impact on the infrastructure: The Contractor shall ensure that there will be no interference with the existing infrastructure including utility facilities during contraction.

(vi) Change in air quality: Though change in water quality is unlikely during construction activity, sprinkling of water shall be carried out by the Contractor at least once a day during dry season.

4.2 Biological Environment

None

4.3 Socio-economic and cultural Environment

In the construction phase following mitigation measures shall be adopted to minimize the impacts:

(i) Loss of farmland and other category of land: Any damage to the farmland by the construction activity will have to be restored and rehabilitated.

(ii) Occupational safety and hazard: The Contractor will provide appropriate training in handling equipment and machinery to the workers and laborers before contraction. All workers employed by the Contractors shall be insured against accident.

(iii) Loss of standing crops: The Contractor shall make compensation for the loss of standing crops due to project activities.

(iv) Employment of project affected people: Priority will be given to the project affected people while hiring workers and laborers during project construction. Nepal being a signatory to the International Convention against the Child Labor, the Contractor shall not employ child labor in construction.

TECHNICAL SPECIFICATION

(Electrical Equipment)

TECHNICAL SPECIFICATION OF ELECTRICAL EQUIPMENT

1. 33 kV Circuit Breaker

1.1. General

This specification covers the design, manufacture, assembly, shop test, supply, delivery, installation works and field test of 33kV vacuum circuit breakers complete with all accessories for efficient and trouble free operation as specified here in under. Circuit breakers shall be offered from reputed makes like Hitachi /GE /ABB/Mitsubishi /LG /Fuji / Siemens/CGL, Areva or equivalent.

The equipment specified in this Section shall conform to the latest edition of the appropriate IEC specifications and/or other recognized international standards. In particular:

IEC 60056	High-voltage alternating switchgear
IEC 62271	High-voltage alternating switchgear and control gear
IEC 60376	Specification and acceptance of new sulphur hexafluoride
IEC 60529	Degree of protection provided by enclosures
IEC 60694	Common specifications for high-voltage switchgear and control gear standards

1.2 Equipment to be furnished

1.2.1 The equipment to be furnished shall strictly be in accordance with the specifications and the Price Schedule.

1.3 Design Requirements

1.3.1 The circuit breakers shall be suitable for 3 phase, 50Hz in 33kV system.

1.3.2 Circuit breaker shall be installed outdoor in a hot and humid climate. All equipment and accessories shall be provided with tropical finish to prevent fungus growth.

1.3.3 The maximum temperature rise in any part of the equipment at specified rating shall not

exceed the permissible limit as stipulated in relevant standards. The de-rating of the equipment shall be made taking 45 deg. C as an ambient temperature of the site, if it is designed for any lower ambient temperature.

1.3.4 The rated peak short circuit current or the rated short time current carried by the equipment shall not cause:

(a) Mechanical damage to any part of the equipment.

(b) Separation of contacts.

(c) Insulation damage of "Current Carrying Part".

1.3.5 Technical particulars of the circuit breaker shall be as per **Appendix 1.5.1.**

1.3.6 All auxiliary equipment shall be suitable for 3 phase 4 wire, 50Hz, 400 V**.**

1.4 Construction Features

1.4.1 This circuit breaker shall be outdoor, three phase, single throw, pneumatically or spring charged motor operated, vacuum type, trip free in any position, complete with operating mechanism and supporting structure.

1.4.2 Bushing or tanks shall be accurately aligned and assembled with the operating mechanism as a complete rigidly mounted unit on a structural steel base or frame at the factory, to permit shipment and installation as an assembled unit.

1.4.3 Contacts

The contacts shall be designed to have adequate thermal and current carrying capacity for carrying full-rated current without exceeding the allowable temperature rise as specified by IEC standards. They shall be designed to have long life so that frequent replacement or maintenance will be unnecessary. The surfaces of either of both moving and stationary arcing contacts, which are exposed directly to the arc, shall be faced with suitable arc resisting material.

1.4.4 Local test switch

Each mechanism shall be equipped with a local test switch for electrically testing the closing and tripping operations of the circuit breaker. A separate manually operated cutout device to disconnect the circuits to remote closing, re-closing and tripping devices shall be provided on each circuit breaker. A warning nameplate requiring operation of this device before operation of the local test switch shall be mounted adjacent to the local test switch.

1.4.5 Emergency trip

Each circuit breaker shall be provided with an emergency hand trip device. This device shall be provided with mechanically interlocked contacts to disconnect circuits from remote closing and re-closing devices.

1.4.6 Position indicator

The circuit breaker shall be equipped with mechanical position indictor. The indicator shall be provided for each pole.

1.4.7 Operating mechanism

The operating mechanism of the circuit breakers shall be spring charged by 110V D.C. motor and with mechanical charging.

The tripping circuit mechanism and the closing control circuit mechanism shall each have a nominal voltage rating of 110 volts DC. The tripping circuit shall operate satisfactorily for a tripping operation over a voltage range of 70-110%. The closing control circuit shall operate satisfactorily over a voltage range of 85-110%.

1.4.8 Operation Counter

There shall be the counter to read the number of operation of VCB.

1.4.9 Accessories

The Contractor shall furnish following accessories as an integral part of the circuit breaker:

(a) Padlocks and duplicate keys

(b) Operation counter

(c) Earthing terminals

(d) Nameplate

(e) Other necessary accessories

(f) Operating handle

1.4.10 Spare parts

Following spare parts shall be provided in required quantities as listed in Price Schedule.

1.5 Tests

1.5.1 Routine tests

One circuit breaker of each type ordered under the Contract shall be fully assembled at the manufacturer's works and subjected to routine tests in accordance with IEC 56 and shall comprise but not limited to the following.

(a) Construction inspection

(b) Leakage test

(c) Operating speed check

(d) Dielectric test

(e) Pressure test

(f) Control and secondary wiring check test

(g) Mechanical operation test

(h) Operating mechanism system check

1.5.2 Design tests

The Contractor shall conduct the following design tests on one circuit breaker being furnished. However, if these tests have been previously conducted on identical circuit breakers, the Contractor may furnish certified copies of such previous reports instead of performing tests on the actual circuit breakers being furnished. The Bidder shall submit the copy of design test for identical circuit breaker with the proposal.

(a) Bushing tests

(b) Dielectric withstand test

(c) Current carrying test

(d) Normal current switching test

(e) Short circuit switching test

(f) Mechanical operation life test

If a circuit breaker has been used for design tests, the test breaker will not be accepted unless the following minimum maintenance are completed, including any other provisions not included herein, but required to render the breaker equivalent of a new breaker:

(a) Replace all latches and pins

(b) Replace all major parts which are subject to fatigue, including, but not restricted to, contacts, movable cross-heads, spring and linkages**.**

1.5.3 Field tests

After installation at Site, the circuit breaker shall be subjected but not limited to the following field tests:

(a) Construction inspection

(b) Measurement of insulation resistance

(c) Operating speed check

(d) Mechanical operation test

(e) Operating mechanism system check

1.6 Performance Guarantee

The performance guarantee figures quoted on the schedule of technical data shall be guaranteed within the tolerances permitted by relevant standard and will become a part of successful Tender's Contract**.**

1.7 Drawings, Data and Manuals

1.7.1 The following drawings and data shall be furnished along with the Tender.

(a) General equipment layout

(b) Outline drawings of the breaker and control cubicle with accessories

1.7.2 After award of Contract the successful Bidder shall submit the required number of copies of the following drawings and data for approval of the Employer/Employer's Representative.

(a) General equipment layout

(b) Outline drawing of the breaker and control cubical with accessories.

(c) Loading data and foundation detail.

(d) Elementary control wiring diagram.

(e) Internal wiring diagram.

(f) External connection diagrams, showing terminal boards and other external connection points for each assembly and the required interconnecting wiring.

(g) Drawing showing typical cross-section of the operating mechanism and breaker mechanism.

(h) Drawing showing typical cross-section and assembly of interrupting device.

(i) Drawing showing assembly of principal component parts and accessories.

(j) Drawing showing details of bushing or porcelain supporting columns, including dimension details of flanges and outline dimensions.

(k) Drawing to show details at all points where adjustments may be made to operating dimension mechanism, breaker mechanisms and contacts.

(l) Any other drawings and data required for design and installation of circuit breaker.

(m) Instruction manual for storage, installation, operation and maintenance of circuit breaker and operating mechanism.

1.8 Nameplate

Each circuit breaker shall be provided with nameplate of weather resistant material fitted in a visible position showing the following items as a minimum.

(a) Manufacturer's name

(b) Manufacturer's serial number and type designation

(c) Year of manufacture

(d) Rated voltage, KV

(e) Rated insulation level, kV

(f) Rated frequency, Hz

(g) Rated normal current, A

(h) Rated short-circuit breaking current, kA

(i) Rated interrupting time cycles

(j) Weight of circuit breaker, kg

1.9 Special Tools

In addition to the tools, which are regularly furnished with such breakers, the Contractor shall also supply all necessary special tools or equipment for assembling and disassembling the breaker. The Contractor shall submit an itemized list of such equipment.

APPENDIX 1.5.1

TECHNICAL PARTICULARS OF 33 kV CIRCUIT BREAKER

1.	**Type**		**Vaccum, Outdoor Type**
2.	**Quantity Required**		**As per Schedule**
3.	**Voltage rating**		
	(a)	**Nominal system Voltage**	**33 kV**
	(b)	**Rated Maximum Voltage**	**36kV**
3.	**Insulation Level**		
	(a)	**Impulse withstand voltage**	**170kV**
	(b)	**Power frequency withstand voltage(1 min)**	**75kV**
5.	**Frequency**		**50Hz**
6.	**Current rating**		
	(a)	**Rated continuous current at 45 deg. C ambient**	**800A**
	(b)	**Rated interrupting current**	**25 kA**
7.	**Re-closing duty cycle**		**0-0.3 sec-CO-3 min.-CO (Rated operating sequence)**
8.	**Auxiliary supply**		
	(a)	**Control circuit**	**DC 110V**
	(b)	**Space heater and auxiliary equipment**	**AC, 3Ph-4W, 400V, 50Hz**

9.

Total maximum break time	60 ms
First pole to clear factor	1.5
Additional Auxiliary Contacts	8 NO, 8 NC
Maximum make time	120 ms
Spring charging motor	110 V DC

2. CONTROL AND RELAY PANEL

2.1 General

2.1.1 This specification covers Study**,** Design, Manufacture, Assembly Factory Test, Supply, Delivery, Installation works and Field Test and Commissioning of Control and Relay Panels as specified herein under. The panel shall be used for the protection of the following :

Transformer Protection equipment/ relays as required shall have to be supplied and installed accordingly.

2.1.2 It is not the intent to specify completely herein all details of Design and Construction of Equipment supplied. However, the equipment supplied shall conform, in all respects, to high standards of Engineering, Design and Workmanship and be capable of performing in continuous commercial operation up to Contractor's guarantee in a manner acceptable to the Employer who will interpret the meaning of Drawings and Specifications and shall have the power to reject any work or material which in his judgment are not in full accordance therewith.

The Tenderer shall submit his proposed Control Panel Arrangement & Layout. The Tenderer is warned that the available space in the existing control rooms is very limited and the panels shall be of such size to fit in available space.

The cost of any relocation of equipment in the control room and outdoor switchyard necessary to complete the specified works shall be included in his bid price and no additional payment will be made for such work.

2.1.3 The indication and annunciation schemes for existing substations shall be compatible with the existing system as far as possible.

2.1.4 Manufacturers for Protection Equipment

All protection relays like over current, earth fault, differential, definite time over current etc shall be of static type and shall be from following manufacturers or equivalent.

a) ALSTHOM (Areva) b) Fuji

c) CGELEC d) Reyrolle / Easun Reyrolle

e) ABB f) Siemens

g) Toshiba h) Mitsubishi

2.2 Equipment to be furnished

2.2.1 Control and Relay panels shall be more or less of the color matching with the existing one

2.2.2 In addition to the above, the following shall be supplied:

(a) Floor channel seals, vibration damping pads, kick plates, earthing pads and holding down bolts and nuts.

b) Special tools and tackle.

2.3 CONSTRUCTION FEATURES

2.3.1 The Panel Dimensions specified are tentative only and it is the responsibility of Tenderer to ensure that all the equipment required can be properly accommodated in the respective space. The panels shall also be of a size & type which can be easily accommodated within the space of existing Panels & existing control room without the necessity for expansion of the control room. Such oversized panels will not be accepted.

2.3.2 The 33 kV panel shall be of Simplex type or Duplex type as per the layout of the respective Substation.

i. In case, the Panels are Duplex type, it shall comprise two vertical front and rear panel sections connected back-to-back by formed sheet steel roof tie members and a central corridor in between. The corridor shall facilitate access to internal wiring and external cable connections. Both ends of the corridor shall be provided with double leaf doors with lift off hinges.

Doors shall have handles with built-in locking facility. Separate cable entries shall be provided for the front and rear panels. However, interconnection between panels shall be by means of inter panel wiring at the top of the panels.

ii. If the panels are of Simplex type, it shall comprise of two vertical fronts side by side, with door at rear sections with built in locking facility.

2.3.3 Panels shall be completely metal enclosed and shall be dust, moisture and vermin proof. Panel enclosures shall provide a degree of protection not less than IP 54 as per IEC.

2.3.4 Panels shall be free standing, floor mounting type and shall comprise rigid welded structural frames enclosed completely with specially selected smooth finished, cold rolled sheet steel of thickness not less than 3mm for front and rear portions and 2mm for sides, top and bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.

2.3.5 All doors, removable covers and panels shall be gasketed all around with gaskets. Ventilation louvers, if provided, shall have screens and filters. The screens shall be made of either brass or GI wire mesh.

2.3.6 Design, materials selection and workmanship shall be such as to result in neat appearance inside and outside with no welds, rivets or bolt heads apparent from outside, with all exterior surfaces true and smooth.

2.3.7 Panels shall be suitable for floor mounting. Metal sills in the form of galvanized steel channels

properly drilled shall be furnished along with anchor bolts and necessary hardware for mounting to a concrete floor. Any irregularity between the sills and flooring shall be sealed to prevent entry of dust, moisture and vermin. Panels shall have additional rolled channel plinth at the bottom with smooth bearing surface. The panels shall be fixed on the sills with intervening materials. The type of anti-vibration strips which shall be supplied by the Contractor shall be subject to the approval of the Employer.

2.3.8 Cable entries to the panels shall be from the bottom unless otherwise specified. The bottom plates of the panels shall be fitted with removable plates of adequate size for holding the cables using cable connectors to seal from dust and moisture. All cable connectors required shall be provided by the Contractor and shall be screwed type and shall be suitable for PVC armored cables.

Control and relay panel enclosure protection class shall be of IP 54. When in closed position there shall not be any chances of entering lizards, mousse etc inside the panel

2.4 Component Mounting

2.4.1 All equipment on front of panel shall be mounted flush or semi-flush. In case of semi-flush mounting, only flange or bezel shall be visible from the front.

2.4.2 Equipment shall be mounted such that removal and replacement can be accomplished individually without interruption of service to adjacent equipment. Equipment mounted inside the panel shall be so located that terminals and adjacent devices are readily accessible without the use of special tools. Terminal markings shall be clearly visible.

2.4.3 Cut-outs and wiring for free issue items, if any, shall be according to corresponding equipment manufacturer's drawings. Cut-outs, if any, provided for future mounting of equipment shall include cover plates.

2.4.4 The centerline of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The centerline of relays with targets and/or requiring adjustment, motors, test switches, and recorders shall be not less than 450mm from the bottom of the panel. No components shall extend below 200mm.

It will be preferable if existing panel layout is used to give uniform appearances.

2.4.5 The centerline of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Likewise, the top lines of all meters, relays and recorders, etc. shall be matched.

2.4.6 No equipment shall be mounted on the doors without prior approval of the Employer.

2.4.7 In the existing substation, panels shall be as far as possible matched with the existing panels in the control room in respect of Dimensions, Color, Appearance, Size and Arrangement of equipment on the front.

2.4.8 The standard phase arrangement when facing the front of the switch-board shall be R-S-T from left

to right, from top to bottom, and front to back. All relays, instruments, other devices, buses and equipment involving three phase circuit shall be arranged and connected in accordance with the standard phase arrangement.

2.5 Mimic Diagrams

2.5.1 Mimic diagrams shall be provided on panels as required. Mimic diagrams shall be screwed on to panels and shall be made of anodized aluminum or plastic of approved fast color material which can be easily cleaned. The width of the mimic bus shall be subject to approval of the Employer.

2.5.2 The colors for the various voltages in the mimic diagram shall be as per the existing colors.

2.5.3 When semaphore indicators are used for disconnecting switch positions, they shall be so mounted in the mimic that the disconnecting switch's 'close' position shall complete the continuity of the mimic. Similarly, when control switches of stay-put type are mounted in the mimic, the 'close' position of the switch shall complete the mimic.

2.6 Annunciators

2.6.1 Annunciators of the visual and audible type shall be provided on the panels when called for in the equipment lists, if enclosed. Annunciators shall be suitable for operation for the voltages specified.

2.6.2 Annunciators shall be of facia type with 35mm x 50mm (minimum) translucent plastic window for each alarm point. Annunciator facia plates shall be engraved in block letter with respective alarm inscriptions, which will be furnished to Contractor by Employer. Alarm inscriptions shall be engraved on each window in not more than three lines and size of the lettering shall be not less than 3mm. The inscriptions shall be visible only when the respective light is lighted. If any other type of Annunciators are to be used, prior approval from the Owner should be taken before manufacturing..

2.6.3 The annunciators shall be suitable for operation with normally open fault contacts which close on a fault. When specified in bill of materials, some of the annunciator points shall be suitable for operation with normally closed faults contacts which open on a fault. It shall be possible at site to change annunciators from "open to fault" to "close to fault" and vice versa. Annunciators shall be suitable for accepting fleeting faults of duration not less than 15 milliseconds.

2.6.4 Annunciators shall be compact self- contained units with associated relays mounted behind the facia units. In case the associated relays cannot be housed behind the annunciator facia units, these shall be mounted and wired in a separate panel which shall be included in the offer. However, the latter arrangement is not preferred due to additional space requirement and wiring interconnections. Alarm relays and facia units shall be interchangeable.

2.6.5 Annunciator facia units shall be suitable for flush/semi-flush mounting on panels. Replacement of individual facia inscription plates and lamps / LED / LCD shall be possible from front of the panels.

2.6.6 One alarm buzzer common to annunciators on all the panels shall be provided. Similarly, "Sound Cancel", "Acknowledge", "Reset" and "Lamp Test" push buttons common to annunciators

on all the panels shall be provided. These common devices shall be located in a particular panel as determined by the Employer.

2.6.7 In case of static annunciator schemes, special precaution shall be taken by the Contractor to ensure that spurious alarm conditions do not appear due to false influence of external magnetic fields on the annunciator wiring and switching disturbances from the neighboring circuits.

2.6.8 Each annunciation window shall be provided with two lamps to provide safety against lamp failure. Lamps shall operate in parallel such that failure of one will not affect operation of the other.

2.6.9 Sequence of Operation of the Annunciator shall be as follows:

Alarm Condition	Fault Contact	Audible Alarm	Visual Alarm

Normal	Open	Off	Off
Abnormal	Close	On	Flashing
Sound cancel	Close or Open	Off	Flashing
Acknowledge	Close or Open	Off	Steady On
Back to Normal	Open	Off	Steady On
Reset	Open	Off	Off
Lamp Test	Open	Off	Steady On

In case 'RESET' push-button is pressed before abnormality is cleared, the lamps shall continue to glow steady and shall go out only when 'Normal' condition is restored.

2.6.10 Any new annunciation appearing after the operation of "Sound Cancel" for previous annunciation, shall provide a fresh "Audible Alarm" with accompanied "Visual Alarm" even if the process of "Acknowledging" or "Resetting" of previous alarm is going on or yet to be carried out.

2.6.11 Provision of testing facilities for flasher and audible alarm circuits of annunciators shall be provided.

2.7 Specific Protection Requirements

2.7.1 Relay Protection

8.7.1.1 Overcurrent and Earthfault Protection

i. Non-Directional Phase Overcurrent Protection shall:

be single pole & have an inverse characteristic with a definite minimum time of 3sec.at

10times setting.

have a variable setting range of 20-200% of rated Current

ii. Non-Directional Earth Fault Protection shall :

be single pole type.

have an inverse characteristic with a definite minimum time of 3sec. at 10 times setting.

have an adjustable setting of 10-80% of rated current.

2.7.1.2 Directional Overcurrent Protection (not applicable)

i. Phase over current relay shall :

be single pole X 3 type

have an inverse characteristic with a definite minimum time of 3secs. at 10 times setting.

have a variable setting range of 50-200% of rated current. have

a characteristic angle of 45 degree.

have a directional controlled low transient over-reach high set instantaneous unit of continuously variable setting range 200-1200% times of rated current.

be of voltage polarized directional controlled type.

ii. Directional Earthfault overcurrent protection (not applicable) Earth

fault overcurrent relay shall :

Single pole type.

be of zero-sequence voltage polarized directional controlled.

have an inverse characteristic with a definite minimum time of 3 secs. at 10 times setting.

have an adjustable setting range of 10-80% of rated current.

have a directional controlled low transient over reach high set with a continuously variable setting range of 5-20 times of rated current.

have a characteristics angle of 45 degree.

2.7.1.3 Local Breaker Back Up Protection

Relay shall :

- be triple pole type.
- have an operating time of less than 15 milliseconds.
- have 2 over current and 1 Earth fault elements.
- have a re-setting time of less than 15 milliseconds.
- have a setting range of 30-320% of rated current.
- have a separate time delay relay with a continuously adjustable setting range of 0.1-1 second.
- have necessary auxiliary relays to make a comprehensive scheme.
- have a continuous thermal withstand two times rated current irrespective of setting.
- provide both retrip and back-up trip output contacts.

2.7.2 Manufacturer of Protection Relay shall be as specified

2.7.3 Other Requirements

i. Layout of panel in the control room, individual panel layout incorporating the hardware and control wiring diagrams and schematics shall be prepared by the Contractor and be sent to the Employer for approval.

ii. All auxiliary relays, if and when required for the completeness of the various protection schemes covered in this order, shall be deemed to be included in the scope of supply whether or not such items are specifically mentioned in the enclosed bill of material.

ii. Omission of hardware specifically mentioned in Price schedule material such as auxiliary relays/protective relays, etc. if found necessary during detailed engineering shall be shipped to the

Employer with spare parts, without any extra cost to the Employer.

iv. All terminal blocks for CT and PT circuits shall be of disconnecting line type. Suitable plastic covers for all terminal blocks shall be provided in order to prevent dust accumulation.

v. Panels shall be mounted to concrete foundation on galvanized steel channels with an intervening layer of anti-vibration strips made of shock absorbing materials which shall be supplied by the Contractor.

Vi. Cable entries for all the panels shall be from bottom. The bottom plates of the panels shall be fitted with removable plates of adequate size for holding cables and sealing from dust and moisture.

vii. A ground bus of bare copper strip of minimum size 25 x 6mm along the length of each panel shall be provided and shall be connected to the ground mat of the station.

2.8 ENERGY METERS

2.9 SPECIFICATION FOR SOLID STATE ENERGY METERS

1. Scope

This specification covers the design, engineering, manufacture, assembly, testing and delivery at site of CT and VT operated A.C. static watt hour meter. The meters shall be 3- Phase 4 wire 0.5 accuracy class for measurement of active, reactive (lead & lag) and apparent power and energy as per power tariff requirement of A.C. balanced and unbalanced load at nominal frequency in the range of 47.5Hz to 52.5Hz using Digital Technology. Meter shall be manufactured using latest and 'state of art' technology and methods prevalent in electronic industry.

It is not the intent to specify completely herein all the details of the hardware, software, communication and design of the system. The material shall, however, conform in all respects to the best standards of engineering, design and workmanship and shall be capable of performing for continuous commercial operation.

Energy meters shall be numeric type and shall be offered from reputed makes like Landis

& Gyr, ABB or EDMI or equivalent.

2.0 Service Conditions

The meters to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions:

Environmental Condition

	a) Maximum ambient temperature	-5 to 55^{0}C
b)	Maximum ambient temperature in shade	45 ^{0}C
c)	Minimum temperature of air in shade	35 ^{0}C
d)	Maximum daily average temperature	40 ^{0}C
e)	Maximum yearly weighted average temperature Relative	32 ^{0}C
f)	Humidity (%) Maximum	
g)	Annual rainfall (mm) 1450	10 to 95

h)	Maximum wind pressure (Kg/m.sq)	150
i)	Maximum altitude above mean sea level (meters)	Upto 2000
j)	Isoceraunic level (days/year)	50
k)	Seismic level (Horizontal acceleration)	0.3g

l) Climate: - Moderately hot and humid tropical climate conducive to rust and fungus growth.

The meters should be designed for tropical condition and shall be constructed to be capable of withstanding all severe stresses and vibrations and dust environments likely to encounter in actual practice.

3.0 Applicable Standards, Accuracy and Certification

The meters shall conform (for testing, performance and accuracy) in all respects the relevant /International standards with latest amendments thereof.

S.No	*Standard No.*	*Title*

1.	***IEC62053-22 Ed. 1.0 B – 2003 with latest amendment.***	***A.C. Static Watt-hour Meters For Active Energy, Class 0.5s / 0.2 s***

There should be no drift of accuracy, which means that the initial accuracy is sustained over the entire life of the meter and there should be no need for adjustment of the accuracy after installation.

The manufacturer of the offered meter must have been accredited with ISO 9001 (including design) quality certification.

4.0 Rating & Type of Service

The energy meters shall be outdoor type connected with the secondary side of out door current and voltage transformers.

S.No	*Item*	*Specification*
i)	***Type of Installation***	***Indoor in panelboard.***
ii)	***CT Secondary***	***/ 5 A***

ii)	***PT Secondary***	For 3 Phase 3 Wire and 4 Wire (HT Metering): ***110 V/√ 3 Volts (Phase to Neutral)*** ***110 V Volts (Phase to Phase)*** For 3 Phase 4 Wire (LT Metering): ***400 V/√ 3 Volts (Phase to Neutral)*** ***400 V Volts (Phase to Phase)*** The voltage range shall be +15% to – 40% of ***rated voltage (Secondary side of Potential Transformer).***
iv)	***Power Factor range***	***Zero Lag-Unity-Zero Lead. For leading Power factor the value of KVAh should be equal to KWh, for the purpose of calculation of average power factor (on the basis of KWh / KVAh). i.e. The value of KVAh shall be based on lagging value of KVARh & KWh.***
v)	***Power consumption***	***As per IEC62053-22–2003 with latest amendment.***
vi)	***Freauency range***	***50Hz ±5%***
vii)	***Earthing System***	***Solidly Grounded***

The maximum continuous current of the meter for guaranteed accuracy is 2 times (200 %) of Ib. The starting current for the meter should be 0.1% of Ib. The meter shall not register with no-load. It should also meet the requirements of withstanding short time over current for 1.0 second up to 20 times $I_{b.}$ The meter shall be suitable for balanced as well as unbalanced loads at all power factors. Unbalance in load should not affect the accuracy of meter.

5.0 General and Constructional Requirements

5.1 The meter should be housed in a safe high grade Thermo engineering plastic/ polycarbonate casing and is dust/moisture proof conforming to IP: 52. The meter cover should be made up of moulded flame retardant polycarbonate, which is tough, resilient and can be fixed up with the help of screws. Provision should be made for sealing the cover also.

5.2 The meter shall have Poly –carbonate opaque base and cover of Poly-carbonate material. The thickness of material for meter cover and base shall be 2 mm (minimum).

5.3 (a) The terminal block should be made out of moulded bakelite/ polycarbonate and should house solid brass terminals with 2 fixing screws per terminal. The terminals should be liberally designed to permit high overload withstand capability. The engineering plastic used for terminal block and cover shall withstand the heat deflection test as per ISO: 75 and Glow wire test as per IEC:62053-22.

The terminal block should have cover which should be separately sealable at two places and housed at the bottom of the meter and once sealed should prevent unauthorized tampering.

(b) The terminals in the terminal block shall be of adequate length in order to have proper grip of conductor with the help of two screws.

(c) Dust proof window of any transparent material (Toughened glass or poly carbonate), which shall not fade in prolonged use, shall be provided to permit clear view of the register. The fixing arrangement shall be such that the window glass cannot be removed without breaking the seals.

(d) The extended terminal cover shall be transparent.

(e) Meter shall be designed in such a fashion that it should be installed in a separate box (surface type) which may be fixed on the electric pole in outdoor condition.

(f) All the insulating materials used in the construction of the meter shall be of non-hygroscopic, non-ageing and of tested quality.

(g) The entire design and construction shall be capable of withstanding the severest stress likely to occur in actual service. The soldering shall be perfect without dry solders.

(h) All parts that are likely to develop corrosion under normal working condition shallbe effectively protected against corrosion by suitable method to achieve durable results.

(i) The meters shall be designed with application of specific integrated circuits.

The electronic components shall be mounted on the printed circuit board using latest Surface Mount Technology (SMT).

(j) The meter shall have a suitable test output device for testing meter.

Preferably the blinking LED or other similar device like blinking LCD shall be provided. The test output device should have constant pulse rate i.e. Pulse/kWh and pulse/kVARhand its value (meter constant) should be indelibly printed on the name plate.

(k) The Push button shall be provided for high resolution reading of display, as brought out elsewhere in this specification.

(l) The meter accuracy shall not be affected by AC/DC magnetic field upto 0.2

Tesla on all the sides of meter i.e. front, sides, top and bottom of the meter. Moreover meter accuracy shall not be affected if permanent magnet of 0.5

Tesla is applied for 15 minutes.

(m) The meter shall also be capable to withstand and shall not get damaged if phase to phase voltage is applied between phases & neutral for five minutes.

(n) Non specified display parameter in the meter should be blocked and it should not be accessible for reprogramming at site.

(o) Complete metering system should not be affected by the external electromagnetic interference such as electrical discharge of cables and Capacitors, harmonics, electrostatic discharges, external magnetic fields and DC current in AC supply etc. The meter shall withstand any type of High Voltage and High Frequency surges which are similar to the surges produced by induction coil type instruments without affecting the accuracy of the meter.The manufacturers should have type test certificates for the same.

(p) The meter should have facility for data retrieval through optical port using CMRI and Laptop PC and RS232 communication port for remote meter reading facility.

(q) The meter PCB should be wire less to avoid improper and loose connections/ contacts.

5.4 Sealing

Proper sealing arrangement shall be provided on the meter to make it tamper proof and to

avoid mishandling by un-authorized person. At least two (2) seals on the body, two (2) seals on the terminals block and one seal each on maximum demand resetting device and communication ports shall be provided. Meter base and cover shall be tightened from rear side with at least two nos. so that meter body could not be opened at site in any case and two nos. firms stickers seals bearing serial no., which should not be repeated shall be provided between meter base and cover.

The meter shall be totally sealed and tamper-proof with no possibility of any adjustment at site.

6.0 Connection Diagram & Terminal Marking

The connection diagram of the metering module shall be clearly shown inside portion of the terminal cover and shall be of permanent nature. The meter terminals shall also be marked and this marking should appear in the above diagram. In case any special precautions need to be taken at the time of testing the meter the same may be indicated alongwith the circuit diagram.

7.0 Marking of Meter:

The marking on every meter shall be in accordance with IEC 62053. The basic marking on the meter name plate shall be as follows:-

i. Manufacturer's name and trade mark.

ii. Type designation

iii. Number of phases and wires

iv. Serial number

v. Month & year of manufacture

vi. Reference voltage/ PT ratio

vii. Frequency

viii. Rated secondary current of CT (-/1 or -/5 A).

ix. Principal unit(s) of measurement.

x. Meter constant (impulse/kWh).

xi. Class index of meter.

xii. Text "SUPPLIED BY NEPAL ELECTRICITY AUTHORITY"

xiii. P.O. No. & Date.

xiv. Guarantee period

8.0 Real Time Clock

The real time quartz clock shall only be used in the meter for maintaining time (NS) and calendar. The time accuracy shall be as per provision of relevant IEC Standard. Facility for adjustment of real time should be provided through CMRI and Laptop with proper security.

9.0 M.D. Registration and Demand Resetting

9.1. The meter shall continuously monitor & calculate the average demand in kVA during the Integration period and maximum out of these shall be stored alongwith date & Time in the meter's memory. The integration period shall be programmable for 15/30/60 minutes on real time basis on block / sliding window principle that should also be programmable.

9.2 The meter shall also display M.D. reset count. The M.D. resetting should be possible in following way:-

a. Automatic reset on a predetermined date & time of the month.

10. T.O.D. Compatibility

There shall be provision for at least 8 (Eight) different TOD register at least in 6 channels for maximum demand kVA, kWh, kVARh and power factor. Similarly, there shall be provision for at least 4 (Four) TOD time zones for energy and demand. The number and timings of these TOD time Zones shall be programmable from base computer as per the requirements of Employer.

11. Self Diagnostic Features.

11.1 The meter shall be capable of performing complete self diagnostic check at regular interval to monitor the circuits for any malfunctioning to ensure integrity of data memory location all the time. The meter shall also keep log in its memory for unsatisfactory functioning or nonfunctioning of Real Time Clock battery, also it shall be recorded and indicated in reading file at base computer software.

11.2 All display segments: "LCD Test" display shall be provided for this purpose.

12. Display of Measured Values

12.1 Permanently backlit LCD panel shall show the relevant information about the parameters to be displayed. The corresponding non-volatile memory shall have a minimum retention time of 12 years. In the case of multiple values presented by a single display it shall be possible to display the content of all relevant memories. When displaying the memory, the identification of each parameter applied shall be possible. The principal unit for the measured values shall be the kilowatthour (kWh) for active energy, kVARh for reactive energy and kVAh for apparent energy.

12.2 The display shall be minimum full 8 or more digit type display of liquid crystal display (LCD). The display shall be digital type with non-destructive read out. The meter should have non-volatile memory (NVM) so that the registered parameters will not be affected by loss of power. An additional LCD display should show the legend of the quantity.The size of digit should be minimum 9X5 mm. The adequate back up arrangement for storing of energy registered at the time of power interruption shall be provided.The meter should have alternate display modes for showing required information. Default mode should be auto scroll type. The number of parameters and the scrolling period shall be field programmable. In alternate mode, required parameters should be displayed and should be possible to view the parameters using push button.

12.3There shall be arrangement for displaying of consumer ID, consumer no, name and address for which record number field should be at least of 8 digits.

12.4 The meter shall be capable of recording and displaying automatically the following:

Display Parameters (Auto Display)

Following parameters shall be diplayed continuously in cyclic order on the meter face to enable NEA to know the parameter at any instant. The time for display shall be programmable and shall not drift throughout the life cycle of meter.

1. Active and Reactive Power,kW & kVAR (forward and reverse)
2. Cumulative Active Energy, kWH (forward and reverse)
3. Cumulative Reactive Energy, kVARH (forward and reverse)
4. Cumulative Apparent Energy, kVAH (forward and reverse)
5. TODActive Energy, kWH (forward and reverse)
6. TOD Reactive Energy, kVARH (forward and reverse)

7. TOD Apparent Energy (kVAH) (forward and reverse)
8. Maximum Demand kVA since Reset (forward and reverse with occurrence, Date & Time)
9. M.D. Reset Count
10. Last month MD (between reset)
11. Date of last month MD reset
12. Cumulative MD
13. Instantaneous Power Factor
14. Line Frequency
15. Instantaneous phase currents
16. Phase voltage (Instantaneous)
17. Real time & date
18. Self diagnostic (LCD) segment check and Battery check
19. CT & PT Ratio

Display Parameters (Push Button)

After using pushbutton the following parameters should be displayed.

1. Active and Reactive Power,kW & kVAR (forward and reverse)
2. Cumulative Active Energy, kWH (forward and reverse)
3. Cumulative Reactive Energy, kVARH (forward and reverse)
4. Cumulative Apparent Energy, kVAH (forward and reverse)
5. TODActive Energy, kWH (forward and reverse)
6. TOD Reactive Energy, kVARH (forward and reverse)
7. TOD Apparent Energy (kVAH) (forward and reverse)

8. Maximum Demand kVA since Reset (forward and reverse with occurrence, Date & Time)
9. M.D. Reset Count
10. Last month MD (between reset)
11. Date of last month MD reset
12. Cumulative MD
13. Instantaneous Power Factor
14. Line Frequency
15. Instantaneous phase currents
16. Phase voltage (Instantaneous)
17. Real time & date
18. Self diagnostic (LCD) segment check and Battery check
19. CT & PT Ratio

NOTE : The meter display should return to Default Display mode (mentioned above) if the ' Push button ' is not operated for more than 15 seconds.

12.5 The meter should measure & record total energy consisting of energy due to harmonics.

12.6 Maximum Demand Integration Period: - Integration period for kVA MD should be of 30 minutes real time based. However, it shall be programmable to 15 minutes if required.

13. Memory

The data stored in the registers should not be lost in the event of power failure and the meter should have non-volatile memory, which does not even need battery back-up. Each meter shall have a non-volatile memory and the data stored on the NVM should be retained upto twelve years without power.

Following monthly data should be stored for 12 months in the non-erasable memory along with the name of the month and shall be accessible for reading through Lap Top.

i. Active energy import, kWh

ii. Active energy export, kWh

iii. Maximum Demand, kVA

iv. Average power factor or kVARh

v. Average frequency for each successive 15-minute block

vi. Reactive Energy Import (while Active Import/Export)

14. Billing History and Load Survey

The meter shall have sufficient non-volatile memory for recording history of following billing parameters and load survey.

14.1 Monthly records for billing

Following monthly data should be stored for at least 18 months (FIFO) with date & time of Reset in the non-erasable memory along with the name of the month and shall be accessible for reading through Lap Top.

a. Cumulative Active energy, kWh Forward Direction

b. TOD Active energy, kWh Forward Direction

c. Cumulative Active energy, kWh Reverse Direction d. TOD Active energy, kWh Reverse Direction

e. Maximum Demand, kVA

f. Consumer Number

g. CT & PT Ratio

h. Meter Serial Number

14.2 Load survey parameters :-

Storage in non–volatile memory for more than 120 days with 30 minutes time integration period of the following parameters – kWH / kW, kVAH / kVA, Phase wise currents, Phase

Voltages, Average Current, Average Voltage, Power Factor– shall be provided on non time based basis. Whenever meter is taken out and brought to laboratory the L/S data shall be retained for the period of actual use of meter. This load survey data can be retrieved as and when desired and load profiles shall be viewed graphically / analytically with the help of meter application software. The meter application software shall be capable of exporting / transmitting these data for analysis to other user software in spreadsheet format. The time required for downloading this data should be as minimum as possible.

15. Tamper and Fraud Detection/Evidence

The meter shall detect and correctly register energy only in forward direction under following tamper conditions:

15.1 The meter accuracy shall not be affected by change of phase sequence. It should maintain the desired accuracy in case of reversal of phase sequence.

15.2 The meter should continue to work even without neutral.

15.3 The meter should work in absence of any two phases i.e. it should work on any one phase wire and neutral, to record relevant energy. It should also work with two phases in case of missing neutral.

15.4 The meter should keep registering correct energy when all the CT polarities are reversed.

15.5 The meter shall not get damaged or rendered non-functional even if any phase and neutral are interchanged.

15.5 Tamper Events

The meter should have features to detect the occurrence and restoration of the following abnormal events.

Missing potential and potential imbalance

The meter shall be capable of detecting and recording occurrence and restoration with date and time the cases of potential failure and low potential, which could happen due to disconnection of potential leads (one or two). The log report should contain the date, time, TOD energy, Consumer Number and the Meter Serial Number. The threshold time for the recording of such events should be programmable and at least 200 sec.

Current unbalance

The meter shall be capable of detecting and recording occurrence and restoration with date and

time of current unbalance (30% or more for 15 minutes). Higher of the 3 phase currents shall be considered as reference for this purpose.

Current Reversal

The meter shall be capable of detecting and recording occurrence and restoration with date and time of reversal of current with phase identification.

Power ON / OFF

The meter shall be capable to record power ON/OFF events in the meter memory. All potential failure should record as power off event.

Current circuit short

The meter shall be capable of detecting and recording occurrences and restoration of shorting of any one or two phases of current.

The meter shall keep records for should keep record of at least **500** such tamper events all the events (Occurrence +Restoration). For above abnormal conditions the recording of events shall be on FIFO basis. It shall be possible to retrieve the abnormal event data along with all related snap shots data through the meter optical port with the help of CMRI & downloaded the same to the base computer. All the information shall be made available in simple & easy to understand format.

16. Data Communication Capability

16.1 Each meter shall have an optical port on its front for tapping all data stored in its memory. Portable or hand held data collection devices/ Lap Top PC shall be used for this purpose. The overall intention is to tap the data stored in the meter's memories once in a month, and transmit the same to a central computer. It shall also be possible to obtain a print out (hard copy) of all data collected from the meters, using the local PC. The data transfer should be reliable and fraud proof.

16.2 Additionally, the metering system shall have a serial RS232 port for transferring the meter data to a remote location via a suitable communication infrastructure.

16.3 The metering system shall be compatible with suitable Base Computer software.

16.4 All meters of the same model shall be totally identical in all respects except for their unique identification codes. They shall also be totally sealed and tamper proof, with no possibility of any adjustment at site, except for clock correction.

16.5 There shall be magnetic device at optical port to hold up one end of communication cable

(used to down load the data to Lap Top).The bidder shall supply a minimum of 40 numbers of optical probe for connection with the Lap Top computers. The price of the optical probe shall be included in the price of the meter itself.

17. Software:

The purchaser shall have the right to use the software as required for the operation of the meter. The supplier shall not charge extra costs for the use of the software. Further, the software should be able to display the three-phase voltages and current waveforms measured by the meter. It should able to display the phasor diagram.

The following software shall be supplied by the meter manufacturer without any extra cost.

17.1 Software for reading and programming the meter contents through CMRI/Laptop Computer.

17.2 Base Computer software for accepting data from CMRI and downloading instructions from Base Computer to MRI.

17.3 Base Computer should have facility to program the display and/or other required parameters in the meter.

17.4 The meters should be capable to communicate directly to Lap Top Computer.

17.5 The base computer software shall be executable on MS Windows 98/2000/XP/Vista system.

17.6 For efficient and speedy recovery of data downloaded through CMRI/Laptop PC on base computer, licensed copies of base computer software shall have to be supplied. This software will be used at numbers of places up to Branch level. As many copies of base computer software as required up to Branch level shall be provided free of cost. If there is common software for downloading of data to be given out to branch offices and the operation of software is restricted through security code, a code generating software shall be provided by the manufacturer. The code so generated will be distributed from central level to the branch offices as per requirements.

17.7 The base computer software shall be Window based & user friendly. The data transfer shall be highly reliable and fraud proof (No editing shall be possible on base computer by any means.

17.8 The protocol used in the meter shall have to be provided at the time of supply for the purpose of Automatic Meter Reading System. The Suppliers shall also have to submit the protocol for meters supplied in the past and ensure that protocol corresponds to the type of meter supplied. The protocol shall be shared by NEA.

17.9 Security Features

1. Communication session count should be available though display and with Laptop.

2. The meter should log the date and time of at least last five program changes in a billing period.

3. The meter should have programmable facility to restrict the access to the information recorded at different security level such as communication read, communication write etc.

17.10 The Supplier or Manufacturer shall provide a software for generating a report in concise and desired format so that these can be used for billing, meter data management, outage management etc.

18. Additional Features

18.1 External Power Supply

Meter shall be provided with super capacitor and battery. The rated shelf life of battery shall be of 15 years. Super capacitor will provide carry over power for all normal power outages at least for 36 hr. duration. Battery will work when super capacitor is discharged or when programmed meter is stored for extended period without electric supply. No auxiliary supply should be required for the meter.

18.2 Meter Calibration

The meter should have a blinking LED, which blinks and is analogous to the rotation of the disk in an electro-mechanical meter for calibration of kWh. The watt-hour per pulse constant is definable by the manufacturer.

18.3 Recovery of Data

The meter shall have provision to communicate with the CMRI/PC even in event of failure of display. In event of failure of component affecting more than just LCD function, manufacturer shall extract the stored data at no cost to the purchaser during the warranty period. All the cost (including transportation to and fro) involved in the process shall be borne by the supplier. Similarly, the memory of the meter shall be suitably protected and secured against unexpected fault conditions.

18.4 Connection Check

The meter should have capability to check the correctness of connections at site.

18.4 Missing Voltage Indication

There shall be visual display of the missing voltage on the face of the meter.

19. Guarantee

The Meter shall be guaranteed for the period of five years from the date of commissioning of meter. Meters found defective/ functioning abnormally within the above guarantee period shall be replaced / repaired by the supplier free of cost within one month of receipt of intimation. If the defective meters are not replaced/repaired within the specified period above, the NEA shall recover an equivalent amount plus 15% supervision charges from any of the bills of the supplier.

20. Tests

20.1 **Type Tests:-**The Meter shall be fully type tested as per the relevant standards within 5 years from the date of opening of Tender. The type test reports of the

offered meters shall be submitted along with the offer. All the Type Test shall be carried out from an internationally recognised independent meter test laboratory, such as PTB, Germany; PTP, Austria; KEMA, Holland; NMI, Holland; CESI, Italy; Falcon, UK etc, Ofgem (formerly known as Offer) and test lab recognised and approved by ANSI (American National Standards Institute) or testing laboratories and authorities duly accredited by the Internationally recognised accreditation body like International laboratory Accreditation Co-operation (ILAC) to prove that the Meters meets the requirements of the specification. In case of test lab recognised and approved by ANSI/ILAC, the certificate of approval/ recognition shall be submitted with the Bid. Type Test Reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable. The purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative at purchaser's cost. For this purpose, the tenderer shall quote unit rates for carrying out each type test. However, such unit rates will not be considered for evaluation of the offer. In case the meters is type tested earlier to 5 years from the date of opening of tender, the supplier/manufacturer have to carry our the fresh type tests at their cost before signing the contract.

20.2 **Acceptance Tests**:-All acceptance tests as per relevant IEC standard shall be carried out on the meter.

20.3 **Routine Test:-** All routine tests as per relevant IEC standard shall be carried out on all the meters.

21. Pre-Dispatch Inspection

All Acceptance tests and inspection shall be carried out at the place of manufacturer unless otherwise specially agreed upon by the manufacturer and purchaser at the time of purchases. The manufacturer shall offer to the inspector representing the purchaser all the reasonable facilities, free of charge, for inspection and testing, to satisfy him that the material is being supplied in accordance with this specification. The Company's representative/Engineer

attending the above testing will carry out testing as per relevant & this specification and issue test certificate approval to the manufacturer and give clearance for despatch.

22. Joint Inspection after Receipt At Stores (Random Sample Testing)

From each lot (lot means the total number of meters received in a Store out of inspected and approved lot by purchaser's representative under one approval letter) of meters received at Stores, 5 sample meters shall be drawn and these meters will be tested by Our Testing Engineer in presence of Supplier/Manufacturer's representative jointly for (i) noload condition,(ii) limits of error test (iii) starting & (iv) repeatability of error test and (v) tamper conditions as per this specification. The 15 days advance intimation will be given to the supplier and if the supplier/manufacturer fails to attend the joint inspection on the date informed, the testing will be carried out by our Testing Engineer in absence of Supplier/Manufacturer representative .If the meters failed in above random sample testing, the lot will be rejected.

23. Packing

The meters shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each meter may be suitably packed in the first instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case of adequate strength with extra cushioning, if considered necessary. The cases may then be properly sealed against accidental opening in transit. The packing cases may be marked to indicate the fragile nature of the contents.

24. Guaranteed Technical Particulars

The technical particulars as specified in IEC shall be guaranteed and statement of guaranteed technical particulars shall be furnished along with tender.

25. Drawings Leaflets

Two sets of drawing showing clearly the general arrangements, fitting details, electrical connections and design features of each component part should accompany the tender. Technical leaflets or brochures giving operating instructions should also be furnished along with the tender. ***TENDERS*** without ***DETAILS ARE LIABLE FOR REJECTION***.

26. User's Manual

The supplier shall furnish the operation & maintenance manual of the Meter offered and the required software for the smooth functioning of the meter.

27. Departure from Specification

If the supplier wishes to depart from this specification in any respect, he should draw the attention to such points of departure explaining fully the reasons thereof. Unless this is done, the requirements of this specification shall be deemed to have been accepted in every respect.

28. Bid Documentation

31.1 The Bidder shall provide the following with the Bid:

a) One (1) clear copy of the governing standard referenced, and

b) Certified type test results for all characteristics of the meter as per IEC62053-22.

SCHEDULE OF GUARANTEED TECHNICAL PARTICULAR

(TECHNICAL DATA SHEET)

(To be filled in by the Bidder/ Manufacturer)

The Bidders/manufacturers are required to furnish the following information in the Data Sheet. Separate sheets can be used if additional space is required. The information furnished shall be supported by the catalogue and test reports. The information not supported by the catalogues, test reports etc. shall be deemed to have been "Not Provided". The bidders/manufacturers are also required to underline the information asked for in the catalogue and /or test reports. Any deviation from NEA's requirements shall be clearly mentioned giving the reasons thereof.

S.No	Description	Unit	NEA's	Bidders
1	Name of Manufacturer and Country of Origin			
2	Type and Catalogue number/Model number			
3	Accuracy Class		0.5 or better	
4	Applicable Standard		IEC62053-22	

5	Service Condition		As per clause 2.0 of Specification	
6	Rating & Type of Service	-	As per clause 4.0 of Specification	
7	General and Constructional Requirements	-	As per clause 5.0 of Specification	
8	Connection Diagram & Terminal Marking	-	As per clause 6.0 of Specification	
9	Marking of Meter	-	As per clause 7.0 of Specification	
10	Real Time Clock	-	As per clause 8.0 of Specification	
			Specification	
11	M.D. Registration and Demand Resetting	-	As per clause 9.0 of Specification	
12	T.O.D. Compatibility	-	As per clause 10.0 of Specification	
13	Self Diagnostic Features	-	As per clause 11.0 of Specification	

S.No	**Description**	**Unit**	**NEA's Requirements**	**Bidders Offer**
14	Display of Measured Values	-	As per clause 12.0 of Specification	
15	Type of Display	-	LCD	
16	Retention Time of Non-Volatile Memory	Years	Min. 12	
17	Digit of Display of LCD	No.	At least 8 in full	

18	Arrangement for Display of consumer ID, Consumer ame and Address	Yes/No	Yes	
19	Display of Parameter			
	i) Auto Display of Parameter as in 12.4	Yes/No	Yes	
	ii) Display of Parameter as in 12.4 using Push Button	Yes/No	Yes	
	iii)The Time for Display Programmable	Yes/No	Yes	
	iv) Drift in Time for Display throughout the Life Cycle of Meter.	Yes/No	No	
20	Maximum Demand Integration Period	-	As per clause 12.6 of Specification	
21	Memory	-	As per clause 13.0 of Specification	
22	Following monthly data stored for 12 months in the non-erasable memory along with the name of the month accessible for reading through Lap Top			
	i) Active energy import, kWh	Yes/No	Yes	
	ii) Active energy export, kWh	Yes/No	Yes	
	iii) Maximum Demand, kVA	Yes/No	Yes	
	iv) Average power factor or kVARh	Yes/No	Yes	
	v) Average frequency for each successive 15-minute block	Yes/No	Yes	
	vi) Reactive Energy Import (while Active Import/Export)	Yes/No	Yes	

S.No	Description	Unit	NEA's Requirements	Bidders Offer
23	Billing History and Load Survey			
	i) Monthly Records for Billing	-	As per clause 14.1 of Specification	
	ii) Load survey parameters	-	As per clause 14.2 of Specification	
24	Tamper and Fraud Detection/Evidence	-	As per clause 15.0 of Specification	
25	Number of Tamper Events	Nos.	Min. 500	
26	Data Communication Capability	-	As per clause 16.0 of	
27	40 Numbers of Optical Probe for Connection With the Lap Top Computers Provided	Yes/No	Yes	
28	All the Software Specified in Clause 17.0 of Specification are Provided at no Cost to Purchaser	Yes/No	Yes	
29	Whether the Meters is Capable to Communicate Directly to Lap Top Computer/CMRI	Yes/No	Yes	
30	Whether the Base Computer Software is Executable on MS Windows	Yes/No	Yes	
31	The Code Generating Software for Downloading of Data from Meter provided?	Yes/No	Yes	
32	Whether the Base Computer Software is Window Based & User Friendly?	Yes/No	Yes	
33	The Protocol Used in the Meter for the Purpose of Automatic Meter Reading System Provided?	Yes/No	Yes	

34	Security Features as Specified in 17.9	Yes/No	Yes	
35	Software for Generating a Report in Concise and Desired Format for Billing, Meter Data Management, Outage Management etc.Provided?	Yes/No	Yes	
36	Meter Provided with Super Capacitor and Battery?	Yes/No	Yes	
37	The Rated Shelf Life of Battery	Years	Min. 15	

S.No	Description	Unit	NEA's	Bidders
38	Whether Super Capacitor will Provide Carry Over Power for All Normal Power Outages at least for 36 hr. Duration ?	Yes/No	Yes	
39	Whether the Bidder agrees to Recover the Meter data in the Conditions Specified in	Yes/No	Yes	
40	Whether the Meter has Capability to Check the Correctness of Connections at Site?	Yes/No	Yes	
41	Missing Voltage Indication as Specified in 18.4 Available?	Yes/No	Yes	
42	Whether Bidder Agrees on the Guarantee Clause as Specified in Clause 19.0?	Yes/No	Yes	
43	Type Test Report Carried Out Within 5 Years from The Date of Opening of Tender from The Testing Laboratories Specified in Clause 20.1 Submitted?	Yes/No	Yes	
44	Whether Bidder Agrees on After Sales Service after Warranty Period as Specified in Clause 23 of Specification?	Yes/No	Yes	

Miscellaneous Accessories

2.9.1 Space Heater

Each panel shall be equipped with space heaters to prevent moisture condensation within the enclosure and shall be completed with switch fuse units for power supply. Space heaters and switch fuse units shall be suitable for continuous operation.

2.9.2 Plug Point

A 230 V, 1 phase, 50Hz AC plug point shall be provided in the interior of each cubicle with on-off switch for connection of hand lamps.

2.10 Tests

2.10.1 Relay and Control Panels shall be subjected but not limited to the following tests:

i. Mechanical operation test

ii. Verification of degree of protection iii.

Calibration test for meters

iv. Characteristic test for relays

v. High voltage test of insulation (2000 volts for 1 minute)

vi. Electrical control, interlock and sequential operation tests vii.

Verification of wiring as per approved schematic diagram.

2.10.2 Type tests and routine tests shall be carried out on all associated equipment as per relevant standards approved by the Employer.

2.10.3 Certified copies of all type and routine test certificates shall be submitted for the Employer's approval before dispatching the control and relay panel.

2.10.4 After completion of the installation, panels shall be subjected but not limited to the following field tests :

i. Electrical control, interlock and sequential operation tests ii.

Calibration test for meters

iii. Measurement of insulation resistance vi

Characteristic test for relays

2.10.5 Transformer Protection

33/11 KV , 3 MVA transformer shall be protected by the following relays a

Over current relay

b Earth fault relay

c Differential relay

d Definite over current relay (if applicable)

APPENDIX: 1.4 .1

BILL OF MATERIAL

The bill of materials shall cover only the major equipment, or such information as will require particular information from the Tenderer. Tenderer is to be understood that, all other associated auxiliary equipment and accessories, although not listed in the bill of materials, but necessary for the complete and sound function of the control board as described in this specification, shall be furnished by the Contractor.

CONTROL & RELAY PANEL

1. Major Components

	Legend	Description	Quantity per Panel
1.	ANN	Annunciator assembly, 24 active points,110V DC, 4 rows high by 6 columns wide, flush mounted, and with: 3-separately mounted push buttons 2-separately mounted indicating lamps, one white lamp, and one red lamp Following minimum annunciation shall be provided: 1. Transformer HV Backup Protection trip 2. Transformer LV Backup Protection trip 3. Transformer Differential Protection trip (3 MVA Transformer) 4. Transformer Bucholz Alarm / Trip 5. Transformer Low Oil Level 6. Tap Changer Bucholz Alarm / Trip 7. Tap Changer Low Oil Level 8. Circuit Breaker Trip 9. Transformer Winding Temperature High	1Lot

		10. Transformer Winding Temperature Extra High 11. Tap changer Temperature High 12. Tap changer Out of Step 13. Transformer Cooling System Fail 14. Pressure Relief Device Operated 15. AC Fail 16. DC Fail 17 –22. Spare	
2.	Relay	Only main relays and instruments are listed here. All the trip relays and auxiliary relays required for satisfactory operation of the scheme shall be included by the Contractor.	
2.1	50/51/50N / 51N	Overcurrent and Earth Fault Protection with Instantaneous Protection	1 Lot
2.2	50B	Breaker Failure Protection	1Nos
2.3		Trip circuit supervision relay	1Nos
2.4	51E	Transformer Protection	1Nos
2.6		Interlocks, Switching & Tripping Relay	1 Lot
3.	A	Indicating ammeter , Digital 0-100A; 0-200A 300-200-100/1A	3Nos
4.	MWH	Electronic type with 0.22 Class	To be Supplied by NEA
5.	P.F.	Power factor 0.6-1-0.6 lead	1Nos
6.	KVA	0-10 MVA	1Nos

7.	CS	Breaker control switch, and with :	1Nos
8.	CS	Disconnecting control switch, and with: 2-separately	1Nos
9.		Electrically operated mimic disconnec device, 110V	1Lot
10.		Electrically operated mimic connected tc position of line ground switch	1Lot
11		Trip Transfer Switch, for transferring trip signal, reclosing relay, PT circuit to bus tie Breaker. (wherever required)	1Lot
12		Multiple Adjustable Ratio Intermediate Current Transformer for Differential Protection, if required	1 Set

3. INSTRUMENT TRANSFORMER

3.1 General

This specification covers the design, manufacture, assembly, shop test, supply, delivery, and installation works and field test of instrument transformers as specified herein under.

The equipment specified in this Section shall conform to the latest edition of the appropriate IEC specifications and/or other recognized international standards. In particular:

IEC 60044 Voltage transformers

IEC 60044 Instrument transformers

IEC 60529 Degree of protection provided by enclosures

Manufacturer of instrument transformer shall hold valid ISO 9001(including design)

quality certificate.

3.2 Equipment to be furnished

The Following Equipment shall be furnished, if seemed necessary, after the approval of Schematic Diagram submitted by the Bidders or as Instructed by the Owner**.** The Schematic diagram should be prepared and submitted by the Bidders with Technical Proposal, after studying the existing Protection and Metering System, such as to provide necessary and adequate Protection to the Transformer Bay as a Whole. The Bidders are required to make the Site visit and access necessary Data and Drawings from the respective Substation. Similarly, the details about the Ratio / Burden / Class will be finalized after the approval of the Schematic Diagram or as Instructed by the Owner.

i. 33 kV Current Transformer for Measurement & Protection

ii. 33 kV Bushing current Transformer for Protection

iii. 11kV Bushing Current Transformer for Protection

iv. 11kV Current Transformer for Measurement & Protection.

V 11kV / 110V Potential Transformer for measurement & Protection

3.3 Design Requirements

3.3.1 Instrument transformers shall be suitable 33kV 50Hz. 3 Phase with neutral solidly grounded system.

3.3.2 Instrument transformers shall be installed outdoor in a hot, humid climate. All equipment and accessories shall be provided with tropical finish to prevent fungus growth.

Burden of the instrument transformers stated herein is the minimum value required. Where higher burden is required to suit the designs, the Contractor shall supply the same without additional cost.

3.4 Construction Features

3.4.1 The instrument transformers shall be oil-filled construction and shall be designed for outdoor service and suitable for vertical mounting.

3.4.2 The core and coils of current transformer shall be mounted in a steel tank on the top of the unit with the primary coil leads extending through insulated bushings for series or multiple connections. A steel base shall support the high voltage bushing and tank. The high voltage bushing shall be sealed to the tank and the base with oil-tight joints.

3.4.3 The primary terminals of instruments shall include provisions for externally connecting the primary winding. The secondary terminals shall be enclosed in a weatherproof terminal box.

3.4.4 Porcelain bushings shall have adequate mechanical and electrical strength. The color of porcelain shall be brown.

3.4.5 Junction boxes

Junction boxes shall be rigid weatherproof type complete with terminal blocks suitable for cable size having the range up to 2x6 sq. mm for termination of the secondary connections (such as delta or wye connection). They shall be made of metal, which will resist corrosion on both inside and outside surfaces; otherwise they shall be suitably protected by galvanizing. Cover of the junction box shall be of hinge door type complete with door handle. Two drainage holes shall be provided at the bottom of the junction box. In case the junction boxes are steel sheet, the thickness of such steel sheet shall be at least 1.2mm. Junction boxes shall be sized and arranged to provide easy access for external cables and adequate space for internal wiring and installed equipment. Enclosure protection class of the junction boxes shall be IP55W

The terminal blocks used should be provided with shorting links on the top of the unit with the primary coil leads extending through insulated bushing for series or multiple connections .A steel base shall support the high voltage bushing and tank. The bushings shall be sealed to the tank and the base with oil tight joints.

3.4.7 Termination

(a) Current transformers

All current transformer secondary winding terminals shall be connected to terminals on terminal located in the junction boxes. In addition, a short -circuit type terminal block shall be provided for each maximum ratio of each core at the terminal blocks in both the secondary terminal box and junction box.

(b) Potential transformer

All PT's secondary terminals shall be connected to terminals on terminal blocks located in the junction boxes.

3.4.8 Protective devices

(a) The secondary phase wire for external connection shall be equipped on all potential transformers with switch and fuse. Fuses shall be rated to provide external short- circuit protection and shall be high rupturing capacity non-deteriorating type. Switches shall be rated not less than 250V AC 50Hz. Switches and fuses shall be contained within the junction box provided for termination. Supply fuse failure supervision shall be provided.

3.4.9 Accessories

The following items shall be provided for each instrument transformer: (a)

Nameplate

(b) Oil level gauge

(c) Oil valves or plugs

(d) Power factor test terminals

(e) Necessary terminal connections

(f) Grounding terminals

(g) Other necessary accessories

3.5 Tests

Tests shall be performed as specified hereunder.

3.5.1 Current transformer

(a) Routine tests

Each current transformer shall be subjected to the following tests.

- Applied potential test
- Induced potential test
- Accuracy tests (including excitation curve for relaying class)
- Polarity check
- Winding resistance measurement for each ratio

(b) Design tests

Type test records of an identical unit of current transformer shall be submitted to Employer/Employer's Representative. In case type test records are not available, the actual tests shall be performed. The items of test shall be as follow:

- Short time current test
- Temperature rise test
- Power frequency withstand voltage (wet) test
- Impulse voltage withstand test
- Temperature rise test

3.5.2 Potential transformer

(a) Routine tests

Each capacitor voltage transformer shall be subjected but not limited to the following tests:

- Power frequency withstand voltage (dry) test.
- Dielectric tests for electromagnetic unit
- Accuracy tests
- Polarity check
- Ratio test

(b) Design tests

Type test records of an identical unit of potential transformer shall be submitted. In case type tests records are not available, the actual tests shall be performed. The items of test shall be as follows:

- Voltage test between phase and ground terminals
- Power frequency withstand (wet) test
- Impulse test
- Radio-influence voltage test
- Short-time over voltage test
- Thermal burden test

3.5.3 Field tests

After installation at Site, all instrument transformers shall be subjected but not limited to the following tests:

(a) Constructions inspection

(b) Polarity check

(c) Ratio test

(d) Measurement of insulation resistance

3.6 Drawings, Data and Manuals

3.6.1 The following drawings and data shall be furnished with the Tender.

(a) Outline dimensional drawings of the equipment

(b) Characteristics and performance data

(c) Type test certificates of similar equipment

3.6.2 After award of Contract the successful Bidder shall submit the required number of copies of the following drawings for approval of the Employer/Employer's Representative.

(a) Outline dimensional drawings of the equipment

(b) Transport/shipping dimensions with weights

(c) Foundation and anchor bolt details

(d) Characteristic and performance data including ratings, ratio and phase angle curves, accuracy for standard burdens, and thermal burden ratings.

(e) Instruction books including complete information for installation, testing, operation and maintenance with renewal parts data.

(f) Any other relevant drawings and data necessary for review of the items stated above.

APPENDIX A-1

TECHNICAL PARTICULARS OF 33kV CURRENT TRANSFORMER

1.	Type	Outdoor, oil immersed for protection and metering
2.	Quantity required	As per Price Schedule
3.	Rated primary voltage	33kV
4.	Max. system voltage	36kV
5.	Impulse withstand voltage	170kV
6.	Rated frequency	50Hz
7.	Number of cores	2
8.	Current Ratio	600-400-200/5A
9	Rated Burden	50 VA
10.	Accuracy	5P/20 and 0.5 for metering
11	Power Factor	0.85
12	Over voltage factor	1.1 Continuous
13	No of secondary windings	as required
14	over load factor	200%
15	Short time thermal rating	25 kA

APPENDIX A-2

TECHNICAL PARTICULARS OF 33kV POTENTIAL TRANSFORMER

1.	Type	Outdoor, oil immersed
2.	Quantity required	As per Price Schedule
3.	Rated primary voltage	33/ √3 kV
4.	Max. system voltage	36kV
5.	Impulse withstand voltage	170kV
6.	Rated frequency	50Hz
7.	Connection	Line to ground
8.	Number of secondary winding	2
9.	Voltage ratio	33,000/ √3/110/√3V
10.	Rated burden for each winding	100 VA
11.	Accuracy	3P and 0.5 for metering
12.	Power factor	0.85
13.	Rated voltage factor	1.1 continuous, 1.5 for 30 sec

ACSR CONDUCTOR

3.1 Scope

This specification covers the design, manufacturing/fabrication, supply and site delivery of Aluminum conductor steel reinforced (ACSR) commonly used on overhead power/distribution line construction.

3.2. Description

3.2.1 All conductors should be of Aluminum Conductors Steel Reinforced (ACSR) construction and shall be manufactured in strict conformity to BS215 Part 2. The ACSR conductor shall be fabricated in accordance with British Standards Institution Specification BS215: Part2 1956 or IS 398:1961.

The steel core and the first layer of aluminum shall be greased. The grease shall be of neutral type and at a temperature of 100º C and the grease neither flow nor extrude from the conductor. The grease shall retain its properties as resistance to oxidation and chemical stability at all service temperatures. The steel strands of ACSR conductor shall be performed so that they remain inert and do not move relative to each other when the conductor is out. The outermost layer of all conductors shall be stranded with right hand lay.

The correct tension must be maintained on the stranding machine when spinning the cable to avoid the possibility of bird caging during stringing. Any condition not complying may be rejected at the discretion of the Engineer.

The ACSR conductors must be manufactured by a company approved to quality standard ISO 9001 or ISO 9002. The ISO certification number, the name of the authorized approving authority with the contact address and telephone and fax numbers shall also be stated. The Bidder shall enclose a verified copy of the ISO certificate with the bid.

The purity of the Aluminum shall be the highest commercially available and not less than 99.5%, the copper content not exceeding 0.48%. The contractor shall submit the certificates of analysis giving the percentage and the nature of any impurities in the metal from which the wires are made. Aluminum wire shall be made to BS2627 and steel wires to BS4565.

Precaution shall be taken during the manufacturing, storage and erection of steel core aluminum conductors to prevent the possibility of contamination by copper or other materials, which may adversely affect the aluminum. The manufacture of steel core aluminum shall be carried out in a portion of factory specially set aside for such

purposes. Machinery previously used in the manufacture of copper or copper-bearing conductors shall not be for the manufacture of these aluminum or steel wires. The size and the composition of the entire conductor shall be as stated in general specification.

The conductors shall be supplied on drums of approved construction. The drums shall be securely battened to protect the conductor. Drum battens shall not be removed until the drum is properly mounted on the drum station on line and battens shall be immediately refitted to the drum if any surplus conductor is left therein. Each drum shall be marked be marked the manufacturer's name, direction of rolling, any mark,code name, the length, size stranding, net weight, gross weight, approximate measurement and production date of the conductor and manufacturing batch number incised. The standard length of the conductor in a Drum shall be as shown in the table below:

Conductor Size, Sq.Inch	0.03"WEASEL"	0.05"RABBIT"	0.1"DOG"
Normal length of the conductor,m	3000	2000	1000

However NEA may ask the supplier to supply conductor of 1 km length per coil and coiled without drum if required. The supplier shall quote the individual weight of the conductor and weight of the drum on which it is rolled.

It is made clear to the contractor that the guaranteed weight of the conductor 0.03 sq.inch size ACSR "WEASEL" is 127.7 kg per km, 0.05 sq.inch size ACSR "RABBIT" is 214 kg per km and 0.1 sq inch size ACSR "DOG" is 394 kg per km. For any reduction in the actual weight of the conductor from guaranteed weight, the deduction on the contract cost will be made by the NEA for the reduced weight as per the rate quoted on the price schedule. However no extra cost will be paid to the contractor for the increased weight (hence length of the conductor).

3.3. General Specification:

The ACSR Conductor to be supplied under this contract shall bear the following technical particulars :

	Description	**DOG**
1	Size	0.1 sq. Inch
2	Number/Diameter of wire	118.7 mm2

	a. Aluminium	6/4.72
	b. Steel	7/1.57
3	Cross Section:	
	a. Aluminium	105 mm2
	b. Steel	13.55 mm2
	c. Total	118.7 mm2
4	Conductor Diameter	14.15mm
5	Ultimate Strength	3310 kg
6	Modulus of Elasticity	0.7750 x 10^6
7	Coeficient of Linear Expansion	19.8 x 10^-6
8	Standard Mass of Conductor	394 kg /km
9	Electrical DC Resistance at 20'C	0.2722 ohm/km
10	Standard Non Jointed Length on reel	1500 m
11	Breaking Load	33.33 kN
12	Mass of Zn Coating in steel strands	200 gm/m2
13	Nominal copper area	65 mm²
14	Standards	

3.4. Tests

The manufactured conductors shall be subjected to the routine test at the manufacturer's premises before shipment.The following tests will be carried out as per IS398:Part 2 1976 Aluminum Conductor, ACSR Conductor (Second edition):

a. Breaking Load Test

b. Ductility Test

(i) Torsion test

(ii) Elongation Test

c. Wrapping Test for Al. wires & Galvanized Steel wires

d. Resistance test

e. Galvanizing test

1.5 Packaging

Each reel of conductor furnished shall contain only one (1) length of cable. In other words there should not be any joint in the conductor rolled in a reel.

a) The conductor drum shall be made of steel suitably protected against corrosion. Protective external lagging of sufficient thickness shall be provided and fitted closely on the reels. Binder consisting of steel straps shall be provided over the external laggings. The drum shall be new and sufficiently rugged in construction to withstand ocean shipping, road transport, several loading and unloading, storage in tropics, hauling and field erection of conductor without distortion or disintegration.

b) All reel shall be legibly marked in paint with the following information:

- ❖ Size of conductor
- ❖ Type of conductor
- ❖ Color of insulation
- ❖ Length in meters
- ❖ Net weight of conductor

- ❖ Direction of rolling
- ❖ Total weight of the whole reel

3.6 Bid Docuentation:

The bidder shall provide with the bid two (2) clear copies of the standard governing fabrication of the conductor and two (2) clear copies of all other specification referenced therein as relevant to the fabrication and testing of the ACSR conductor. The supplier shall also provide with the certificate of compliance, as specified in BS215Part2: 1970 at the time of the shipment of each lot of conductor or as required by the appropriate selection of the equivalent national standard. The Bidder shall provide certified test results of all types of ACSR conductors as required by governing standards.

All data, drawings, catalogue and others technical documents shall be bound separately from the Bid documents.

TECHNICAL DATA SHEET

(To be filled in by the Bidder/ Manufacturer)

The Bidders/manufacturers are required to furnish the following information in the Data Sheet. Separate sheets can be used if additional space is required. The information furnished shall be supported by the catalogue and test reports. The information not supported by the catalogues, test reports etc. shall be deemed to have been *"Not Provided"*.

The bidders/manufacturers are also required to underline the information asked for in the catalogue and /or test reports. Any deviation from NEA's requirements shall be clearly mentioned giving the reasons thereof.

ACSR Conductor

S.No.	Description				Bidders' Offer		
1	Manufacturer						
2	Governing Standards						
3	Copies of Standards Attached?						
4	Copies of type test attached?						
5	If standards are not to BS 215 / IEC: 209 (Part II) , are conductor specifications as the BS: 215 requirements in respect of the followings?						
	Diameter			Yes/No			
	Stand Size			Yes/No			
	Direction of Lay			Yes/No			
	Lay Ratio			Yes/No			
	Materials			Yes/No			

6					
	1	Size	0.1 sq. Inch "Dog"		
	2	Number/Diameter of wire			
		a. Aluminium			
		b. Steel			
	3	Cross Section:			
		a. Aluminium			
		b. Steel			
		c. Total			
	4	Conductor Diameter			
	5	Ultimate Strength			
	6	Modulus of Elasticity			
	7	Coeficient of Linear Expansion			
	8	Standard Mass of Conductor			
	9	Electrical DC Resistance at 20'C			
	10	Standard Non Jointed Length on reel			
	11	Breaking Load			
		a. Aluminium			
		b. Steel			
	12	Mass of Zn Coating in steel strands			

TECHNICAL DATA SHEET

33kV CIRCUIT BREAKER

S. No	Description	Unit	NEA requirement	Bidders Offer
1	Manufacturer and Country of Origin			
	Model No.			
2	Year of manufacturing experience			
3	Applicable Standard		IEC	
4	Type		VCB Out door	
5	Poles		Three pole	
6	Pole breaking		Three	
7	Rated Voltage			
7.1	Nominal	kV	33	
7.2	Maximum	kV	36	
8	Rated Current			
8.1	Continuous at 45 degree ambient	A	800	
8.2	Rated intrrupting current	kA	25	
8.3	Momentory	kA		
9	Frequency	Hz	50	
10	Temperature rise above 45 deg C ambient		As per IEC	
10.1	Contacts	Deg C		
10.2	Terminals	Deg C		
11	Rated short circuit breaking current			
12	Rated short circuit making current			
12.1	Peak	kA		
12.2	RMS symmetrical	kA		

13	Interrupting time at 100% capacity			
13.1	Maximum opening time	ms	60	
13.2	Total interrupting time	ms	60	
14	Closing time	ms		
15	Make time	ms		
16	Maximum current breaking capacity	A		
17	Insulation level			
17.1	Impulse withstand voltage(peak)	kV	170	
17.2	Power frequency withstand voltage	kV	70	
18	Operating Mechanism			
18.1	Type		Spring Loaded	
18.2	Number of mechnism per beaker			
18.3	Single/Three phase autorecloser		Not required	
18.4	Operating voltage of closing and tripping coil	V DC	110	
18.5	Operating voltage range			
	Closing	% of rated voltage	85-110%	
	Tripping		70-110%	
18.6	Closing and tripping current	A		
18.7	Spring charging motor rating			
	Capacity	kW		
	Rated voltage	V	110 DC	
18.8	Time required for the motor to charge the spring completely	Sec	<30	
18.9	Space heater and auxialiary equipment			
18.10	Push bottom for local operation	Yes/No	Yes	
18.11	Selection switch for local and remote comtrol	Yes/No	Yes	
19	Operating counter provided	Yes/No	Yes	

20	Space heater provided for cubicle	Yes/No	Yes	
21	Thickness of sheet steel of cubicle	mm	2	
22	Number of auxiliary contacts	No	6No,6NC,6MBB	
23	Operating duty cycle		0-0.3sec-CO-3min-CO	
24	Number of possible operation without maintenance under			
	Rated short circuit breaking current	No		
	Rated Normal Current	No		
25	Porcelain insulator			
25.1	Manufacturer			
25.2	Creepage distance	mm	900	
26	Pad locking provision for local cubicle	Yes/No	Yes	
27	Total weight of the cubicle	kg		
28	Mechanical dimension (LxwxH)			-

TECHNICAL DATA SHEET

CURRENT TRANSFORMER

S. No	Description	Unit	NEA requirement	Bidder's Offer
1	Manufacturer and Country of Origin			
	Model No.			
2	Year of manufacturing experience	Years		
3	Applicable Standards		IEC	
4	Type		One phase outdoor, oil immeresed	
5	Number of phases	Nos	1	
6	Number of core in each CT	Nos	1	
7	Frequency	Hz	50	

8	Rated primary voltage			
8.1	Nominal	kV	33	
8.2	Maximum	kV	36	
9	Trmperature rise above 45deg C ambient at Normal rated current	deg C		
10	Insulation level			
10.1	Impulse withstand voltage	kV	170	
10.2	Power frequence withstand voltage (1min rms)	kV	75	
11	Creepage distance	mm		
12	Short time thermal rating	kA	25	
13	Current ratings	A	300-200-100/5	
14	Rated VA burden	VA	50	
15	Accuracy class		5P20 for protection and 0.5 for metering	
16	Rated thermal VA burden	VA		
17	Over load factor	%	200	
18	Dimension	cu mm		
19	Weight	kg		
20	ISO 9001 holder	Yes/No	Yes	
21	ISO 9001 certificate submitted	Yes/No	Yes	
22	Type test certificate submitted	Yes/No	Yes	

TECHNICAL DATA SHEET

33kV CONTROL AND RELAY PANEL

S. No	Description	Unit	NEA requirement	Bidder's Offer
1	Control and relay panel type			
1.1	Manufacturer and Country of origin			
1.2	Year of manufacturing experience	Years		
2	Control switches			
2.1	Manufacturer and Country of origin			
2.2	Type			
2.3	Current Rating	A		
2.4	Catalog Furnished	Yes/No	Yes	
3	Push Botton			
3.1	Manufacturer and Country of origin			
3.2	Type			
3.3	Contact rating continuous	Amp		
	Making current	Amp		
	Breaking current	Amp		
3.4	Catalog Furnished	Yes/No	Yes	
4	Indicating Lamps			
4.1	Manufacturer			
4.2	Voltage ratings	V		
4.3	Wattage	W		
5	Indicating instruments			
5.1	Ammeter			

	Manufacturer and Country of origin			
	Type		Digital	
	Current Range (300-200-100/5 Amp CT operated)	A		
	Accuracy Class		0.5	
	Scale			
	Type of scale			
	Range of indication (300-200-100/5 Amp CT operated)	A	0-100 0-200 0-300	
	Lineal/ Non linear			
	Overloaded range	%	1.5	
	VA burden			
	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No		
6	Voltmeter			
	Manufacturer and Country of origin			
	Type		Static	
	Accuracy class		0.5	
	Scale			
	Range of indication	kV	0-36	
	Linear/Non linear			
	Overscale range	%	1.1	
	VA burden	VA		
	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No	Yes	
7	Apparent power meter (kVA)			
	Manufacturer and Country of origin			
	Type		digital	

	Rated voltage	kV	33/√3:0.11/√3	
	Rated current	A	300-200-100/5	
	Current range (Transducer operated)	mA		
	Accuracy class		0.5	
	Scale	MVA		
	Type of scale			
	Range of indication		0-10	
	Linear/Non linear			
	VA burden			
	Current coil	VA		
	Voltage coil	VA		
	Catalog furnished	Yes/No	Yes	
	Transducer operated	Yes/No	Yes	
8	kWH Meter			
	Manufacturer and Country of origin			
	Type		TOD (static)	
	Applicable standard		IEC	
	Accuracy class		0.2	
	Import Export meter provided	Yes/No	Yes	
	Rated voltage	kV	33/√3:0.11/√3	
	Rated current	A	300-200-100/5	
	VA burden			
	Current coil	VA		
	Voltage coil	VA		
	Impulse contact provided 1pulse 100kW	Yes/No	Yes	

TECHNICAL DATA SHEET

33kV CONTROL AND RELAY PANEL

S. No	Description	Unit	NEA requirement	Bidder's Offer
	Reverse rotation locking mechanism provided	Yes/No	Yes	
9	Power factor meter			
	Manufacturer and Country of origin			
	Type		Digital	
	Accuracy class		0.5	
10	Annunciators			
	Manufacturer and Country of origin			
	Type			
	Manufacturer's type designation			
	Catalog furnished	Yes/No	Yes	
	Number of inputs (annunciator/event)			
	Number of active points	Nos	24	
	Number of rows		4	
	Number of column		6	
	Type of mounting		Flush	
	Replacement of individual inscription plates and lamps from	Yes/No	Yes	

	front panel possible			
	Sequence of operation as per specification	Yes/No	Yes	
11	Protective Relays			
11.1	Phase Over Current Relay			
	Manufacturer and Country of origin			
	Type		Static Non directional	
	Manufacturer's type designation			
	Applicable standards		IEC	
	Triple pole or single pole		Single*3	
	Current setting range	% of rated current	20-200%	
	Operating time at 10 times current settings	msec	3	
	Reset time	ms		
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	500-2000%	
	Operating range			
	No Conatcts			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diod provided	Yes/No	Yes	
	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test Certificate submitted	Yes/No	Yes	

11.2	Earth fault relay			
	Manufacturer and Country of origin			
	Type		Static/Non directional	
	Manufacturer's type designation			
	Applicable standard		IEC	
	Triple pole or single pole		Single	
	Continuous overlload capacity	xIn		
	Current setting range	% of rated current	10-80%	
	operating time at 10 times current setting	msec	3	
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	500-2000%	
	Operating range			
	No Conatcts			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diod provided	Yes/No	Yes	
	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.3	Directional Overcurrent Relay		Not required	
	Manufacturer and Country of origin			
	Type		Static/ directional	

	Manufacturer's type designation			
	Applicable standard		IEC	
	Triple pole or single pole		Single*3	
	Current setting range	% of rated current	50-200%	

TECHNICAL DATA SHEET

33kV CONTROL AND RELAY PANEL

S. No	Description	Unit	NEA requirement	Bidder's Offer
	operating time at 10 times current setting	sec	3	
	Reset time	ms		
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	200-1600%	
	Operating range			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diod provided	Yes/No	Yes	

	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.4	Directional Earth Fault Relay			
	Manufacturer and Country of origin			
	Type		Static/ directional	
	Manufacturer's type designation			
	Applicable standard		IEC	
	Triple pole or single pole		Single	
	Continuous overload capacity	xIn		
	operating time at 10 times current setting	sec	3	
	Characteristics		IDMT (Standard inverse)	
	Instantaneous unit provided	Yes/No	Yes	
	Current setting range	% of rated current	200-1600%	
	Operating range			
	Insulation test as per IEC	Yes/ No	Yes	
	Indication			
	Hand reset flags provided	Yes/No	Yes	
	Light emitting diod provided	Yes/No	Yes	
	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.5	Differential Relay			
	Manufacturer and Country of origin			

	Satndard reference			
	Type			
	Voltage rating	V	110	
	Type of Mounting		Flush	
	Operating time setting	ms	<30	
	Sensivity setting		20-50%xIn	
	Bias setting			
	CT ratio Compensating range			
	Burden for Current Circuit	VA		
	DC Burden	VA		
	Tripping	A		
	Making Current	A		
	Closing load (At 110V DC)	A		
	Ambient Temperature Range	Deg C		
	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
11.6	Auxilliary Tripping and Lockout Relay			
	Manufacturer and Country of origin			
	Type			
	Manufacturer's type designation			
	Applicable standard		IEC	
	Operatring Time	ms	<15	
	Does the lockout relay reset by the manually operated or electrically operated reset device			
	Is the cut off contact provided to interrupt the operating coil	Yes/No	Yes	

	Contact rating at 125V DC	A		
	Auxilliary DC supply	V	110	
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	

TECHNICAL DATA SHEET

33kV CONTROL AND RELAY PANEL

S. No	Description	Unit	NEA requirement	Bidder's Offer
11.7	Break Fail Lockout Relay, 86K			
	DC Voltage Rating	V	110	
	Nos of electrically separate No and NC Contacts			
11.8	Break Failure Lockout Relay BF			
	DC Voltage Rating	V	110	
	Nos of electrically separate No and NC Contacts			
	Technical Literature submitted	Yes/No	Yes	
	Test certificate submitted	Yes/No	Yes	
12	Construction of Control and Relay Panel			
	Type		Simplex	
	Manufacturer's type designation			
	Applicable Standard			
	Control panel furnished as per specification	Yes/No	Yes	
	Enclosure protection calss	IP	IP54	

	Thickness of sheet metal used			
	Front and rear portion	mm	>3	
	Side top and bottom cover	mm	>2	
	All instruments, meters, relays and control switches flush or semi flush type		Flush	
	Ground Bus			
	Material		Copper	
	Size	mm x mm		
	Internal Wirring			
	Type of Insulation			
	Voltage Grade of Wires	V	600	
	Cross Section of Wires	sq.mm	2.5 min	
	Current Circuit			
	Voltage and auxilliary circuit			
	Over all dimension of control board	cu mm		
	Shipping data			
	Size of large package	mmxmmxmm		
	Weight of heaviest packge	kg		

SPECIFICATION OF CIVIL PARTS

1. SITE WORKS

Work Included

Furnishing all materials equipment and labor and performing all operations required for the clearing stripping, Filling and compacting of substation areas and constructing access roads so indicated on the drawings, specified herein and as evidently necessary to complete to work as given in the price schedule.

1.2 Clearing and Stripping

1.2.1 General

Clearing shall include cutting, leveling , removal and disposal with lead of 100 m, as specified of all trees, bushes down timber, debris, posts, fences, indicted structures and other obstructions from the areas to be occupied by permanent works of the contract and as indicated on the drawings specified herein and directed by the Owner/Engineer. Areas so indicated shall be stripped of 20 cm thick topsoil. Topsoil approved by the Owner/Engineer shall be stockpiled for use in the finish grading and seeding work. Stockpiled topsoil shall be free from trash, vegetation, or other debris.

1.2.2 Protection

The Contractor shall be responsible for prevention of damage to structures and other objects, which are not included in the clearing work. No objects of any kind outside the indicated limits of the work shall be removed or damaged. Existing utilities which are not specifically include in the work shall be protected by the contractor. The contractor shall be responsible for employment of safe methods of demolition and clearing.

1.2.3 Payment

Payment for the contract item "Clearing and stripping" will made at the lump sum price as bid therefore in the schedule which shall include full compensation for all costs incurred in performing the clearing and stripping, including but not limited to removal and disposal of bushes, splash, roots and debris and stripping, stockpiling and disposal of topsoil or unsuitable earth material within lead of 100 meters.

1.3 Compacted Fill for Site Grading

1.3.1 The contractor shall provide and compact select borrow material within the limits of the work to the lines, grades and elevations to be specified by the Owner/Engineer. In general, the new substation sites and access roads will be elevated by approximately one meter from the existing ground level. The contractor shall provide details of filling for approval of the owner.

1.3.2 Common Fill

The contractor may use fill materials available from cut areas in the switchyard if suitable and approved by the owner. This materials shall be well-graded bank-run gravel, relatively free from clay, loan on vegetables matter and with no stones over 10 cm in maximum dimensions, or materials of equivalent strength and characteristics. Representative samples from proposed borrow sources shall be submitted to the

Owner/Engineer for approval of the borrow source. Approval of borrow source shall both mean automatic approval of Owner/Engineer. If Owner/Nepal Electricity Authority rejects any material the Contractor shall remove it from site without any extra cost to the Owner.

1.3.3 The Contractor shall, at his option, use areas approved by the Owner/Engineer for production of select borrow or at his own expense, make arrangements for obtaining select borrow at other sources with prior approval of the Owner/Nepal Electricity Authority.

1.3.4 Unless otherwise specified y the Owner/Engineer, compacting shall be to the following sensitizes at optimum moisture contents as determined by ASTMD-1557, Method D.

a) Fill location and required density

1)	Under building and yard foundation	95 percent
2)	Sub-base for roadways	90 percent
3)	Gravel roadways top 400mm	95 percent
4)	All other locations	90 percent

b) It is Contractor's responsibility to select his method for attaining the required compaction and obtain approval of the Owner/Engineer for the proposed method. Should the method of compaction prove unsatisfactory, it is the Contractor's responsibility to take remedial measures and obtain the approval of the Owner/Engineer for the changes made. For the compaction of fill, 2 tom vibrating roller is preferable.

c) The Owner/Engineer reserves the right to have compaction tests performed by an independent laboratory, with all testing costs borne by the Contractor. Any additional compaction or replacement of fill required to meet the specified density, as evidence by the tests, shall be done by at the expense of the Contractor.

d) Failure of the compacted fill to reach the required density as evidence by these tests, is cause of rejection by the Owner of the work in the affected area(s). Unless the Contractor can rework and compact the fill to the required density, he shall remove the fill in the areas affected. Subsequently the Contractor shall replace the removal fill with material which he can compact to the required density.

e) Compaction shall be carried out in layer wise, each layer not exceeding 300 mm loose thickness.

1.3.5 Measurement for payment for the contract item, "Site Grading " Shall be the number of cubic meters of site grading, filled of bankrun gravel furnished and placed in accordance with the Specifications, as shown on drawings, or as directed by the Owner/Engineer. The measurement and the payment shall be for compacted volume.

1.3.6 Payment for the contract item, : Site Grading" will be made at the unit price for cubic meter. Bid therefore in the price schedules which unit price shall include full compensation for all costs incurred in furnishing all materials and all other operations related to fill including but not limited to:

a) Obtaining materials to job site from source, to temporary stockpiles and/or points or final disposition.

b) Transporting, materials to job site from source, to temporary stockpiles and/or points or final disposition.

c) Leveling the top surface to the finish grade.

1.4 Crushes Stone Substation Yard Surfacing

1.4.1 The Contractor shall furnish, delivery, deposited and spread crushes stone on the switchyard area. The crushes stone shall be crushes granite, gneiss or equal, 25mm size and shall be hard, durable and seamless, spread and bladed dense but not compacted. The Contractors shall spread the crushes stone on previously properly prepared sub surfaces. The cover shall be 150mm thick.

1.4.2 Measurement for payment for contractor item. Crushes Stone for Substation Yard surfacing, shall be at the number of square meters of crushes stone surface of crushed stone furnished and placed in accordance with Specification, as shown on deducting area cover by permanent structure and fixtures.

1.4.3 Payment for the contract item "Crushed Stone for Substation Surfacing" will be made at the unit price per square meter therefore in the Schedule, which unit price shall include full compensation for all costs incurred in furnishing all materials and all other operation related to the fill including but not be limited to:

a) Obtaining materials from owner/Engineer approved source.

b) Transporting materials to job site from source, to temporary stockpiles and/or to points of final disposition.

1.5 Site Drainage

1.5.1 The Contractor shall design and furnish all construction works for collection and disposing storm water all around the switchyard site into the soak pit drain or nearby channel.

1.5.2 Grading

Location and its direction of the elevations shall be as per approved drawings.

1.5.3 Drainage channel materials

a) All concrete drains must be built to tall

Excavating must give allowance to formwork which shall be refilled with proper compaction.

b) Concrete pipes

Concrete pipes shall be Np-3 class or equivalent in required size. Closed pipes shall be used at road crossing, the perforated type pipes shall be used for switchyard area. 150 mm dia. Perforated pipe shall be made of asbestos cement. 250 mm and 200mm dia. Perforated pipe shall be made of R.C.C hume pipe Np-2 class or equivalent. Those pipes shall be protected with screened gravel of 25mm-40mm size.

1.5.4 Construction

Excavating, trenching and backfilling for drainage channels shall be done after all other underground utilized are installed but before road sub grade is prepared.

a) Trench Excavation

Trenches for pipe shall excavated to a sufficient depth and width to enable to pipe and any specified joint bedding, hunching etc. to be accommodated.

b) Bedding and laying of pipes

Immediately following excavation of trenches, pipes shall be laid. Pipe shall be laid so that each one is in contact with the bed throughout the length of its barrel.

c) Jointing of pipes

Length of each pipes shall be commercially available joints to be constructed in the fields shall be factory made collar jointed with jute packing and cement sand

mortar 1:3. And the joint location shall be covered by 30cm thick concrete (1:2:4).

d) Backfilling

After 48 hours of pipe jointing, the trenches shall be backfilled with excavated materials. IF excavated materials is not suitable then the contractor shall replace it by select borrow. Backfilling shall be done in layer wise, each layer not exceeding 15 cm.

1.5.5 Open channel type drainage

Excavation and backfilling for this type of drainage shall be done as specified herein.

The surface shall be made as smooth as possible with plaster work. Side and base shall be constructed in stone masonry wall 360 mm thick and cement sand mortar to be used shall be 1:5 ratio by volume.

1.5.6 Payment for the contract item "Drainage" will be made at lump sum bid price. Therefore in the schedule the bid price shall include full compensation for all costs incurred in furnishing all materials, equipment labor and other operations related to the scope of work.

1.6 Laying of underground cable

Contractor shall furnish all construction work for under grounding of 12 kV cables from substation outgoing cable exit point to nearest take off poles.

This work shall include excavation, sand filling from the top and backfilling. All work shall be done according to the standard practice.

Cost of "12 kV power cable and accessories: in the Price Schedule shall include the cost of laying of cable with required materials as described above.

1.7 Cable Trenches

1.7.1 General

Concrete cable trenches of adequate size shall be designed and constructed in accordance with the drawings and as directed by the Owner/Engineer. Trenches shall be designed with floor drains to assure proper drainage and shall be equipped with floor drains to assure proper drainage and shall be equipped with removable iron covers. At

road crossing R.C.C. Hume pipe - NP3 of sufficient size shall be provided. The detailed design shall be approved by the Owner.

1.7.2 Payment

Payment for the contract item, cable trenches, will be made at the unit price per meter bid. Therefore, in the schedule the unit price shall include full compensation for all costs incurred in furnishing all materials, equipment and labor and all other operations related to cable trench, design and construction, including but not be limited to:

a) Performing detail designs and preparation of construction drawings

b) Supplying transporting all materials to job site.

c) Excavating and backfilling for the cable trenches.

d) Construction the cable trenches with floor drains, reinforced concrete wall, base and removable cover.

2. CONCRETE FOUNDATION AND TRENCHES

Work Included

Furnishing all materials, equipment and labor and perform all operations required for the design and construction of all the concrete foundations for equipment and other structures, oil containment and cable trenches, as specified herein and as evidently necessary to complete the work.

2.2 Foundation Design

2.2.1 General

The Contractor shall design all foundations specified on the bid drawings. The design shall be based on assumed soil parameters. Upon completion of the detail soil test, actual soil conditions shall be investigated and shown to be in compliance with the assumed condition.

2.2.2 Submittals

The Contractor shall submit design calculations, detail drawings and reinforcement steel schedules to the Owner/Engineer for review and comment before construction commences, Review of the foundation design by the Owner/Engineer in no way relieves

the Contractor of his responsibility for an adequate foundation design, even though this Specification sets forth the basis foundation design criteria. Upon receiving the Owner's /Engineer comments, the Contractor shall submit to the Owner/ Engineer final drawings of all foundation details, including reinforcement steel schedules on drawing sheet sizes for record file.

2.2.3 Design Load

The structure design loads are defined on the structure outline drawings and the loads used to design the foundation shall be actual working loads applied to the foundations by the equipment and structures. The foundations shall be designed to resist all vertical and lateral forces, uplift forces and overturning moments with a minimum factor of safety of 1.5.

2.2.4 Bearing Loads

The Contractor shall used an allowable soil bearing pressure of 1.0kg/cm2 for the design of the foundation for the purpose of bidding, but this is only reference value. After award of contract the Contractor shall carry out detail soil test and detail design of foundation based on the soil test result. There may be variation in the volume of work in final design compared to the bidding design, for which the Contractor will not get any extra payment.

2.2.5 Uplift and Overturning Loads

The uplift and overturning resistance of concrete spread footing shall be assumed as the weight of a volume of earth in the form of an inverted frustum of cone or pyramid. The cone of pyramid height shall be 30cm less than the depth from finish grade to the top of the concrete mat, the base area shall be the top area of the mat and the top area shall be determined by the intersection of planes starting at the mat edges and sloping outward at a 20 degree cone angle from the vertical and the horizontal plane 30 cm below finish grade.

2.2.6 Unit weight for overturning resistance

The following unit weight shall be used for design:

a) Soil …….. 12,000kg/m3

b) Concrete…… 16,00kg/m3

2.2.7 Payment

No separate or direct payment will be made to the Contractor for design works. All costs incurred in connection therewith shall be included in the lump sum bid price for the construction of various works.

2.3 Soil Test

2.3.1 Ground bearing tests

The contractor shall carry out soil tests to determine the ground bearing capacity by means of a Standard Penetrations Test and Auger Boring and tests shall be performed in accordance with the following Specifications.

a) The Contractor shall perform soil investigation work according to the approved plan and details of tests. Report on test results including various data collected during the investigation works and Contractor's recommendations, on which the design will be based, shall be approved Owner/Engineer.

b) Sub surface investigation for soil strength of foundation for structures and equipment shall conform to the following requirements.

Number of boring shall be at least 2 borings at the locations specified below:

- One at take-off structure foundation
- One at transformers foundation

c) Thin-walled tube soil sampling in accordance with ASTM D-1587-63 T shall b made at every meter for the first three meter of depth.

d) Standard penetration tests in accordance with ASTM-D-1586-64T shall be made at every meter for the first three meter of depth and every two meters fort he further depth after this-walled tube soil samples have been taken.

e) Every undisturbed sample collected from thin-walled tube shall be subject to the following series of test.

- Natural moisture content
- Atterberg limits
- Sieve analysis

- Unit weight
- Specific gravity determination
- Unconfined compression tests.

f) Accurate log of all soil strata penetration resistance test unconfined compressive strength, soil classification, ground water table and other tests result shall be recorded in the reports submitted.

The Contractor shall provide all necessary equipment, materials and personnel to prepare conduct and report the tests.

2.3.2 Payment

Payment for the contract item: Soil Testing will be made at the lump sum price bid. Therefore, in the schedule, the price shall include compensation for all costs incurred in furnishing all materials and labor and other operations related to soil testing.

2.4 Excavation and Backfill

2.4.1 The contractor shall excavate earth, rock, stumps and all the other materials encountered as required for construction of the foundations, oil containments and trenches and drainage pipes. The Contractor shall place all suitable excavated materials in backfill or in graded embankment in the immediate area at structures. Materials found to be unsuitable for foundation backfill or grading shall be wasted and disposed of at Contractor own expense, and shall be backfilled with select borrowing material.

2.4.2 Excavation shall be maintained in a clean, safe and sound condition until completion of the foundation construction and shall be dike to prevent flooding by surface runoff. Suitable pumping equipment shall be provided and used to dewater excavation so that all installation work and backfilling is performed in the dry state. Any previously prepared foundation bearing surface that is softened by water runoff of otherwise contaminated before placement of the structure foundation shall be excavated and replaced at the Contractor's expenses.

2.4.3 In those excavation where the base is unstable. Lies below groundwater level, or has been over excavated, the Contractor shall furnished and place a layer of crushed stone, or selected backfill, or borrow to stabilize the base for placement of foundation.

2.4.4 Backfill shall be place in not greater than 20cm lifts before compaction. Each lift shall be thoroughly compacted before the following lift is placed, Pneumatic or equivalent tempers shall be used on cohesive materials: vibratory compactors shall be used on non-cohesive materials. Compaction shall achieve a density at least equal to that of the

surrounding undisturbed earth. Large stones or rock fragments may be used in the backfill provided they do not interfere with proper compaction. Particles larger than 25 cm shall be placed not nearer than 0.5 m of the structure and at least 1.0m below ground surface.

2.4.5 Rock particles larger than 10 cm shall not be in contact with the concrete.

2.4.6 Upon the completion of excavation a 10 cm thick layer of boulder or selected borrow shall be provided at the base of each foundation.

2.4.7 Payment

No separate or direct payment will be made to the Contractor for excavation and backfill. All costs incurred in connection therewith shall be included in the lump sum bid prices for the construction of the various foundation types.

2.5 Foundation Construction

2.5.1 General requirement

All materials and labor required to remove and replace at his expense any materials incorporated in the work that do not conform to these Specifications.

a) The Contractor will be required to remove and replace at his expenses any materials incorporated in the work that do not conform to these Specifications.

b) The Contractors shall furnish without extra cost all materials the Owner/Engineer may required for testing. The cost of the tests shall be borne by the Contractor.

2.5.2 Measurement

Measurement for payment for the contract item: Concrete foundation, shall be on the basis of the actual number of each type of foundation constructed by the Contractor.

2.5.3 Reference to standard specifications

Standard referred to in these specifications are as follows.

a) ASTM refers to the latest edition of publications of American Society for Testing and Materials.

b) ACI refers to the latest edition of publications of American Concrete Institute.

2.5.4 Measurement Standard

Measurement standards referred to in these Specifications, gallons shall be understood to be U.S gallons.

a) Gallons – whenever used in these Specifications, gallons shall be understood to be U.S gallons.

b) Bag- Wherever used in these Specifications, bag will be understood to mean 50 kg bags of Portland cement.

2.5.5 Concrete

The Contractor shall design and test concrete mixes which have a 28 days specified compressive strength of 210kg/sq.cm.

a) At least on month prior to the placement of any concrete, the Contractor shall test cylinders for each trial mix under both field-cured and laborated cured conditions. The test cylinders shall be made and tested in accordance with the applicable standards. Also for every new batch of cement purchased one set of test cylinders shall be taken before two weeks of using that cement.

b) The concrete mixes be of such proportions as to produce a plastic and workable mix which will not separate during placing and will finish sell without using excessive quantities of mixing water.

c) After the test results are known for the test cylinders, the Contractor shall submit test result to Owner/Engineer then Owner/Engineer will notify the Contractor of the acceptable design mixes.

d) When placing concrete in hot weather, the recommendations of the American Concrete Institute's publication "Recommended, Practice for Hot Weather Concreting"(ACI 605) shall be followed in so far and the Owner/Engineer nay direct. The use of set retarders will be at the Owner/Engineer's discretion. For concrete placed during extremely hot weather, the aggregate shall be collected by frequent water spraying in such a manner as to utilize the cooling effect of evaporation. Concrete with a temperature of 30 deg. C high before placement will be rejected and shall be wasted at the Contractor's expense.

2.5.6 Cement

In locations where conditions do not required high sulfate resistance, cement shall conform to the requirements of ASTM C150 type 1.

a) In locations where, in the opinion of the Owner/Engineer, the conditions required the use of high sulfate resistance cement, conforming to the requirements of ASTM C150 type V shall be used without any extra cost to the Owner.

b) The aggregates shall consist of clean, natural materials or, subject to the approval of the Owner/Engineer, manufactured aggregate may be used.

c) Aggregates shall be separated into sand and coarse aggregate before being used. No pit or crusher run materials will be permitted without prior approval of the Owner/Engineer.

d) Natural fine aggregate or sand grading shall be within the following limits and the fitness modules shall be between 2.5 and 2.8.02

Sieve Size	Amount finer than each Laboratory
U.S. Std.	Sieve, Weight Percent
3/8" (9.5mm)	100
# 4 (4.75mm)	95 to 100
# 8 (2.36mm)	80 to 10
# 16 (1.16mm)	50 to 85
# 30 (600micron)	25 to 60
# 50 (300 micron)	10 to 30
# 100 (100 micron)	2 to 10

c) Natural coarse aggregate grading shall be within the following limits, depending upon the nominal size of the coarse aggregate.

U. S Standard Sieve	Nominal 1-1/2"	Nominal ¾" (19mm)
2" (50.8mm)	100	
1-1/2" (25-38mm)	95-100	
1" (25mm)		100
¾" (19mm)	35-70	90-100
3/8" (9.5mm)	10-30	20-55
No. 4 (4.75mm)	0-5	0-10

2.5.7 Slump

All the concrete shall have a maximum slump of 102 mm and minimum slump of 75 mm at the time of placing. The water-cement ratio shall be determined by consideration of the specified strength, the water reducing admixtures, the slump required for proper placement, air entraining requirements, the available and maximum allowable aggregate size and its specific gravity the fitness modulus of the fine aggregate and its specific gravity and the amount of water carried on the aggregates. The slumps and maximum sizes of aggregate as well as the computation of trail mixes shall be as described in the American concrete Institute Recommended Practice of Selecting Proportions for Concrete (ACI 613) The minimum amount of cement per cubic meter of concrete using 8mm aggregate, shall be 6 bags (300kg) for a concrete design strength of 210kg/sq. cm. But if 210 kg/cm^2 strength of 28 days concrete cannot be achieved with this cement content the more cement shall be used for which the Contractor will not get nay extra payment. The proportion of all materials in the concrete shall be subjected to approval by the Owner/Engineer. The Contractor shall provide all plant and equipment necessary to determine and control the actual proportion of materials entering the batch.

a) In calculating the total water in any mix. The amount of water carried on the aggregate shall be included, the water on the aggregate shall be determined periodically by test and the amount of free water on the aggregate subtracted from the water added to the mix. In all cases the amount of water to be used shall be the minimum amount required to produce a plastic mixture of the strength specified and of the required density, uniformity and workability. The consistency of any mix shall be that required for the specific placing conditions and methods of placements.

b) Water used in mixing and curing concrete shall not more than 1,000 parts per million chlorides no more than 1,3000 parts per million sulfates, shall not have a turbidity count greater than 2,000 parts per million and shall also be free of objectionable quantities of oil and organic materials.

2.5.8 Storage of materials

Cement and aggregate shall be stored at the site of the work in such manner as to payment deterioration or instruction of foreign matter. Special care shall be taken in storing cement to keep it thoroughly dry at all times.

a) Cement that has become caked in storage in still usable only if, when pressed between the thumb and fingers, it powders readily. Otherwise, its use will not be permitted.

b) When reinforcing steel is delivered to the job in advance of the Contractor's requirements, the Contractor shall provide suitable protection in order to prevent excessive rust developing on the reinforcing steel. It will be Contractor's responsibility to remove excessive rust.

c) Before starting the foundation construction all screened aggregates and sand shall be collected and stockpiled near site. So that it is free from clay, dust and other foreign materials.

2.5.9 Concrete mixing

Before any concrete mixing is begun all equipment for mixing, transporting and placing the concrete shall be cleaned of all dirt and debris. All dirt and debris shall also be removed from the places to be occupied by the concrete.

a) All mechanical equipment shall be checked before starting a concrete placement to as certain whether or not is in good operation condition and not shall be tuned-up, repaired or replaces to the satisfaction of the Owner/Engineer.

b) When a foundation location is ready for concrete placement, the Contractor shall inform Owner/Engineer at least 24 hrs. before concrete placing time so that Owner/Engineer may inspect to assure that the excavation is free of water, mud any debris : then the bottom surface of the excavation is a well leveled and properly compacted crushes stone sub-base; that the reinforcing steel is properly secured in place; and that the form-work is properly braced.

c) Rock surface shall be as flat as possible and projecting ridges shall be leveled off before the concrete is placed or space between the ridges shall have been filled with concrete to form a horizontal surface.

d) The Contractor shall ensure that all materials that is to be embedded in the concrete has been placed before the concrete is places. The contractor shall be responsible for the accurate location of all embedded materials. Any work in accurately or improperly set shall be relocated and rest reset at the Contractor's expense.

e) All batching components of the concrete shall be accurately measured. Measuring on a weight basis is preferred however measuring on a volume basis will be allowed as long as careful controls are maintained. Weight measurements shall be made using standards batching equipment for large quantities and wheelbarrow scales for small quantities. Volume measurements shall be made in batching boxes. The batching boxes shall be as large as is practical.

f) The batch mixer shall be rotated at a speed recommended by the manufacturer and mixing shall be continued for at least one and one half (1-1/2) minutes after all materials are in the mixes, unless the size of the batch is over 1.2 cu. M. when additional mixing time shall be required as advised by the Owner/Engineer. A mechanically operated batch mixer shall be used for concrete mixing.

g) The retempering of concrete, which has partially hardened, that ism remixing with or without additional cement, aggregate or water, will not be permitted.

h) Concrete shall be conveyed from the mixer to the place of final deposit within 30 minutes by methods which will prevent the segregation or loss of the materials. After 30 minutes of mixing the mixed concrete shall be rejected and replaced by fresh concrete at contractors own expense.

i) Equipments for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insured a practically continuous flow of concrete at the delivery end without separation of the materials. The chutes shall never be on a slope that is steeper than two vertical to three horizontal. Conveying equipment shall not any aluminum parts the come in contact with the concrete.

j) When the Concrete is to be placed on hard rock or other concrete, after the existing surface has been properly cleaned and otherwise prepared the existing surface is to be wetted until it is saturated. The first batch of concrete places shall be as required. The grout shall be evenly spread on the water-saturated surface and then normal concrete shall be deposited continuously and as rapidly as practicable.

k) The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the bars and so that each layer properly mixes with its predecessor. Successive layers shall be places within 15 minutes of the proceeding layer.

l) When placing concrete with free drops over 2 meters, sufficient numbers of hoppers and trunk must be provided of a size to allow for proper placing. The trunk sections shall reach within 500mm of the bottom of the placement.

m) The concrete shall be consolidated during and after depositing by vibration, the concrete shall be thoroughly worked around reinforcement and embedded items and into corners of forms.

n) All concrete must be consolidated by means of internal vibration expect where the Owner/Engineer has given written permission to use some other method of consolidation. The type and make of vibrator must have a speed of at least 6000 vibrations per minute (VPM) when the machine is being supplied, furnish

efficient transformers, compressors, etc. of approved type to operate all vibrators at the voltage, pressure etc. specified by the manufacture.

o) The Contractor shall always have at least two vibrators in operating condition at the location of the concrete placement.

p) Vibrators shall not be used to transport concrete inside the forms.

2.5.10 The Contractors shall make at least one set of concrete compressive strength test cylinders each day or for each 100 cubic meters of concrete, or as directed by the Owner/Engineer. There shall be three cylinders to a set and the cylinders shall be made in accordance with ASTM C31. Only one cylinder shall be made from any batch containing less than ½ cubic meters of concrete.

a) The Contractors shall delivery cylinders to a location designated by the Owner/Engineer where they will be tested in accordance with ASTM C39. Two of the cylinder will be tested at 28 days. If the 28-days test cylinder shall be discarded. If the 28 days tests indicated a compressive strength of less than 210 kg/sq.cm. the remaining cylinder will be tested at 90 days. The cost of the tests will be borne by the Contractor.

b) If the 90 days compressive strength indicates a compressive strength of less than 210kg/sq.cm. the Owner/Engineer will determine what remedial measures are necessary and the Contractors shall perform the remedial measures at his own expenses. The remedial measurements may include, but are not limited to, the replacement of the entire foundation, The Contractor shall also pay for any additional concrete tests including core drilling and the repairs or replacements which may result from same, which the Owner/Engineer deems necessary strength.

2.5.11 Concrete formwork

Forms shall be used, wherever necessary to confine the concrete for structures and shape it to the required lines OR to insure contamination of the concrete by materials caving or sloughing from adjacent surfaces lest by excavation.

a) Forms shall be provided with tie rods and clamps to have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Molding strips shall be places in the corners of forms so as to produce chamfered edges on permanently exposed concrete surfaces. All exposed surfaces shall be formed with plywood or steel sheathing. Unexposed surfaces may be formed with any materials of adequate strength and

tightness to hold the plastic concrete in proper position and prevent the loss of mortar.

b) If plywood or steel forms are not available, the Contractor may substitute wood planking provided exposed surfaces are remove to remove ridges.

c) Before concrete is places, the surfaces of all forms shall be coated with a form oil that effectively prevents sticking and will not stain the concrete surfaces. For steel forms, form oil shall consist of refined mineral oil. For steel forms, form oil consist or refined mineral oil. For steel forms, from oil shall consist of refined mineral oil compound.

d) Forms shall be removed only after 48 hours of concreting or when the strength of the concrete is such that form removal will not result in cracking, spalling, or breaking of edges of surfaces, or other damage to the concrete. Any concrete damages by forms shall be repaired immediately.

2.5.12 Concrete finishing and curing

a) The expose top surface of all concrete foundation piers shall be wood floated and steel troweled and shall be slightly sloped to prevent the accumulation of water.

b) Immediately after the removal of forms, the holes left by form tie rod fastener shall be filled with mortar and all damaged or defective concrete shall be repaired or removed and replaced to the satisfaction of the Owner/Engineer. Improperly consolidated concrete shall be removed by chipping and the clipped openings or recesses shall be of such depth and shape are required to insure that the patching materials placed in the openings or recesses will be thoroughly keyed and bonded to the concrete. “dry pack” mortar shall be used for filling relatively deep chipped recesses with small surface dimensions. Concrete will be required for the replacement of defective concrete where surface dimension of the shipped openings or recesses are relatively large. The depth of chipped recesses for concrete patches shall extend at least 25 mm beyond the nearest reinforcing steel.

c) To insure proper curing, all concrete shall be kept moist for a period of least ten (10) days. Burlap or/and equivalent materials or a curing compound shall be applied over exposed concrete surfaces, the burlap shall be kept moist at all times.

2.5.13 Membrane curing compound

Membrane curing compound shall be applied uniformly by spray, leaving no pinholes or gaps, at a rate not to exceed 4.91 square meters per liter. The curing compound shall be applied after finishing operations are completed and surface moisture has disappeared. If

forms are removed prior to 7 days placing the concrete, the uncovered surfaces shall be coated with the curing compound as specified herein.

a) Foundations shall not be backfilled before they have been inspected by Owner/Engineer to see that they are free from surface defects and voids, or that the defects and voids have been properly repaired,

b) The foundations shall not be subjected to any loads in addition to those existing at the time of placing of the foundation concrete until the curing period has elapsed.

2.5.14 Payment

No separate or direct payment will be made to the Contractor for concrete. All costs incurred in connection therewith shall be included in the lump sum bid price for the construction of the various foundation types and trenches.

2.5.15 Torsteel reinforcing bar

All torsteel reinforcing bar shall conform to the requirement of BS 1144 or equivalent and shall fabricated in accordance with the "Manual of Standard Practice" of the concrete Reinforcing Steel Institute.

a) Mill scale rust, oil and mud shall be removed from reinforcing steel by firm rubbing with burlap or equivalent treatment before the reinforcing steel is placed.

b) The minimum center-to-center distance between parallel bars shall be two and one-half (2-1/2) times the diameter of the bars. In no case shall be clear spacing between bars be less than 25 mm not less than one -one third (1-1/3) times the nominal maximum size of coarse aggregate.

c) All reinforcing steel shall have a protective concrete cover of not less than:

1) 80mm - on the bottom of footing and on any surface of concrete that will be exposed to salt water.

2) 50mm - concrete exposed to weather or ground

d) Reinforcing steel hall be accurately located and shall be secured in position by the use of annealed iron, no less than No. 16 gauge and shall be supported in a manner that will keep the reinforcement away from the exposed concrete surfaces. Concrete blocks shall be used to support the reinforcing steel in the

foundation mat: broken stones or wooden blocks shall not be used to supporting the reinforcing steel.

No separate or direct payment will be made to the Contractor for concrete Reinforcement Steel. All costs incurred in connection therewith shall be included in the lump sum bid price for the construction of the various foundation types.

2.5.16 Grouting

Grouting for seating structural steel members and equipment on foundations shall be non-shrink (not-setting) Portland cement mortal grout or a suitable commercially available grout, at the Contractor's option. Grouting shall be done under pressure by means of an expanding agent or by means of static head. Propositioning and missing of grout shall conform to the following:

a) Mortal grout containing aluminum powder as an expansive agent mixture of 1 part cement and 2 parts sand, by weight, with a water cement ratio not exceeding 0.55, the quantity of aluminum powder used shall be approximately 0.005 percent of the weight of cement, the actual quantity to be determined from tests with materials to be used, and at the temperature and under the conditions of a placement. Aluminum powder shall be blended with cement in proportions of one part powder 10-50 parts cement, by weight and the blend shall be sprinkled over the dry batch. After all ingredients are added, the batch shall be missed 3 minutes. Grout, which has not been placed within 45 minutes, shall be wasted.

b) In lieu of use of an expensive agent. Settlement shall be reduced by extending the missing period or by delaying final mixture to minimize the interval between time to placement and initial set and placement the under static header pressure. The motor grout shall be mixture of one part cement and 2.5 parts sand, with a water cement ratio of approximately 0.50, slump shall be the minimum necessary to enable placement.

No separate or direct payment will be made to the Contractor for Grouting. All costs incurred in connection therewith shall be included in the lump sum bid price for the construction of the various foundation types.

2.5.17 Payment

Payment for the contract item, Concrete foundation, will be made at the unit price per foundation type bid in the Schedule, which unit price shall include full compensation for all costs incurred in furnishing all materials, equipment and labor and all costs incurred

in furnishing all materials, equipment and labor and all other operations related to concrete Foundation design and construction, including but not limited to:

a) Performing detail foundation design and preparation of construction drawings including bar-bending schedule.

b) Supplying and transporting

c) Excavation, dewatering, providing 10cm thick soiling layer as under Article 2.4.6 of this section, providing 5cm thick (1:3:6) lean concrete layer and back filling for the foundations.

d) Constructing the foundation including form work setting, reinforcement bar cutting bending and fixing.

e) Grouting for base plates

f) Concrete testing

INSPECTION, TESTING AND COMMISSIONING

1.1 SCOPE OF WORK

The whole of the Works supplied under the Contract shall be subject to inspections and tests by the Employer or their Representatives during manufacture, erection and after completion. The inspections and tests shall include, but not be limited to, the requirements of this section of the Specifications.

The Contractor shall provide all costs, appliances, apparatus, supervision, labor and services necessary to carry out all tests, unless specifically stated otherwise.

The Contractor shall furnish the detailed schedule of his commissioning plan at least one month prior to the scheduled date. The schedule shall include the commissioning procedures, testing sequences and details of special testing equipment, tests and commissioning record formats, information about relevant standards etc.

The scope of the commissioning program includes the site testing and putting into successful operation of all the equipment supplied under the Contract, for 33kV, 11kV, AC & DC plants and all secondary voltages systems. Testing of energy meters and certification of their accuracy shall also be included.

1.2 OBJECTIVES

The objectives of commissioning work, prior to the successful energization of Plant at full voltage and connection to the system, are the following:

- Confirm the integrity (correctness) of installation.
- Confirm the integrity of insulation, connections and phasing.
- Ensure proof of equipment characteristics.
- Review workmanship.
- Confirm the correct implementation of the design.
- Check equipment ratings.
- Check settings and operation of protective relays.
- Check and measure resistivity of earthing grid and earthing system.
- Confirm the proper functioning of SCADA system.

1.3 QUALITY ASSURANCE, INSPECTION AND TESTING

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

(a) His organization structure for the management and implementation of the proposed quality assurance program.

(b) Documentation control system.

(c) Qualification data for bidder's key personnel.

(d) The procedure for purchases of materials, parts, components, and selection of sub-contractors' services including vendor analysis, source inspection, incoming raw materials inspection, and verification of materials purchases.

(e) System for shop manufacturing including process controls and fabrication and assembly controls.

(f) Control of non-conforming items and system for corrective actions.
(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 products to the Employer.
(l) System for maintenance of records.
(m) System for handling storage and delivery.
(n) A quality plan detailing out the specific quality control procedure adopting 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.

- 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 Employer's inspection of material/equipment.

The Employer, through his duly authorized representatives, reserves the right to carry out Quality Audit and Quality Surveillance of the systems and the procedures of the Contractor's and the subcontractor's Quality Management and Control Activities.

- Inspection, Testing and Inspection Certificates

The provisions of the clauses on Test and Inspection of the General Conditions of Contract and Special Conditions of Contract shall be applicable to the supply and erection portions of the Works. The Employer shall have the right to re-inspect at his expenses, any material though it would have been previously inspected and approved by him at the Contractor's works before, and if, after the same are inspected at Site following the latter, material is found defective, then the Contractor shall bear the cost of this inspection and reinstatement according to specification.

1.4 TESTS AT MANUFACTURERS WORKS

1.4.1 General

Where no specific test is specified, then the various items of materials and equipment shall be tested in accordance with the relevant British, IEC, or American Standards. Where no appropriate standard is available, tests shall be carried out in accordance with the maker's standard practice, which shall be subject to the Employer's approval.

At least fourteen days' prior notice, in writing or by tele-fax, shall be given to the Employer of the readiness of the plant for test or inspection and every facility shall be provided by the Contractor and sub-Contractor (s) to enable the Employer or their Representative to carry out the inspections and witness the tests. This includes progress, test rig and packing inspections also.

Inspection of equipment will not be carried out unless the Employer has approved copies of the relevant sub-orders, drawings and test procedures. No equipment shall be packed, prepared for shipment, or dismantled for the purpose of packing for shipment, unless it has been satisfactorily inspected, or inspection has been waived by the Employer.

Functional electrical and mechanical tests shall be carried out on the completed plant after assembly in the Works. The extent and method of recording the results shall be agreed by the Employer in sufficient time to enable the tests to be satisfactorily witnessed or to make any changes to the proposed program of tests. All instruments and apparatus used in the performance of the tests shall be subject to the approval of the Employer and, if required by the

Employer, shall be calibrated to an agreed standard at a laboratory of national standing to be nominated by the Contractor and approved by the Employer. The costs of carrying out such calibration shall be borne by the Contractor in all cases.

The costs of making/performing any test shall be borne by the Contractor. This shall apply to tests performed at the site or elsewhere.
After receiving the prior information about the completion of manufacturing at the factory, the Employer will depute his personnel to the Contractor's factory to witness the fabrication, assembly and testing of any or all parts of major equipment. The number of the Employer's personnel and equipment to be witnessed will be as listed below. The duration of such visits shall be as per inspection/testing requirements.

- 12 kV Switchgear	1 persons, 1 visit
- 33 kV Circuit Breaker	2 person, 1 visit
- Power Transformer/Station Transformer	2 persons, 1 visit
- 33 kV Control & Relay Panel	2 persons, 1 visit
- Disconnecting Switch & LA	1 persons, 1 visit
-Instrument Transformers	1 persons, 1 visit

Note:

Inspection and Testing of Power Transformer,

The Inspection and Testing works shall be carried out at the manufacturer's Factory/Premise. The minutes of meeting of the Inspection and Testing works shall be prepared. The inspection report as well as minutes of meeting shall be mentioned with, whether the results of Inspection & Testing comply with the Technical Specification as per contract agreement or not.

After successful Inspection and Testing, Power Transformer shall be sealed and packed in presence of the Employers inspectors/ representative and the same Power Transformer shall be dispatched.

The photograph of the Sealing/packing of Power Transformer along with the representative of the Employer/manufacturer/Contractor shall be submitted with the Inspecting and Testing Certificate.

1.4.2 Test Certificates

Within30 days of the completion of any test, triplicate sets of all principal test records, test certificates and performance curves shall be supplied to the Employer.

These test records, certificates and performance curves shall be supplied for all tests, whether or not they have been witnessed by the Employer or his representative. The information given on such test certificates and curves shall be sufficient to identify the material or equipment to which the certificate refers and should also bear the Contract reference title. Specified requirements shall be shown on each certificate for comparison with actual test results.

When all equipment has been tested, test certificates of all factory and site tests shall be compiled by the Contractor into volumes and bound in an approved form complete with index. Two copies of each volume shall be supplied to the Consultant and five copies to the Employer.

1.4.3 Type Tests

Type tests are required to prove the general design of the equipment and the Contractor may submit certificates of such design tests, which have been carried out on identical equipment. Notwithstanding any provision in BS, IEC or ANSI Standards, the Employer shall have the right to accept such certificates in lieu of the specified type tests or to reject them.

The type tests prescribed shall be carried out at the Contractor's cost in all cases, where either such certificates are not available or are rejected by the Employer.

1.5 RESPONSIBILITIES

To ensure that the test jurisdiction and transfer of responsibilities is regulated by strict safety and handover procedures, the Contractor agrees the interface with the Employer to establish and implement handover procedures consistent with the terms of these Specifications.

The Employer shall retain full jurisdiction over all commissioning activities, which may affect the operation of the existing system. In these circumstances and when so requested, shall provide technical advices and assistances.

The Contractor shall be responsible for technical guidance and assistance in establishing the scope and method of tests, witnessing of the testing, assessment of results, and re-negotiation of the changes in test schedules which may be necessary as a result of other circumstances, such as delays in the delivery, possible equipment failures.

1.6 SAFETY PROCEDURES

The Contractor shall share the responsibility for safety procedures with the Employer. The Contractor shall establish and implement a work permit and tagging system and associated safety procedures (subject to the review of Employer) for all equipment, systems and areas not covered by the Employer's safety procedures.

The Employer will assume responsibility for the establishment and implementation of tagging, safety and work permit procedures for the protection of personnel and equipment, as soon as equipment and systems are connected to or are energizeable from the existing system.

1.7 TRAINING OF THE EMPLOYER'S STAFF

The Contractor shall plan for the Employer's staffs' participation, either continuously or on a regularly recurring basis, in the commissioning work and:

Allow the Employer's staffs to become familiar with the operating and maintenance aspects of the new equipment supplied by him,

Maintain a continuing assessment with the Employer of the precautions required in or possible consequences of, initial energization of equipment, Allow for the above two necessary objectives in the preparation of schedules.

The Contractor shall station at site, at least, one technical expert for a minimum of six months continuously after commissioning to rectify any problems, as well as train the Employer's attending staffs. If required, the length of his stay shall be extended as per requirement, which shall be at the Employer's discretion.

1.8 COMMISSIONING STAFF

The Contractor shall provide commissioning personnel including skilled and unskilled labor as required. Submit a list with names, experience and proposed duration of the stay of key personnel on site, consistent with the construction schedule, along with the commissioning program.

Ensure that only staffs assigned to commissioning fulfills that duty for the duration of the assignment.

Ensure that commissioning staffs have authorization, and the competence, to undertake minor repairs or to make temporary redesigns and to reconnect systems to meet the specified system performance to preclude delays in energization and putting into commercial service of any part of the works.

1.9 TEST EQUIPMENT

The Contractor shall ensure that all instruments, tools and other equipment required for testing and commissioning are available on site, ensure that the test equipment is of satisfactory quality and condition and, where necessary, is calibrated by an approved authority or standard.

Make arrangements for the provision of power supplies for testing with necessary vector configuration, voltage and current rating.

1.10 COMMISSIONING PROGRAM

Prepare a commissioning program for approval by the Employer and for incorporation into the Project master construction program. Allocate adequate time in this program to permit full commissioning of all components.

Carry out all testing during normal working hours as far as practicable. Tests, which involve existing apparatus and system outages, may be carried out outside normal working hours. Give the Employer sufficient notice to allow for the necessary outage arrangements to be made in conformity with the testing program.

Note that no tests listed in the agreed program will be waived except upon the instructions or consent of the Employer in writing.

1.10.1 Test Procedures

The following basic tests, in addition to others, shall be carried out:

- Measurement of insulation resistance.
- AC withstand voltage test

1.10.2 Requirements for Field Tests

The field tests shall be carried out in presence of Employer under the following conditions:

AC withstand test voltages for conductors and outdoor equipment shall be normal operation voltage of the transmission line and, withstand voltage test shall be carried out for ten (10) minutes by the normal voltage mentioned above. The field tests shall be carried out by the Contractor after adjustment of all the equipment have been completed.

Expandable and lead wires and other materials required for the field tests shall be arranged by the Contractor. The Contractor shall be responsible for providing all measuring instruments, test equipment and tools required for the tests.

Preparation of the test record sheets and test reports shall be the responsibility of the Contractor and the results of the field tests shall be submitted by the Contractor for Employer's approval.

Measurement of insulation resistance of the equipment shall be performed by at least 1000 V meggar.

After completion of the measurement of insulation resistance mentioned above, ac withstand voltage test shall be performed by the normal operation voltage of the existing power system in accordance with the following procedure:

- 11 and 33 kV Main Circuit: The 11 kV and 33 kV circuit breakers and disconnecting switches, except for circuit breakers receiving power for the test from the existing power system through a transmission line, shall be closed, succeeding, normal operation voltage shall be charged on the equipment and bus conductors for ten (10) minutes for ac withstand voltage test. The indication value of meters mounted on the board during the ac withstand voltage test shall be recorded on the test record sheets prepared by the Contractor.

Submit test procedures, consisting of detailed test methods and samples of the related test record forms, for all equipment to be tested, to the Employer for approval along with the commissioning program. Strictly adhere to these procedures for the commissioning tests.

1.10.3 Records

Maintain an up-to-date record of all commissioning activities on site.

Record the results of the tests clearly on forms and formats approved by the Employer and with clear references to the equipment and items tested, so that the record can be used as the basis for maintenance tests, in future. Submit the required number of site test records to the Employer as soon as possible after completion of the tests.

Record the details of the test equipment and instruments used in the test sheets, in those cases where the instrument or equipment characteristics can have a bearing on the test results.

1.10.4 "As-Built" Drawings

Keep an ongoing record of all changes on a master set of drawings. Produce and supply a minimum of five complete sets of marked-up "As Constructed/As-Built" drawings before leaving the Site. Correct and re-issue the original drawings as soon as possible as per this specification.

1.10.5 Test Methods

Carry out all necessary tests for commissioning the substations. The following clauses detail the tests which are considered to represent the minimum required in addition to those specified under the appropriate IEC Publications, other approved standards and the manufacturer's instructions for each item of equipment.

Strictly adhere to the methods of testing approved by the Employer.

A) Site and Commissioning Tests for Main and Auxiliary Equipment

General Checks:

Make a general check of all main and auxiliary equipment. Include a check of the completeness, correctness and condition of ground connections, labeling, arcing ring, paint surfaces, cables, wiring, pipe-work, valves, blanking plates and all other auxiliary and ancillary items.

Check for oil and gas leaks and that insulators are clean and free from external damage. Check that loose items, which are to be handed over to the Employer, e.g., blanking plates, tools, spares, etc. are in order and are correctly stored or handed over.

Circuit Breaker Tests

Check and set pressure switches settings when required. Also test mechanical operating systems.

Carry out contact resistance tests. In the case of multi-interrupter circuit breakers, perform resistance tests at each interrupter or pair of interrupters as well as through the series of interrupters on each pole.

Test local and remote trip/close operation and perform circuit breaker and auxiliary contact timing tests on all circuit breakers.

Control/ Relay Panels, energy meters and Switchboards

Carry out general testing and inspection, as referred to above. The Contractor shall also carry following tests: a) Carrier signal testing b) protective relay testing c) Instrument transformers testing c) Phase correcting testing. Functionally test and perform the timing tests on circuit breakers and AC and DC circuits, associated with stand-by auxiliary supplies and stand-by generating sets, particularly where automatic operation is defined.

Carry out insulation measurement tests of secondary circuits with a 1000 V DC meggar before and after high voltage testing.

Check shutters, interlocking, earth procedures and the inter-changeability of components.

Carry out a high voltage 50 Hz dielectric test on each bus at 75% of the specified value for the equivalent factory test.

Disconnecting Switch and Earth Switches

Test all disconnecting switch and earth switches operationally to confirm contact pressures, contact resistance, simultaneous-operation of all phases and the ease of operation.

Check the local and remote indications and the operation of auxiliary contacts. Check the earthing mat at the operating positions and check the availability of connecting points for maintenance earthing arrangements.

Test the earth switches and maintenance earthing devices to confirm the opening and closing sequences and check the ground mat connections, indications and manual locking devices.

Lightning Arresters

Inspect and verify the condition and satisfactory mounting of the arresters and their earth connections, electrodes and operation counters. Note the counter readings.

Test conductivity on selected connections and joints.

Perform high voltage DC tests on all HV cables and isolated phase bus bars at 75% of the specified value for the equivalent factory test. Carry out with at least 1000 V DC meggar the insulation measurement test, before and after high voltage tests.

B) Earthing System

Carry out the tests and measurements in accordance with IEEE Standard 80. Test the effectiveness of the bonding and earthing and make conductivity tests on selected joints on the main earthing system and at the connections to equipment and structures. Check the precautions taken to avoid corrosion attack on the earthing system.

Measure the resistance of the earthing system to the remote earth indicating method and equipment used. Separate test probes of minimum 300 to 600 meters length to effectively test the earthing system. Perform earthing resistance measurements with the transmission line earth wires disconnected from the grounding grid.

C) Particular Constraints and Special Tests

The Contractor shall be prepared to cooperate with any special tests requested by the Employer.