NEPAL ELECTRICITY AUTHORITY

(Undertaking Government of Nepal)

Generation Directorate

Medium Generation Operation and Maintenance Department

PANAUTI HYDRO POWER STATION

Khopasi, Kavre.

NATIONAL COMPETITIVE BIDDING (NCB)

(Single Envelope Bidding Procedures)

TENDER NO.: NEA-PHPS-2074/075-ST-EM-03

BID DOCUMENT

FOR

REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR

First Date Of Notice Publication:	**2074-11-23.**
Last Date And Time Of Bid Purchase:	**2074-12-22 Within Office Hrs.**
Last Date And Time Of Bid Submission:	**2074-12-23 Before 12:00 Hrs.**
Date & Time Of Bid Opening:	**2074-12-23 At 14:00 Hrs**

FY: 2074/075

Issued on: ……

Name & Address of the Bidder: ……..

……..

Abbreviations

BDS..... Bid Data Sheet
BD..... Bidding Document
DCS..... Delivery and Completion Schedule
DP ……. Development Partner
EQC..... Evaluation and Qualification Criteria
GCC..... General Conditions of Contract
GoN..... Government of Nepal
ICC..... International Chamber of Commerce
IFB..... Invitation for Bids
Incoterms..... International Commercial Terms
ITB..... Instructions to Bidders
LGRS..... List of Goods and Related Services
NCB ……. National Competitive Bidding
NEA ……. Nepal Electricity Authority
PAN …….. Permanent Account Number
PPMO ……Public Procurement Monitoring Office
SBD..... Standard Bidding Document
SBQ..... Schedule of Bidder Qualifications
SCC……. . Special Conditions of Contract
SR ..... Schedule of Requirements
TS..... Technical Specifications
UNCITRAL ……. United Nations Commission on International Trade Law
VAT ……. Value Added Tax

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INVITATION FOR BIDS

NEPAL ELECTRICITY AUTHORITY

GENERATION DIRECTORATE

Tender No: **[NEA-PHPS-2074/075-ST-EM-03]**

First Date of publication: ***2074/11/23***

1. **Nepal Electricity Authority (NEA), Generation Directorate, Medium Generation Operation and Maintenance Department, Panauti Hydropower station** invites wax sealed bid from reputable manufacturers, registered suppliers or their authorised representatives for:
   Rehabilitation and Reinforcement of 6.3/33kV Switchyard of Panauti Hydropower Station and 33/11kV switchyard at Bhaktapur.
2. The eligible Bidders shall have up to date Firm/Company Registration Certificate, VAT and PAN Registration Certificates, Tax Clearance Certificate or Submissions of Tax Returns up to ***F.Y. 073/74***, joint venture agreement/authorization (if any), power of attorney and a written declaration of not having conflict of interest in the proposed bid procurement proceedings and has not been punished for the profession or businesses related offences.
3. A complete set of Bid Documents may be purchased during office hours on all working days by any interested eligible Bidder from ***2074/11/23*** onwards upon submission of a written application to the address given below accompanied by a bank voucher of the amount (non-refundable) specified in Clause 5 below towards the cost of the Bid Document deposited in ***NEA, Generation Current A/C No. 1206101-001-012-524 at Nepal Rastra Bank, Thapathali, Kathmandu*** or, **Panauti Hydro Power Station** A/c No. ***01500100050730000001 (Dharauti) at Nepal Bank Limited, Banepa, Kavre***. The Bid document shall be available for sale up to one day before the last date of Bid submission as specified in Clause 7 hereunder.
4. Local bidders must produce an attested copy of the certificates of VAT and PAN registration and Tax Clearance Certificate up to F.Y. 073/74 at the time of purchase of the Bid Document. Local agents intending to purchase the Bid Documents on behalf of their principals must produce the authorization from their principals.
5. All Bids accompanied by a bid bond in amount and validity period as specified below must be delivered in accordance with the Instruction to Bidders at or before 12:00 hour's local time on or before the dates and address: Medium Generation O & M Department, Durbarmarg, Kathmandu.
6. The Bids shall be opened at 14:00 hours local time on the same date of the Bid submission at the office Medium Generation O & M Department Durbarmarg, Kathmandu, in the presence (or without presence) of the authorised representatives of the Bidders who choose to be present. If the specified dates of Bid submission and opening fall on a public holiday, Bid submission and opening shall be done on the next working day.

Tender No.	Last date of Bid Purchase	Last date of Bid Submission	Bid Opening Date and time	Cost of Bid Document (NRs.)	Bid Bond	
NEA-PHPS-2074/075-ST-EM-03	**2074-12-22 Within Office Hrs.**	**2074-12-23 Before 12:00 Hrs**	**2074-12-23 At 14:00 Hrs**	**3,000.00**	**3,60,000.00**	120 days from the last date of Bid submission

7. NEA shall not be responsible for any costs or expenses incurred by Bidders in connection with the preparation or submission of Bids.
8. Interested eligible Bidders may obtain further information on the Bid or inspect the Bid Documents at the office given below or information pertaining to Bid and e-bidding from NEA's website **http://eproc.nea.org.np**
9. Any amendment in the tender notice shall be published in the NEA Web Portal and NEA Generation Business, office of General Manager, Durbarmarg, Kathmandu.

Nepal Electricity Authority
Generation Directorate
Medium Generation O&M Department
Panauti Hydropower Station
Khopasi, Kavre
Tel/ Fax. 011- 410056

Nepal Electricity Authority
Generation Directorate
Medium Generation O&M Department
Durbarmarg, Kathmandu
Tel/ Fax. 01-4153081

Published on The Rising Nepal

Nepal Electricity Authority

Generation Directorate

(Publication Date 2074/11/23)

National Competitive Bidding

Sealed Tenders/Quotations are invited for the following Schemes of Nepal Electricity Authority, Large & Medium Generation Operation & Maintenance Department (LGOMD) & (MGOMD).

S.No.	Works/Jobs (e-bid)	Bid No.	Sale of Bid Documents till date (Office time)	Last date of Bid Submission, Opening Time & Place	Cost of Bid Documents (Bank deposit)	Bid Security/ Bid Bond (Bank Deposit/ Bank Guarantee)	Bid Documents available at	Bank A/C No
Modikhola Hydro Power Station (MKHPS), Dimuwa, Parvat								
1	Supply and Delivery of Various Electronic Components associated with Governor, Bearings, Guide Vanes, Generator Air Brake etc. at MKHPS	MKHPS -074/075-ES-SQ02	Up to 2074/12/07	2074/12/08 till 12:00 Noon & 02:00 PM, Modikhola HPS, Dimuwa, Parvat	NRs. 1,000/-	Nrs.50,000/-	Medium Generation O. & M. Dept., Kathmandu & Modikhola HPS, Dimuwa, Parvat	Nabil Bank Ltd., Pokhara A/C No. 1201017500027 or Nepal Rashtra Bank, Thapathali, Ac No. 1206101-001-012-524
2	Supply, Delivery, Testing & Commissioning of 11 KV Indoor VCB for Incomer & 400/230 V ACB for Internal Distribution System at MKHPS	MKHPS -074/075-MS-SQ05			NRs. 1,000/-	Nrs.50,000/-		
3	Supply and Delivery of Desander Gate Spare Parts at MKHPS with Modification, Repair and Maintenance	MKHPS -074/075-MS-SQ06			NRs. 1,000/-	Nrs.50,000/-		
Panauti Hydro Power Station (PHPS), Khopasi, Kavre								
1	Rehabilitation and Reinforcement of 6.3/33 kV Switchyard of Panauti Hydro Power Station and 33/11 kV Switchyard at Bhaktapur	NEA-PHPS-2074/075-ST-EM-03	Upto 2074/12/22	2074/12/23 till 12:00 Noon & 02:00 PM, Medium Generation Operation and Maintenance Dept. Durbarmarg, Kathmandu.	Nrs. 3,000/-	Nrs. 360,000/-	Medium Generation O. & M. Dept., Kathmandu & Panauti HPS, Khopasi, Kavre	Nepal Rashtra Bank, Thapathali, Ac No. 1206101-001-012-524 or Nepal Bank Limited, Banepa, Kavre A/C No. 01500100050730000001

Section I. Instructions to Bidders

Section I. Instructions to Bidders

A. General	
1. Scope of Bid	1.1 The Purchaser ***indicated in the BDS*** issues this Bidding Document for the supply, delivery of Goods and Related Services incidental thereto as specified in Section V, Schedule of Requirements. 1.2 Throughout this Bidding Document : (a) the term "in writing" means communicated in written form with proof of receipt; (b) if the context so requires, singular means plural and vice versa; and (c) "day" means calendar day.
2. Source of Funds	2.1 NEA, in accordance with its annual program and budget, intends to apply a portion of the allocated budget to eligible payments under the contract(s) ***indicated in the BDS*** for which this Bidding Document is issued. Or The NEA 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 NEA 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 NEA and upon approval by the DP in accordance with the terms and conditions of the financing agreement between the NEA and the DP (hereinafter called the "Loan Agreement"), and will be subject in all respects to the terms and conditions of that Loan Agreement. No party other than the NEA shall derive any rights from the Loan Agreement or have any claim to the funds.
3. Fraud and Corruption	3.1 Anticorruption related laws require that GoN's officials (including beneficiaries of funds), as well as bidders, suppliers, and contractors and their sub-contractors under GoN/DP-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, this bidding document; (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 NEA/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 atters relevant to the investigation or from pursuing the investigation; or

(bb) acts intended to materially impede the exercise of the NEA/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;

(b) 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 competing 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 pricewith 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 Without prejudice to any other rights of the Purchaser under the related laws, GoN 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 convicted by a court of law in a criminal offence which disqualifies the Bidder from participating in the contract, (b) If it is proved that the bidder has committed an act contrary to ITB 3.2. 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 Supplier shall permit the GoN/DP to inspect the Supplier's accounts and records relating to the performance of the Supplier 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 address such practices when they occur.
4. Eligible Bidders	4.1 This Invitation for Bids is open to eligible Bidders/Suppliers indicated ***in the BDS***. 4.2 A Bidder may be a natural person, private entity, government-owned entity (subject to ITB 4.4) or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture (JV). In the case of a JV: (a) all parties to the JV shall be jointly and severally liable; and (b) a JV shall nominate a representative who shall have the authority to conduct all businesses 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. 4.3 A Bidder shall not have a conflict of interest. All Bidders 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, including but not limited to: (a) have controlling shareholders in common; (b) receive or have received any direct or indirect subsidy from any of them; (c) have the same legal representative for purposes of this Bid;

	(d) 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 Purchaser regarding this bidding process; (e) a Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which it is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, 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 goods and services that are the subject of the bid. 4.4 A Bidder that is under a declaration of ineligibility by the GoN/DP in accordance with ITB 3.4, at the date of the deadline for bid submission or thereafter, shall be disqualified. 4.5 A GoN-owned enterprise may also participate in the bid if it is legally and financially autonomous, it operates under commercial law, and it is not dependent agency of the Purchaser. 4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Purchaser, as the Purchaser shall reasonably request. 4.7 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 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, GoN 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.
	4.8 A bidder and all parties constituting the Bidder shall have the nationality of an eligible country as defined by the concerned DP for DP funded projects. 4.9 The domestic Bidder who has obtained Permanent Account Number (PAN) and Value Added Tax (VAT) registration certificate(s) and Tax clearance certificate or proof of submission of tax return from 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 Goods and Related Services	5.1 All goods and related services to be supplied under the contract are eligible, unless their origin is from a country ***specified in the BDS***.

	5.2 For purposes of this clause, "origin" means the place where the goods are mined, grown, or produced, or the place from which the related services are supplied 5.3 The origin of goods and services is distinct from the nationality of the Bidder.
6. Site Visit	6.1 For goods contracts requiring installation/ commissioning/ networking or similar services at site, the Bidder, at the Bidder's own responsibility and risk, is encouraged to visit and examine the Site and obtain all information that may be necessary for preparing the Bid and entering into a contract for the supply of goods and related services. 6.2 The Bidder should ensure that the Purchaser is informed of the visit in adequate time to allow it to make appropriate arrangements. 6.3 The costs of visiting the Site shall be at the Bidder's own expense.

B. Contents of Bidding Document

7. Sections of the Bidding Document	7.1 The Bidding Document consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read and construed in conjunction with any Addenda issued in accordance with ITB 9. **PART 1 Bidding Procedures** • Section I. Instructions to Bidders (ITB) • Section II. Bid Data Sheet (**BDS**) • Section III. Evaluation and Qualification Criteria • Section IV. Bidding Forms **PART 2 Supply Requirements** • Section V. Schedule of Requirements **PART 3 Conditions of Contract and Contract Forms** • Section VI. General Conditions of Contract (GCC) • Section VII. Special Conditions of Contract (SCC) • Section VIII. Contract Forms 7.2 The Purchaser will reject any Bid submission if the Bidding Document was not purchased directly from the Purchaser, or through its assigned office ***as stated in the BDS***. 7.3 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document as well as in Amendments, if any. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid. 7.4 The Invitation for Bids issued by the Purchaser is not part of the Bidding Document
8. Clarification of Bidding Document/Pre-bid meeting	8.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Purchaser in writing at the Purchaser's address ***indicated in the BDS***. The Purchaser will respond in writing to any request for clarification, provided that such request is received within the time limit ***specified in the BDS*** prior to the deadline for submission of Bids. The Purchaser shall forward copies of its response to all Bidders who have

	acquired the Bidding Document directly from it, including a description of the inquiry but without identifying its source. Should the Purchaser deem it necessary to amend the Bidding Document as a result of a clarification, it shall do so following the procedure under ITB 9 and 24.2. 8.2 The purchaser may organize a pre-bid meeting of Bidders at least ten (10) days before the deadline for submission of Bids at the place, date and time as ***specified in the BDS*** to provide information relating to Bidding Documents, Technical specifications and the like matters. Should the purchaser deem it necessary to amend the Bidding Document as a result of a clarification, it shall do so following the procedure under ITB 9 and ITB **24.2**.
9. Amendment of Bidding Document	9.1 At any time prior to the deadline for submission of the Bids, the Purchaser may amend the Bidding Document by issuing addenda. 9.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document directly from the Purchaser. 9.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of the Bids, pursuant to ITB **24.2**.

C. Preparation of Bids

10. Cost of Bidding	10.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
11. Language of Bid	11.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in the 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.
12. Documents Comprising the Bid	12.1 The Bid shall comprise the following: (a) Bid Submission Sheet and the applicable Price Schedules, in accordance with ITB Clauses 13, 15, and 16; (b) Bid Security in accordance with ITB 21; (c) alternative bids, if permissible, in accordance with ITB 14; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 22; (e) documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to bid; (f) documentary evidence in accordance with ITB Clauses 18 and 31, that the Goods and Related Services conform to the Bidding Document;

	(g) documentary evidence in accordance with ITB 19 establishing the Bidder's qualifications to perform the contract if its Bid is accepted; and (h) any other document required in the BDS. 12.2 The Bidder is solely responsible for the authenticity of the submitted documents
13. Bid Submission Letter and Price Schedules	13.1 The Bidder shall submit the Bid Submission Sheet using the form furnished in Section IV, Bidding Forms. This form must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested. 13.2 The Bidder shall submit the Price Schedules for Goods and Related Services, according to their origin as appropriate, using the forms furnished in Section IV, Bidding Forms
14. Alternative Bids	14.1 Unless otherwise ***indicated in the BDS***, alternative bids shall not be considered.
15. Bid Prices and Discounts	15.1 The Bidder shall complete the appropriate Price Schedule and the sources of Goods schedules included herein, stating the unit prices, total cost per item, the total Bid amount and the expected countries of origin of the Goods to be supplied under the contract. 15.2 Prices quoted in the Price Schedules shall be entered separately in the following manner: i. the price of the goods quoted EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable: (i) on the components and raw materials used in the manufacture or assembly of goods quoted ex works or ex factory; or (ii) on the previously imported goods of foreign origin quoted ex warehouse, ex showroom or off-the-shelf; ii. the price for inland transportation, insurance, and other costs incidental to delivery of the goods to their final destination, if ***specified in the BDS***; iii. the price of other (incidental) services, if any, ***listed in the BDS***. 15.3 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, unless otherwise ***specified in the BDS***. A Bid submitted with an adjustable price quotation shall be treated as nonresponsive and shall be rejected, pursuant to ITB **31**. However, if in ***accordance with the BDS***, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero. 15.4 The terms EXW shall be governed by the rules prescribed in the current edition of INCOTERMS published by the International Chamber of Commerce, Paris.

	15.5 The Bidder's separation of price components in accordance with ITB 15.1 above will be solely for the purpose facilitating the comparison of bids by the Purchaser and will not in any way limit the Purchaser's right to contract on any of the terms offered. 15.6 If the Bidder intends to offer any unconditional discount, it shall always be expressed in fixed percentage and that shall not vary as the quantity varies and be applicable to each unit rate. The methodology for its application shall be provided in bid submission letter.
16. Currencies of Bid	16.1 All Prices shall be quoted in Nepalese Rupees or as specified in **BDS.**
17. Documents Establishing the Eligibility of the Bidder	17.1 To establish their eligibility in accordance with ITB 4, Bidders shall: (a) complete the eligibility declarations in the Bid Submission Sheet, included in Section IV, Bidding Forms; and (b) if the Bidder is an existing or intended JV in accordance with ITB 4.2, submit a copy of the JV Agreement, or a letter of intent to enter into such an Agreement. The respective document shall be signed by all legally authorized signatories of all the parties to the existing or intended JV, as appropriate. (c) submit the copy of the documents as ***specified in BDS***.
18. Documents Establishing the Conformity of the Goods and Related Services to the Bidding Document	18.1 To establish the conformity of the Goods and Related Services to the Bidding Document, the Bidder shall furnish as part of its Bid the documentary evidence that the Goods and Related Services conform to the requirements specified in Section V, Supply Requirements. 18.2 The documentary evidence may be in the form of literature, drawings or data, and shall consist of a detailed item-by-item description of the essential technical and performance characteristics of the Goods and Related Services, demonstrating substantial responsiveness of the Goods and Related Services to those requirements, and if applicable, a statement of deviations and exceptions to the provisions of Section V, Schedule of Requirements. 18.3 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Section V, Schedule of Requirements, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in Section V, Schedule of Requirements.
19. Documents Establishing the Qualifications of the Bidder	19.1 The documentary evidence of the Bidder's qualifications to perform the contract, if its bid is accepted, shall establish to the Purchaser's satisfaction that the Bidder meets each of the qualification criterion specified in Section III, Evaluation and Qualification Criteria. 19.2 If so ***required in the BDS***, a Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization using

	the form included in Section IV, Bidding Forms to demonstrate that it has been duly authorized by the manufacturer or producer of the Goods to supply these Goods in Nepal and take care of the warranty provided. 19.3 If so ***required in the BDS***, a Bidder that does not conduct business within Nepal shall submit evidence that it will be represented by an Agent in Nepal equipped and able to carry out the Supplier's maintenance, repair and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications. 19.4 A foreign Bidder wishing to have or already having a local agent shall state the following: a. Name and address of the Agent/Representative, b. The Agent/Representative providing type of services, c. Amount of commission if the Agent/Representative is entitled to get such payment and if it participates in the procedure of payment, d. Other agreement with Agent/Representative, if any, e. Bidder shall certify in the Letter of Authorization as follows: "We certify that the statement and disclosure made by us on the above are complete and true to the best of our knowledge and belief", If the agent has not been appointed: f. Source of information about tender invitation, g. The remuneration given to the individual or firm/company or organization to work on its behalf for submitting tender, representation in the bid opening and other required action in connection with the tender, h. Transfer or handover an evidence of foreign currency exchanged which required to be submitted with the tender, i. If the bank account of any Nepali citizen has been used for the exchange of foreign currency specify the name of the individual and his address. If the foreign currency has been exchanged by self then the certificate of currency exchange. 19.5 If a foreign Bidder in its Bid, has not provided the information mentioned in ITB 19.4 or has submitted its bid stating that the Bidder does not have a local agent and later it is proved that the bidder has a local agent or it is proved that the commission mentioned in the Bid is less than the commission received by the local agent then the Purchaser shall initiate proceedings to blacklist such bidder in accordance with ITB 3.2. 19.6 In case of bids submitted in hard copy the Bidder requests for withdrawal or modification of its bid between the interval 24 hours prior to the deadline for submission of bids and expiration of the period of bid validity specified by the Bidder on the Letter of Bid except as provided in ITB 18.2 In case of e-submitted bids, the 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 asprovided in ITB 18.2
20. Period of Validity of Bids	20.1 Bid shall remain valid for a period ***specified in the BDS*** after the bid submission deadline date prescribed by the purchaser. A bid valid for a shorter period shall be rejected by the purchaser as nonresponsive.

	20.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 21, it shall also be extended for a corresponding period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid.
21. Bid Security	21.1 The Bidder shall furnish as part of its bid, in original form a Bid Security as ***specified in the BDS***.
	21.2 If a bid security is specified pursuant to ITB 21.1, the bid security shall be a demand guarantee in any of the following forms at the Bidder's option: (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 case of a bank guarantee, the Bid Security shall be submitted using the Bid Security Form included in Section IV, Bidding Forms. The form must include the complete name of the Bidder. The Bid Security shall be valid for minimum thirty (30) days beyond the end of the validity period of the bid. This shall also apply if the period for bid validity is extended. The bid security issued by any foreign Bank outside Nepal must be counter guaranteed by an "A" class Commercial Bank in Nepal. 21.3 If a bid Security is required in accordance with ITB 21.1, any Bid not accompanied by an enforceable and compliant Bid Security in accordance with ITB 21.2, shall be rejected by the Purchaser as nonresponsive. In case of e- Submission, if the scanned copy of an acceptable bid security letter is not uploaded with the electronic bid then bid shall be rejected. 21.4 If a Bid Security is specified pursuant to ITB 21.1, the Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract Agreement and furnished the required Performance Security. 21.5 The Bid Security may be forfeited: (a) If a Bidder requests for withdrawal or modification of its bid as against of the ITB clause 26.3 during the period of bid validity specified by the Bidder on the Bid submission form except as provided in ITB 20.2; or (b) if the successful Bidder fails to: (i) Sign the Contract in accordance with ITB 42; or (ii) furnish a Performance Security in accordance with ITB 42. 21.6 The Bid Security of a JV must 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 17.1.
22. Format and Signing of Bid	22.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 12 and clearly mark it "ORIGINAL." In addition, the Bidder shall submit copies of the Bid, in the number ***specified in the BDS*** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail. 22.2 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. 22.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the Bid.

D. Submission and Opening of Bids

23. Sealing and Marking of Bids	23.1 Bidders may always submit their bids by mail or by hand or by courier, but in any means bid must be delivered within the deadline of submission as mentioned in ITB 24. When so ***specified in the BDS***, Bidders have the option of submitting their bids electronically. Bidders submitting bids electronically shall follow the electronic bid submission procedures ***specified in the BDS***. 23.2 Bidders submitting bids by mail or by hand or by courier shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with ITB 14, 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. The rest of the procedure shall be in accordance with ITB 23.3 and 23.4. 23.3 The inner and outer envelopes shall: (a) bear the name and address of the Bidder; (b) be addressed to the Purchaser in accordance with ITB 23.1; and (c) bear a warning "NOT TO OPEN BEFORE THE TIME AND DATE FOR BID OPENING". 23.4 If all envelopes are not sealed and marked as required, the Purchaser will assume no responsibility for the misplacement or premature opening of the bid.
24. Deadline for Submission of Bids	24.1 Bids must be received by the Purchaser at the address and no later than the date and time ***indicated in the BDS***. In case of e-submission, the standard time for e-submission is Nepal Standard Time as set out in the server. The e-procurement system will accept the e-submission of bid from the date of publishing of notice and will automatically not allow the e-submission of bid after the deadline for submission of bid. 24.2 The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Document in accordance with ITB 9, in which case all rights and obligations of the Purchaser and Bidders

	previously subject to the deadline shall thereafter be subject to the deadline as extended.
25. Late Bids	25.1 The Purchaser shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 24. Any Bid received by the Purchaser after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
26. Withdrawal, or Modification of Bids	26.1 A bidder may withdraw, or modify its bid after it has been submitted either in hard copy or by e-Submission. Procedures for withdrawal or modification of submitted bids are as follows: (i) Bids submitted in hard Copy a) Bidders may withdraw or modify its bids 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 before 24 hours prior to the last deadline of submission of bid. The corresponding modification of the bid must accompany the respective written notice. All notices must be: (aa) prepared and submitted in accordance with ITB 20 and ITB 21,and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "MODIFICATION;" and (bb) received by the Employer 24 hours prior to the deadline prescribed for submission of bids, in accordance with ITB 24. ii) E-submitted bids. 26.2 a Bidder may submit modification or withdrawal prior to the deadline prescribed for submission of bids through e-GP system by using the forms and instructions provided by the system. Once a Bid is withdrawn, bidder shall not able to submit another bid for the same bid. 26.3 Bids requested to be withdrawn in accordance with ITB 26.1 (i) shall be returned unopened to the Bidders after the end of bid opening process. 26.4 In case of bid submitted in hard copy no Bid shall be withdrawn or modified in the interval between 24 hours prior of 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. In case of e-submitted bid no Bid shall be withdrawn or modified in the interval between for submission of bids and the expiration of the period of bid validity specified by the Bidder on the bid submission form or any extension thereof.
27. Bid Opening	27.1 The Purchaser shall conduct the bid opening in public in the presence of bidder or its representative who chose to attend at the address, date and time ***specified in the BDS***. The Purchaser shall download the e-submitted bid files. The e-procurement system allows the Purchaser to download the e-submitted bid files (report) only after bid opening date and time after login simultaneously by at least two members of the Bid opening committee. Electronically submitted bid shall be opened at first in the same time and date as ***specified above***. Electronic Bids shall be opened one by one and read

	out. The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete. 27.2 Before opening the bids the opening committee shall separate the envelopes of the bids received after the deadline of bid submission, the envelopes containing an application given for WITHDRAWAL, MODIFICATION of bids and the envelopes of bids duly registered. The bids received after the deadline of submission shall be returned to the concerned bidder unopened. Then envelopes marked "WITHDRAWAL" shall be opened first, read out, and recorded, and the envelope containing the corresponding Bid shall not be opened, but returned to the Bidder. If the withdrawal notice is not accompanied by a copy of the valid authorization pursuant to ITB 22.2, the withdrawal shall not be permitted and the corresponding Bid will be opened. Envelopes marked "MODIFICATION" shall be opened, read out, and recorded with the corresponding Bid. No Bid shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at bid opening. Only envelopes that are opened, read out, and recorded at bid opening shall be considered further. 27.3 All other envelopes shall be opened one at a time, and the following read out and recorded: the name of the Bidder and whether there is a modification; the Bid Prices (per lot if applicable), any discounts and alternative offers; the presence of a Bid Security, if required; if there is discrepancy between figure and words, description of such discrepancy; whether the bid form is signed by the bidder or his agent; and any other details as the Purchaser may consider appropriate. Only discounts and alternative offers read out and recorded at bid opening shall be considered for evaluation. No Bid shall be rejected at bid opening except for late bids, in accordance with ITB 25.1. 27.4 The **opening committee** 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 lot if applicable, any discounts and alternative offers if they were permitted; 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. A copy of the record shall be distributed to all Bidders who submitted bids in time, and posted on line when electronic bidding is permitted. The Bidders' representatives who are present shall also be requested to sign an attendance sheet.

E. Evaluation and Comparison of Bids

28. Confidentiality	28.1 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 publication of the Contract award; thereafter, information will be disclosed in accordance with ITB 40.1. 28.2 Any attempt by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post-qualification of the Bids or Contract award decisions may result in the rejection of its Bid. 28.3 Notwithstanding ITB 28.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.
29. Clarification of Bids	29.1 To assist in the examination, evaluation, comparison and post-qualification of the Bids, the Purchaser may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder with regard to its Bid and that is not in response to a request by the Purchaser shall not be considered. The Purchaser'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 Purchaser in the evaluation of the Bids, in accordance with ITB 33.
30.Deviations, Reservations, and Omissions	30.1 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.
31. Determination of Responsiveness	31.1 The Purchaser's determination of the responsiveness of a Bid is to be based on the contents of the Bid itself, as defined in ITB 12. 31.2 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 Goods and Related Services specified in Section V, Schedule of Requirements; or (ii) limits in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids. 31.3 The Purchaser shall examine the technical aspects of the bid in particular, to confirm that all requirements of Section V, Schedule of Requirements have been met without any material deviation or reservation.

32. Non-material Non-conformities	32.1 The Purchaser may regard a Bid as responsive even if it contains minor deviations that do not materially alter or depart from the characteristics, terms, conditions and other requirement set forth in the Bidding Document or if it contains errors or oversights that are capable of being corrected without affecting the substance of the Bid. 32.2 Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify non-material non-conformities or omissions in the Bid related to documentation requirements. Requesting information or documentation on such non-conformities 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. 32.3 Provided that a Bid is substantially responsive, the Purchaser shall rectify non-material non-conformities or omissions. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section III, Evaluation and Qualification Criteria. 32.4 If small differences 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 bid. 32.5 If the value is found fifteen percent more than the quoted amount of the bidder on account of small differences pursuant to ITB 32.4, such bid shall be considered irresponsive in substance and shall not be considered for evaluation.
33. Correction of Arithmetical Errors	33.1 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis: (a) 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 Purchaser 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. 33.2 If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be rejected and the bid security shall be forfeited.

34. Goods manufactured in Nepal to be procured	34.1 If the price of goods manufactured in Nepal, are higher up **to fifteen** percent than that of manufactured in foreign countries, the goods manufactured in Nepal shall be preferred in the evaluation of the Bids. 34.2 for granting such preference pursuant to 34.1, the bidder must submit the country of origin issued by competent authority stating that the value added of the goods in Nepal is more that 30 percent. 34.3 In case of granting preference, the bid shall be compared (for bid comparison only) by adding an amount equal to 15 percent of the bid price of the such Goods manufactured in Nepal to the bid price of Goods manufacture outside Nepal and lowest evaluated bid shall be determined.
35. Evaluation and Comparison of Bids	35.1 The Purchaser shall evaluate and compare each Bid that has been determined, up to this stage of the evaluation, to be substantially responsive. 35.2 To evaluate a Bid, the Purchaser shall only use all the criteria and methodologies defined in this Clause and in Section III, Evaluation and Qualification Criteria. No other criteria or methodology shall be permitted.
36. Post-qualification of the Bidder	36.1 The Purchaser shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive Bid is qualified to perform the Contract satisfactorily. 36.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 19. 36.3 An affirmative determination 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 Purchaser shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.
37. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids	37.1 The Purchaser reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to Contract award, without thereby incurring any liability to the Bidders.

F. Award of Contract

38. Award Criteria	38.1 In the absence of prequalification, the Purchaser shall select to 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.
39. Purchaser's Right to Vary Quantities at Time of Award	39.1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services originally specified in Section V, Schedule of Requirements, provided this does not exceed the percentages ***indicated in the BDS***, and without any change in

		the unit prices or other terms and conditions of the Bid and the Bidding Document.
40. Notification of Intention to Award	40.1	The Purchaser shall notify the concerned Bidder whose bid has been selected in accordance with ITB 38.1 within seven days of the selection of the bid, in writing that the Purchaser has intention to accept his/her bid and shall Inform via the Letter of Intention included in the Contract Forms and the information of name, address and amount of selected bidder shall be given to all other bidders who submitted the bid.
	40.2	If no bidder submits an application pursuant to ITB 43.1 within a period of seven days of providing the notice under ITB 40.1 the Purchaser shall accept the bid selected in accordance with ITB 38.1 prior to the expiry of bid validity period, and notification of award shall be communicated to the bidder to furnish the performance security and sign the contract within fifteen days.
41. Performance Security	41.1	Within fifteen (15) days of the receipt of notification of award from the Purchaser, the successful Bidder shall furnish the Performance Security in accordance with the GCC, using for that purpose the Performance Security Form included in Section VIII, Contract Forms, or another form acceptable to the Purchaser. i) If bid price of the bidder selected for acceptance is up to 15 (fifteen) percent less than the approved cost estimate, the performance security amount shall be 5 (five) percent of the bid price. ii) For the bid price of the bidder selected for acceptance is more than 15 (fifteen) percent below of the cost estimate, the performance security amount shall be determined as follows **Performance Security Amount = [(0.85 x Cost Estimate –Bid Price) x 0.5] + 5% of Bid Price.** The Bid Price and Cost Estimate shall be inclusive of Value Added Tax.
	41.2	Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.
42. Signing of Contract	42.1	The successful Bidder shall sign the contract in the form included in section VIII after the submission of performance security in accordance with ITB 41.
	42.2	At the same time, the Purchaser shall also notify all other Bidders of the results of the bidding, and shall publish in an English/Nepali language newspaper or well-known and freely accessible website the results 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. 42.3 The Purchaser shall promptly respond in writing to any unsuccessful Bidder who, within thirty days from the date of issuance of notification of award in accordance with ITB 40.2, requests in writing the grounds on which its bid was not selected. 42.4 If the bidder whose bid is accepted fails to sign the contract as stated ITB 39.1, the Public Procurement Monitoring Office shall blacklist the bidder on recommendation of the Public Entity.
43. Complaint and Review	43.1 If a Bidder dissatisfies with the Procurement proceedings or the decision made by the Purchaser in the intention to award the Contract, it may file an application to the Chief of the concerning Public Entity of the Purchaser within seven (7) days of having, receipt of such notice or decision making, for review of the proceedings stating the factual and legal grounds. 43.2 An application filed after the deadline pursuant ITB 43.1 shall not be processed. 43.3 The chief of Public Entity of the Purchaser shall, within five (5) days after receiving the application, give its decision with reasons, in writing pursuant to ITB 43.1: (a) whether to suspend the procurement proceeding and the procedure for further proceedings to be adopted; or (b) whether or not to reject a application. No application can be submitted before the Review Committee for review against the decision made by the chief of the Public Entity for the Bid amount up to the value ***as stated in BDS***. 43.4 If the Bidder is not satisfied with the decision of the Public Entity in accordance with ITB 43.3, or the decision by the Public Entity is not given within five (5) days of receipt of application pursuant to ITB 43.1, 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 above the amount as stated in ITB 43.3. The application may be sent by hand, or by post, or by courier, or by electronic media at the risk of the Bidder itself. 43.5 Late application filed after the deadline pursuant to ITB 43.4 shall not be processed. 43.6 Within three (3) days of the receipt of application from the Bidder, pursuant to ITB 43.4, the Review Committee shall notify the concerning Public Entity of the Purchaser to furnish its procurement proceedings and comments on the issue, pursuant to ITB 43.3. 43.7 Within three (3) days of receipt of the notification pursuant to ITB 43.6, the Public Entity shall furnish the copy of the related documents along with its comment or reaction of complaint to the Review Committee.

	43.8 The Review Committee, after inquiring from the Bidder and the Public Entity, if needed, shall give its decision within one (1) month after receiving the application filed by the Bidder, pursuant to ITB 43.4. 43.9 The Bidder, filing application pursuant to ITB 43.4, shall have to furnish a cash amount or Bank guarantee ***as stated in BDS*** with the validity period of at least ninety (90) days from the date of the filing of application pursuant to ITB 43.4. Application filed without furnishing the security deposit shall not be processed. 43.10 If the claim made by the Bidder pursuant to ITB 43.4 is justified, the Review Committee shall have to return the security deposit to the applicant, pursuant to ITB 43.9, within seven (7) days of such decision made. 43.11 If the claim made by the Bidder pursuant to ITB 43.4 is rejected by the Review Committee, the security deposit submitted by the Bidder pursuant to ITB 43.9 shall be forfeited.
44. Provision of PPA and PPR	44.1 If any provision of this document are inconsistent with Public Procurement Act (PPA), 2063 or Public Procurement Regulations (PPR), 2064, the provision of this documents shall be void to the extent of such inconsistency and the provision of PPA and PPR shall prevail
45. Special Instruction to Bidders for E-Bidding	45.1 As per specified in Bidding Data

Section II. Bid Data Sheet

Section II. Bid Data Sheet

A. Introduction	
ITB 1.1	Name of the Purchaser**: Panauti Hydro Power Station, Khopasi, Kavre**
ITB 2.1	Identification number of the Contract: ***NEA-PHPS-2074/075-ST-EM-03*** ***Rehabilitation and Reinforcement of 6.3/33kV Switchyard of Panauti Hydropower Station and 33/11kV switchyard at Bhaktapur.***
ITB 2.1	Name of the Project: ***[Not Applicable]*** Name of the DP: **Not Applicable** Implementing Agency: ***Panauti Hydro Power Station, NEA*** Funding: ***Internal Resources of Nepal Electricity Authority***
ITB 4.1	Bidders from the following countries are not eligible: **[Not Applicable]**
ITB 4.9	The foreign Bidder shall submit at the time of bid submission: (i) Notarized Copy of Firm / Company Registration Certificate (ii) A written declaration made by the bidder, with a statement that s/he is not ineligible to participate in the procurement proceedings; has no conflict of interest in the proposed procurement proceedings, and has not been punished for a profession or business related offense. (iii) Joint Venture Authorization/ Agreement (if any) (iv) A Notarized Power of Attorney authorizing the signatory of the bid to commit the Bid on behalf of the Bidder. (v) Declaration of local agent with percentage of commission. (vi) Declaration to submit VAT registration certificate, at the time of contract agreement. (vii) Other documents as needed
ITB 5.1	Goods and related services to be supplied from following countries are not eligible: ***Not Applicable***
B. Bidding Document	
ITB 8.1	For **clarification purposes** only, the Purchaser's address is: Attention: Name of the Purchaser is **Nepal Electricity Authority** **Generation Directorate** **Medium Generation Operation and Maintenance Department** **Panauti Hydropower Station** **Khopasi, Kavre, Nepal** ***Tel./Fax : 011- 410056*** **Email:- panautihps2022@gmail.com**
ITB 8.1	The purchaser will respond in writing to any request for clarification provided that such request is received no later than **Ten (10)** days prior to the deadline date for submission of bid.
ITB 8.2	Pre-Bid meeting ***"shall not"*** be organized.

	If a Pre-Bid meeting will take place, it will be at the following date, time and place: **Date: N/A** **Time: N/A** **Place: N/A**
C. Preparation of Bids	
ITB 11.1	The language of the Bid is: **Nepali or English**
ITB 12.1 (h)	The Bidder shall submit the following additional documents with its Bid: insert any other documents required, such as,' ***[Insert list of document/s]*** (i) **Power of Attorney (Notarized)** (ii) **Joint Venture Agreement (if any)** (iii) **Manufacturer's Authorization, if necessary** (iv) **End User's Certificates** (v) **ISO or any International Standard Certificate** (vi) **Type test certificate, if necessary.** (vii) **Other documents**
ITB 14.1	Alternative Bids: **Not applicable**
ITB 15.2 (i)	**The price quoted shall be:** The prices shall include all duties, taxes and other levies. The prices should be expressed in the term of EXW in Nepalese Rupees.
ITB 15.2 (ii)	The Prices for inland transportation: ***to be quoted in the Price Schedule*** **The final destination is *respective Power Plant***
ITB 15.2 (iii)	The price of other incidental services: Not **Applicable**
ITB 15.3	The prices quoted by the Bidder shall be: **Fixed**
ITB 15.4	The **incoterms** additions is: **Incoterms 2010**
ITB 17.1 (c)	The Bidders shall submit: ▪ Notarized Copy of Firm / Company Registration Certificate ▪ Notarized Copy of VAT and PAN Registration Certificate, ▪ Notarized Copy of Tax Clearance Certificate/Tax return submission evidence for the F/Y 073/74 ▪ A written declaration made by the bidder, with a statement that s/he is not ineligible to participate in the procurement proceedings; has no conflict of interest in the proposed procurement proceedings, and has not been punished for a profession or business related offense. ▪ Joint Venture Authorization/ Agreement (if any) ▪ A Notarized Power of Attorney authorizing the signatory of the bid to commit the Bid on behalf of the Bidder. ▪ Other documents as needed
ITB 19.2	A Manufacturer's Authorization letter is required for: **1. 33kV VCB** **2. 33kV Current Transformer (CT)** **3. 33kV Potential Transformer (PT)**

	4. Control and Relays (C&R) Panel
ITB 19.3	The Bidder "**is**" required to include with its bid, evidence that it will be represented by an Agent in Nepal.
ITB 20.1	The bid validity period shall be Ninety (90) calendar days after the date of Bid closing prescribed by NEA
ITB 21.1	The Bidder shall furnish a bid security, from "A" class commercial bank with a minimum of ***NRs 3,60,000/-,*** which shall be valid for 30 days beyond the validity period of the bid.
ITB 21.2	If the Bidder wishes to submit the Bid Security in the form of cash, the cash should be deposited in Deposit Account No.: **01500100050730000001 (Dharauti)** of Panauti Hydropower Station, Khopasi, Kavre at **Nepal Bank Limited., Banepa, Kavre** and submit the receipt of the deposited amount of cash along with the bid.
ITB 22.1	In addition to the original of the Bid, the number of copies is: ***None***
ITB 22.2	The written confirmation of Authorization to sign on behalf of the Bidder shall consist of: ***Power of Attorney***
D. Submission and Opening of Bids	
ITB 23.1	Bidders **shall have** the option of submitting their bids electronically.
ITB 23.1	Electronic submission of bids shall be as per procedures listed in Page No. 26 and onwards of this bidding document.
ITB 24.1	For bid submission purposes only, the Purchaser's address is : **Nepal Electricity Authority** **Generation Directorate** **Medium Generation Operation & Maintenance Department** **Durbar Marg, Kathmandu** ***Tel./Fax :* 01-4153081**
ITB 24.1	The deadline for bid submission is: Date:**2074-12-23** till 12:00 Noon Time : **12:00 hrs** Place : **Nepal Electricity Authority** **Generation Directorate** **Medium Generation Operation & Maintenance Department** **Durbar Marg, Kathmandu** ***Tel./Fax :* 01-4153081**
ITB 24.1	If the last date of purchasing, submission and opening of Bid falls on a government holiday then the next working day shall be considered as the last day without any change in the time and place as fixed.
ITB 27.1	The bid opening shall take place at: Date: **2074-12-23** Time : **14:00 hrs** Place : **Nepal Electricity Authority** **Generation Directorate** **Medium Generation Operation & Maintenance Department** **Durbarmarg, Kathmandu** ***Tel. :* 01-4153081**

ITB 27.1	If electronic bid submission is permitted in accordance with ITB 23.1, the specific bid opening procedures shall be: as mentioned e-bidding process
E. Evaluation and Comparison of Bids	
ITB 34.1	A margin of preference shall be applied to domestically manufactured goods in accordance with the following provisions: a.) The preference margin shall not be applied to the whole package but only to the domestically manufactured goods within the package. b.) For comparison of bids, fifteen (15) percent domestic/privilege shall be granted for goods of Nepalese origin to be supplied directly from manufacturing plant in Nepal.
ITB 36.4	Bids shall be rejected as being non-responsive if: a. The bidder has not purchased and submitted the original document issued by NEA. b. The Bid Document is issued in the name of one firm and Bid proposal submitted by another firm. c. The Bid does not contain wax sealed bid proposal. d. The Bid is not signed and stamped by the bidder or their authorized representative. e. It is proved that bidders have submitted the bids by making such arrangements that limits the participation of other bidders or influences the bid price in any manner. f. The Bid is received by NEA after the deadline for submission of Bids. g. All the information required by the bid document is not mentioned or falsely quoted. h. The documents and guarantee/bank voucher as required by the bid are not attached with the bid proposal. i. The notarized copy of joint venture agreement is not attached, in case the bidder is participating in the bid in Joint Venture. j. The amount of commission, currency of payment, and method of payment to the bidder's agent are not revealed. k. Any other conditions with the agent is not revealed or falsely mentioned. l. The notarized power of attorney to sign the bid on behalf of joint venture is not attached. m. The percentage of liability among joint venture partners is not clearly mentioned. n. The bid is conditional. o. Any conditions mentioned in tender invitation are not fulfilled. p. Data on qualifications of Bidder/ Manufacturer are not filled and the supporting documents required by the forms are not furnished. q. Proposed delivery schedule showing completion dates more than NEA's requirement. r. The Bid fails to satisfy that Bid is fully cognizant of the scope and details of the work involved.

	s. The Bid does not contain technical information and documents for major items required by the Specifications for materials on which the bidder is offering. t. The offered goods are not substantially in compliance with the specification. u. If the attached Technical Data Sheet in the specification is not properly completed and/or data furnished are not supported by the catalogues and test reports (wherever required). v. Qualification criteria as per **Section III** are not met. w. The description provided by the bidders pertaining to the qualification is found to be false or is substantially incomplete. x. The bidder is blacklisted in its contractual obligations in past NEA contracts. y. If the required documents are not submitted authenticated English version. However, the documents in Nepali language issued from the concerned authority of Nepal will also be accepted. z. The Bid Security (Bid Bond) is not enclosed pursuant to Clause 21 or is not acceptable in form and / or substance. aa. The Bid has price escalation clause. bb. The Bid Security submitted is not specifically mentioned to be applicable to the offer of the Bidder. cc. The Bid Bond submitted by someone other than the Bidder does not clearly mention that the Bond is submitted on behalf of the Bidder in the Bid Bond itself. dd. The Bid Bond is not in the name of Joint Venture, in case of Joint Ventures. ee. The bid price of lowest substantially responsive bidder is substantially higher than the estimated price.
F. Award of Contract	
ITB 39.1	The maximum percentage by which quantities may be increased/ decreased is **upto 25%**
ITB 43.3	No application can be submitted before the Review Committee for review against the decision made by the chief of the Public Entity for the bid amount up to the value of Nepalese Rupees 20,000,000 (twenty million)
ITB 43.9	The Bidder, filing application pursuant to ITB 43.4, shall have to furnish a cash amount or Bank guarantee equal to 0.5% of its bid price.
ITB 44.1	This clause is modified as: If any provision of this document are inconsistent with Public Procurement Act (PPA), 2063 or NEA, Financial Administration Regulation, 2068, the provision of this documents shall be void to the extent of such inconsistency and the provision of PPA and NEA, Financial Administration Regulation, 2068 shall prevail.

Special Instructions to Bidders for E-Bidding

(As per ITB 23.1)

General procedures for electronic bid submission (e-submission) is described below.

Bid preparation

A Bidder who wish to submit the bid electronically may purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.

Description of bid submission procedure through electronically (e-submission) only:

i) Interested bidders shall, either purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.

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

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

S.N.	Document	PDF File Name	Requirement	Remarks
1	Letter of Bid	Letter of Bid-1	Mandatory	
2	Bid Security (Bank Guarantee)	Bid Security-2	Mandatory	
3	Company Registration	Company Reg-3	Mandatory	All firms of JV
4	VAT Registration	VAT Reg-4	Mandatory for National firms	All firms of JV
5	Tax clearances certificate	Tax-5	Mandatory for National firms	All firms of JV
6	Power of Attorney of Bid Signatory	Power of Att-6	Mandatory	
7	Business Registration (License) Certificate	License-7	Mandatory	
8	Bank Voucher for Cost of Bidding document	Voucher-8	Mandatory	
9	Joint Venture Agreement	JV-Doc-9	Mandatory for JV Firm	In case of JV
10	Qualification Information	Qualifications-10	Mandatory	As per 1.3, 1.4, 1.6, 1.7 of Section III.
11	Applicable Price Adjustment Table	Price adjust-11	Mandatory where applicable	
12	Complete BOQ	BOQ-12	Mandatory	
13	Eligibility Information	Eligibility-13	Mandatory as per ITB 17.1(c)	
14	Schedule of Requirement	Sch. Of Req.-14	Mandatory	Delivery Schedule of Section V
15	Manufacturers Authorization	Auth-15	Mandatory where applicable	Additional Documents as stated in TDS of section
16	Technical Data Sheet	TDS-16	Mandatory	
17	Catalogues mentioned in Technical Specification	Catalogues-17	Mandatory	
18	Type Test Certificate	Certificate-18	Mandatory where applicable	
19	ISO or any international standard certificates	ISO-19	Mandatory where applicable	

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

iv) For e-submission purpose the Bidder shall, at first, register in the e-procurement section of NEA Web site http://www.nea.org.np

v) After preparing all the required bidding documents in PDF scan files as specified in (ii) and (iii), the Bidder shall upload the PDF bid files and submit his complete bid online through e-procurement section of NEA website http://www.nea.org.np within the specified date and time

The Employers address for the purpose of e-submission of bid:

The Employers address for the purpose of electronic Bid submission is e-procurement section of http://www.nea.org.np.

In case of e-submission of bid, 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.

In case both the electronic bid and original bid in hard copy are submitted to the Employer within the specified time period, the Bidder's electronic bid and original bid in hard copy will be accepted for evaluation provided the Bid price in Bill of Quantity Sheet is same. If there is any discrepancy in Bid price in Bill of Quantity between the electronic 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, as per ITB Clause.

However, for electronically submitted bid in PDF files, the bidder shall be required to submit documents/clarifications as specified in ITB Clause within 3 days of notification.

The deadline for e-submission of bids shall be;

- Bidders shall be also explained about the details of e-submission procedures in the pre-bid meeting.
- The e-procurement system will accept the e-submission of bid during office hours from the date after publishing the notice and will automatically not allow the e-submission of bid after the deadline for submission of bid, as specified above.
- The standard time for e-submission is Nepalese standard time as set out in the server of NEA.
- In case of e-submission of bid, the Bidder shall submit his bid electronically in PDF files in the manner as specified in ITB Clause only, and submission of "original plus one copy" shall not be required before deadline for submission time as per ITB Clause.

Provision for Substitution or Modification or Withdrawal of Bid

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.

In case of e-submitted bid;

- Bidders may submit his Substitution or Modification or Withdrawal either in hard copy or through e-submission.
- For Substitution of Bid the Bidder shall follow similar steps as specified in ITB -Clause with a Substitution letter in PDF file.
- 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.

Bid opening for e-submitted bid;

- Electronically submitted bid shall be opened first at the same time and date as specified in the ITB and IFB notice.

- The e-procurement system allows the Employer to download and open the e-submitted bid files from bidders only after the time for opening the bids.
- The e-submitted bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files (not complying the ITB Clauses) shall be considered incomplete and rejected for further bid evaluation.
- After opening of e-submitted bids files, all files shall be printed and recorded at the time of bid opening.

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

Clarification of Bid

In case of e-submission of bid, the Bidder shall be required to submit the original completed Bid consisting of Forms of Bid, Qualification Information, Special Conditions of Contract, Bill of Quantities, Supplementary Information and other clarifications for verification purpose upon notification to do so from the Employer.

Examination of e-submitted Bids and Determination of Responsiveness

For a e-submitted bid to be substantially responsive the requirement as specified in the ITB Clauses shall be fulfilled.

Evaluation and Comparison of e-submitted Bids

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 as specified in ITB Clause.

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

Steps to be followed by a Bidder to submit the electronic bid submission

1. Prepare the paper bid document

- Either purchase the Bid Document directly from the Employer office or may download the bid document from the website and deposit the equivalent amount in the Revenue account of the employer as specified in the notice or/and Bid Document.
- Fill the rates and amount in BOQ,
- Fill the Bid Form,
- Prepare the necessary copy of Company registration, VAT/PAN registration, Tax clearance certificate,
- Prepare the necessary specific papers like Power of Attorney for bid signatory, Joint Venture agreement, if bidding in JV,
- Prepare summary of qualification information sheet (Financial turnover, Experience, Manpower, Equipment, Credit line, Litigation etc) in the specified format,
- Prepare the bid guarantee letter for the specified bid security amount and in the specified format,

2. Prepare the Electronic bid files in pdf format

Once prepared the above paper documents the bidder shall prepare the electronic bid files in pdf format as follows;

- Scan the above documents in pdf format, give the specific file name for each document,

- Prepare all scanned bid files in pdf format and save them in a separate folder in own computer to ease bid uploading process.

3. Electronic bid submission

- Once the electronic bid files are ready the Bidder shall connect to internet,
- Open the NEAs website www.nea.org.np and open E-procurement section,
- Register in the Bidders name and get User name and Password for Login,
- Confirm the registration by clicking the specified link in auto generated e-mail from NEAs web site,
- After confirmation for bidder's registration click Bidder, fill User name, Password and Login,
- Choose and click the specific tender notice for which the electronic bid files has been prepared,
- Click the Bid now button to submit the electronic bid files,
- Upload each specified electronic bid files by clicking the Upload button and select the respective bid files by Browsing,
- Once all the electronic bid files are uploaded, click the Submit the Bid button for final e-submission of electronic Bid,
- Once the e-submission is successfully completed the Bidder shall receive a auto generated confirmation e-mail from the NEAs website,
- Bidder to keep the conventional paper bid document, qualification information, and other related documents safe as the Buyer may seek the supporting bid documents and clarifications, as necessary during bid evaluation process.
- The Bidder shall submit the necessary supporting documents and clarifications (conventional bid document)

Section III. Evaluation and Qualification Criteria

Section III - Evaluation and Qualification Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders if the bidding was preceded 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 35 and ITB 36, 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 35.2 the following criteria shall apply:

Evaluation Criteria

1.1 Power of Attorney

The Bid shall include a notarized power of attorney authorizing the signatory of the bid to commit the Bid on behalf of the Bidder.

1.2 Legal Status:

i) For the Bidder which is not a Joint-Venture:

The Bidder shall be a **Person or Firm or Institution or Company** for conducting business. A notarized copy of legal registration certificate shall be submitted along with the Bid.

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 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 **Person or Firm or Institution or Company.** Each of the partners of the JV shall be legally registered for conducting business.

(d) Notarized copies of legal registration certificates for each JV partners shall be submitted along with the Bid.

1.3. Project Experience:

1.3.1 For the Bidder which is not a Joint Venture (JV):

a. The Bidder shall include certificates from the end users validating that the Bidder has successfully completed, **Rehabilitation and Reinforcement (or new construction) of at least one contract of similar nature or higher capacity** in the last 10 years.
The Bidder must have executed construction, installation and commissioning of at least one Contract of similar size and nature or number of contract of similar nature whose aggregate size is not less than the size of this bid.

If the bid involves design the bidder shall propose the reputed designer with the experience of similar work and two user certificates not earlier than 10 years from the date of bid submission.

b. The end user's certificates included in the bid shall be on the end user's original letter head with valid address for correspondence and signed by or on behalf of the end user.

1.3.2 For the JV Bidder:

(a) The lead partner shall have completed at least one project of size which is at least < 40% of the Project experience stated above>. If the Bidder is previously not involved in design, then Lead Partner shall propose the reputed designer with the experience of similar work and two end user certificates not earlier than last ten (10) years from the date of bid submission.

(b) Each of the other partners of the JV shall have accomplished at least one project of size (as a JV) at least <25% of the Project Experience stated above>.

1.4 Financial Capacity of the Bidder

1.4.1 Financial Statements:

The Bidder including joint venture partners, if any, shall submit audited financial statements (Balance Sheet and Profit & Loss Account) for the last three (3) fiscal years. Balance sheet and profit& Loss Account sheet shall be signed and sealed by the registered auditor(s).

1.4.2 Line of Credit:

In the event that the working capital of the bidder (including each of the JV partner) is to be supplemented with the line of credit from a Bank, the Bidder shall submit original letter of the Bank pledging unequivocally that the Bank will provide required financial support in case the Bidder is awarded the contract. The amount of line of credit shall be clearly mentioned in the Bank letter. The bid title and the bid number shall also be mentioned in the Bank letter.

1.4.3 Average Annual Turnover

(a) For the Bidder which is not a Joint Venture:

The Bidder shall have Average Annual Turnover (defined as the total payments received by the Bidder averaged over last three consecutive years) of not less than **NRs. 7.2 Million.**

(b) For the JV Bidder:

i. The Average Annual Turnover of the lead partner shall not be less than 40% of the amount stated above in sub-clause 4.3(a).
ii. The Average Annual Turnover of other partners shall not be less than 25% of the amount stated in sub-clauses 4.3(a).
iii. Aggregate Annual Turnover (with line of credit facilities) of all the JV partners shall not be less than the values specified in sub-clauses 4.3(a).

1.4.4 Availability of Financial Resources (Working Capital)

(a) For the Bidder which is not a Joint Venture:

The Bidder shall have working capital (defined as total current assets less total current liabilities) of **at least NRs. 4.32 Million** in the last fiscal year.

If the Bidder's working capital is inadequate, the Bidder shall supplement Working Capital with Banker's letter confirming the availability of a line of credit such that aggregate of the Bidder's Working Capital for the last fiscal year and the line of credit shall not be less than the required amount.

(b) For the JV Bidder:

i. Working Capital of the lead partner shall not be less than 40% of the amount stated above in sub-clause 4.4(a).

ii. Working Capital of other partners shall not be less than 25% of the amount stated in sub-clauses 4.4(a).

iii. Aggregate working Capital (with line of credit facilities) of all the JV partners shall not be less than the values specified in sub-clauses4.4 (a).

1.5 Quality of Goods/Services

i. In case the Bidder is not the manufacturer of Goods/Services offered, the Bidder shall submit manufacturer's certificate authorizing the Bidder to supply the manufacturers' Goods

- **33kV VCB**
- **33kV Current Transformer (CT)**
- **33kV Potential Transformer (PT)**
- **Control and Relays (C&R) Panel**

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 letterhead with seal/stamp of the manufacturer.

ii. The manufacturers of goods/ services to be supplied under this Bid shall hold valid quality **ISO certificate** as required by the specifications and a copy of ISO certificates 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 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.

1.6. Manufacturer's Experience

The Bidder shall submit at least two numbers of end user certificates showing that the Bidder or manufacturer has successfully completed the **supply, delivery, testing and commissioning of (List of items as asked in Technical Data Sheet) as least twice the bid quantity** of the similar items as a main supplier over last five years period ending on the last date of bid submission. Out of the supplied quantity, a minimum of half the bid quantity of offered goods shall have been in operation satisfactorily to the end users for at least one (1) year. The end user certificates shall be on the letterhead of the end user with valid address for correspondence and signed by or on behalf of the end user.

1.7. 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.

2. Qualification

2.1 Eligibility

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

2.1.1 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	not applicable	Letter of Bid

2.1.2 Government-owned Entity

Applicant required to meet conditions of ITB Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Forms ELI -1, ELI - 2 with attachments

2.1.3 Ineligibility

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	not applicable	Letter of Bid

2.1.4Other Eligibility

- Notarized Copy of Firm Registration Certificate
- Notarized Copy of Business Registration Certificate
- Notarized Copy of VAT and PAN Registration Certificate,
- Copy of Tax Clearance Certificate/Tax return submission evidence for the F/Y 2073/074
- A written declaration made by the bidder with a statement that s/he is not ineligible to participate in the procurement proceedings; has no conflict of interest in the proposed procurement proceedings, and has not been punished for a profession or business related offence.
- Joint Venture Authorization/Agreement (if any).
- Notarized Power of Attorney.
- Other documents as needed

2.2 Pending Litigation

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

2.2.1 Pending Litigation

All pending litigation shall be treated as resolved against the Applicant and so shall in total not represent more than 50 percent of the Applicant's net worth.	must meet requirement by itself or as partner to past or existing JV	not applicable	must meet requirement by itself or as partner to past or existing JV	not applicable	Form LIT – 1

Note: (1) *The percentage should normally be within the range of 50% to 100% of an Application's net worth.*

2.3 Financial Situation

Refer above clause **1.*4.* (Financial Capacity of the Bidder)**

2.4 Experience

Refer above Clause 1.***3. Project Experience***

2.4.2Specific Construction Experience

(a) **Contracts of Similar Size and Nature**

Refer above Clause 1.***3. Project Experience***

(b) **Experience in Key Activities**

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
For the above or other contracts executed during the period stipulated in 2.4.2(a) above, a minimum experience in the following key activities: The Bidder must have executed Rehabilitation and Reinforcement **(or new construction)** of	must meet all requirements	must meet all requirements	Each Partner other than Lead partner must executed at least one contract or number of contract of Rehabilitation and Reinforcement **(or new construction)** of at least one	not applicable	Form EXP-2(b)

at least one contract of similar nature or of higher capacity or number of contract of similar nature whose aggregate size is not less than the size of bid amount.			contract of similar nature or higher whose aggregate size is not less than 20% of the size of bid amount.		

* List the production rate(s) for the key activity or activities in the subject contract. The rates should be about 80% of the estimated production rates of the key activity or activities in the subject contract as needed to meet the expected construction schedule with due allowance for adverse climatic conditions.

2.5 Personnel

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

No.	Position	Total Work Experience [years]	Experience In Similar Works [years]
1	Project Engineer (Electrical)	5	3
2	Electrical /Electronics/Mechanical Technical personnel	5	2
3			
4			
5			

Note: *The bidder must submit the copy of documentary evidence for this along with bid document for required Personnel*.

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Information Forms included in Section 4 (Bidding Forms).

2.6 Equipment

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

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

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section 4 (Bidding Forms)

Section IV. Bidding Forms

1. Bid Submission Form

(The Bidder shall accomplish the Bid Submission Form in its Letter Head Clearly showing the Bidders Complete name and address)

Date: _____

Invitation for Bid No.: _____

To:

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre
Tel./Fax 011-410056

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Document, including Addenda No.: [***INSERT NO***.]_____;

(b) We offer to supply in conformity with the Bidding Document and in accordance with the delivery schedule specified in the Schedule of Requirements, the following Goods and Related Services: ***[description of goods and services]***_____
_____;

(c) The total price of our Bid, excluding any discounts offered in item (d) below is: ***[total Bid amount in words and figures]***_____
_____;

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

(e) Our Bid shall be valid for a period of _____***[Insert number as specified in bid validity period]*** days from the date fixed for the bid submission deadline in accordance with the Bidding Document, 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 the amount of …. of the Contract Price for the due performance of the Contract;

(g) We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Document;

(h) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the GoN;

(i) The following commissions, gratuities, or fees, if any, have been paid or are to be paid with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount and currency

(If none has been paid or is to be paid, indicate "none.")

(j) 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.

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

(l) We declare that, we have not been black listed as per ITB 3.4 and 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.

(m) We agree to permit NEA/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 NEA/DP.

Name _____

In the capacity, of _____

Signed _____

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

Date _____

2. Bid Security

[This is the format for the Bid Security to be issued on the letterhead by a "A" class commercial bank specified by Nepal Rastra Bank]
[Insert Bank's Name, and Address of Issuing Branch or Office]

Date: *[insert date]……*

To:

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre
Tel./Fax 011-410056

BID GUARANTEE No.: *[insert number]…….*

We have been informed that ***[insert name of the Bidder]*** (hereinafter called "the Bidder") intends to submit its bid to you (hereinafter called "the Bid") for the execution of ***[insert name of contract]*** under Invitation for Bids No***. [Insert IFB number]*** ("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 ***[insert name of Bank]*** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of ***[insert amount in figures] [insert amount in words]***upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Form of Bid; or

(b) having been notified of the acceptance of its Bid by the *Purchaser* during the period of bid validity, (i) fails or refuses to execute the Contract, if required, or (ii) fails or refuses to furnish the performance security, in accordance with the ITB.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the contract signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; and (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder; or (ii) thirty (30) days after the expiration of the Bidder's bid which comes to be ***[insert the date]***.

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

Name _____

In the capacity, of _____

Signed _____

Duly authorized to sign the Bid Security for and on behalf of _____

Date_____

3. Technical Proposal Format

Personnel

Equipment

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Others

4. 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*

5. 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.

(i) For the equipment under Bidder's ownership

No.	Equipment Type and Characteristics	Total Nos. of Equipment under Bidder's Ownership	No. of Equipment engaged/proposed for ongoing/committed	Nos. of Equipment proposed for this contract
1.				
2.				
3.				
4.				
5.				

(ii) For the Equipment to be leased/hired

No.	Equipment Type and Characteristics	Total Nos. of Equipment under the ownership of lease/hire provider	No. of Equipment engaged/committed for other works	Nos. of Equipment proposed to be leased/hired for this contract
1.				
2.				
3.				
4.				
5.				
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	Detais of rental / lease / manufacture agreements specific to the projec	

The Bidder shall be solely responsible for the data provided. However, this shall not limit the right of Employer to verify the authenticity of submitted information.

6. Bidder's Information and Qualification Format

(iii) Site Organization

(iv) Method Statement

(v) Mobilization Schedule

(vi) Construction Schedule

(vii) Others

7. Bidder's Information Form

[The Bidder shall fill in this Form. No alterations to its format shall be permitted and no substitutions shall be accepted. In case of joint venture, each partner shall fill the information in separate form.]

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

Page _____ of_ _____ pages

1.	Bidder's Legal Name	
2	Bidder's Address:	
3	Bidder's Country of Registration:	
4.	Bidder's Year of Registration:	
5.	Bidder's Legal Address in Country of Registration	
6.	Bidder's Authorized Representative Information: …..Name: Address: Telephone/Fax numbers: Email Address	
7	Bidder's Telephone/Fax numbers:	
8	Bidder's Email Address:	
	Attached are copies of the following original documents. ❑ 1. Firm Registration Certificate ❑ 2. Authorization to represent the firm	

8. Joint Venture Information Form

Lead Partner	Name of the Lead Partner in Joint Venture: Share of the Lead Partner: Place of Firm Registration: Place of Business Registration: Percentage of Partnership:	
Partner	Name of the Partner in Joint Venture: Share of the Lead Partner: Place of Firm Registration: Place of Business Registration: Percentage of Partnership:	
Partner	Name of the Partner in Joint Venture: Share of the Lead Partner: Place of Firm Registration: Place of Business Registration: Percentage of Partnership:	
	Name of the partner authorized to sign the Bid:	

9. Financial Situation 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			
Profits Before Taxes			
Profits After Taxes			

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

- Historic financial statements must be audited by a certified accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

10. Average Annual Turnover Form

The information supplied should be the Annual Turnover of the Bidder 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 (in NRs)**
Average Annual Turnover	

11. Financial Resources Form

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, available to meet the total cash flow requirements of the subject contract

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

Note:

The letter from the Bank must be unconditional.

12. Pending Litigation Form

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

Year	Matter in Dispute	Value of Pending Claim in NRs	Value of Pending Claim as a Percentage of Net Worth

13. Specific Experience Form

Bidder's Legal Name: _____ Date: _____

IFB No.:

Page _____ of _____ pages

Similar Contract	**Information**		
Contract Identification	_____		
Award date Completion date	_____ _____		
Role in Contract	☐ Contractor	☐ Management Contractor	☐ Subcontractor
Total Contract amount	_____		Currency____
Description of the works performed by the Bidder			
If partner in a JV or subcontractor, specify participation of total Contract amount	_____ %	_____	Currency____
Employer's Name:	_____		
Employer's Address:			
Employer's Telephone/fax number: Employer's E-mail:	_____ _____ _____ _____		

The Bidder shall complete this form for each contract completed/in progress.

14. Statement of Non-involvement in Bankruptcy

To.

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre
Tel./Fax 011-410056

Gentleman,

It is here by certify that... ... ... ***[Name of Bidder]*** has never either himself of any of his direct associates or any of his administrators has been involved in any case of bankruptcy or suspension of payments.

Signed and sealed this day ..... of .....

.....

Bidder's Name in Print and Signature

15. Declaration of Local Agent

The BIDDER offers the following information with respect to a Local Agent:

1. Name and address of Local Agent:

2. Amount of commission, currency of payment, and method of payment:

3. Other conditions of the Agreement:

Signature and Stamp of Bidder

16. Statement of Due Performance

To.

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre
Tel./Fax 011-410056

Gentleman,

The Bidder hereby declares that, till date, no dispute has raised in any contract executed or under execution other than the cases herewith mentioned. All claims raised have been settled amicably between NEA and the bidder beside the cases listed here below. No civil or criminal case against the bidder has been raised or is currently being raised or being dealt with in court other than the cases here with listed.

List of disputes raised in other contracts:

Contract	Employer	Date of dispute	Amount	Remarks
.....	.....	.....	.....	.....

List of claims pending from other contracts:

Contract	Employer	Date of claim	Amount	Remarks
.....	.....	.....	.....	.....

List of civil criminal cases:

Contract	Employer	Date	Court	Case
.....	.....	.....	.....	.....

Signed and sealed this day ... of ... ...

.....
BIDDER's Name in Print and Signature

17. 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									

18. Manufacturer's Authorization Letter

[This letter of authorisation 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:

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre
Tel./Fax 011-410056

WHEREAS ***[name of the Manufacturer]*** who are established and reputable manufacturers of ***[name and/or description of the goods]*** having factories at ***[address of factory]***

We hereby authorize ***[name and address of Agent]*** solely to submit a Bid, and subsequently negotiate and sign the Contract with you against IFB No. ***[reference of the Invitation to Bid]*** for the above goods manufactured by us.

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 _____

(Form To be filled up by Bidder/Manufacturer)

S. N.	Description	NEA requirement	Bidder's Status
1	**Experience (To be filled in by manufacturer)**		
1.1	Manufacturing experience	At least 5 years	
1.2	Users' certificates	At least from 2 Users for 2 times the Bid Quantity (in total)	
1.3	Satisfactory Operation of GOODS for at least 1 year	0.5 times of Bid quantity (in total)	
2	**Financial Status (To be filled in by Bidder)**		
2.1	**(a) For the Bidder which is not a Joint Venture** Average annual turnover of the Bidder over the last 3 years (2070/71, 2071/72, 2072/73, 2073/74) **(b) For the JV Bidder** Annual turnover for each year of the Lead Partner over the last 3 years (2070/71, 2071/72, 2072/73, 2073/74) Average annual turnover of the Other Partners over the last 3 years (2070/71, 2071/72, 2072/73, 2073/74)	At least NRs 7.2 Million At least 40% of the amount stated above in Sub-clause 2.1 (a) At least 25% of the amount stated above in Sub-clause 2.1 (a)	
2.2	**(a) For the Bidder which is not a Joint Venture** Working capital in the last fiscal year **(b) For the JV Bidder** Working capital in the last fiscal year for the Lead Partner Working capital in the last fiscal year for Other Partner	At least NRs 4.32 Million At least 40% of the amount stated above in Sub-clause 2.2 (a) At least 25% of the amount stated above in Sub-clause 2.2 (a)	
2.3	Audited Balance Sheet as specified in form Submitted?	To be submitted	
3	**Experience (To be filled in by bidder)**		
3.1	In case the Bidder is not the manufacturer of Goods offered, the Bidder shall submit manufacture'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 letterhead with seal/stamp of the manufacturer.	To be submitted	

3.2	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.	To be submitted	
3.3	Type test certificate, if applicable, shall be included in the bid and shall bear a date that is not earlier than 5 years from the last date of bid submission. The type test certificate shall have been issued by reputed independent laboratory accredited by International Laboratory Accreditation Corporation (ILAC) or International Accreditation Forum (IAF) or other reputed accreditation agencies.	To be submitted	
3.4	The Bidder shall submit at least two numbers of end user certificates showing that the bidder or manufacturer has successfully completed the **supply, delivery, testing and commissioning of (list of items as asked in Technical data sheet) items as 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 50% (of bid quantity) of offered goods shall have been in operation satisfactorily to the end users for at least one (1) year. The end user certificates shall be on the letterhead of the end user with valid address for correspondence and signed by or on behalf of end user.	To be submitted.	
3.5	***Project Experience:*** ***1. For* the Bidder which is not a Joint Venture (JV):** a) The Bidder shall include certificates from the end users validating that the Bidder has successfully completed, supply, delivery, installation, testing and commissioning of at least one contract of similar nature **Rehabilitation and Reinforcement (or new construction) of at least one contract of similar nature or higher capacity** in the last 10 years. The Bidder must have executed construction, installation and commissioning of at least one Contract of similar size and nature or number of contract of similar nature whose aggregate size is not less than the size of this bid. If the bid involves design the bidder shall propose the reputed designer with the experience of similar work and two user certificates not earlier than 10 years from the date of bid submission. b) The end user's certificates included in the bid shall be on the end user's original letter head with valid address for correspondence and signed by or on behalf of the end user. **2. For the JV Bidder:** (a) The lead partner shall have completed at least one project of size which is at least < 40% of the Project experience stated above>. If the Bidder is previously not involved in design, then Lead Partner shall propose the reputed designer with the	To be submitted.	

	experience of similar work and two end user certificates not earlier than last ten (10) years from the date of bid submission. (b) Each of the other partners of the JV shall have accomplished at least one project of size (as a JV) at least <25% of the Project Experience stated above>.		

Nepal Electricity Authority

Declaration Form (for e- bidding)

S. N.	Description		Status			
			Issued (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	Completed Certified Audited Report of the Bidder (and each partner in case of JV)	Year 1				
		Year 2				
		Year 3				
11	Performance (or user) Certificates (Bidder)	1				
		2				
		3				
		4				
12	Manufacturer's Authorizations	1				
		2				
		3				
		4				
13	Power of Attorney for signing the Bid Document & made the declaration					
14	Business License of Manufacturers'					
15	User Certificate s (Manufacturers')					
16	ISO Certificate					
17	Type Test Reports (if required as per specification)					
18	Technical Data Sheet					
19	Other Certificates (as per requirements)					

Price Schedules

Price Schedules

Nepal Electricity Authority									
Panauti Hydropower Station, Khopasi, Kavre		**PRICE SCHEDULE "A-1"**							
WORKS : IMPORTED SUPPLIES									
TENDER NO: NEA-PHPS-2074/075-ST-EM-03		**L/C : Local Currency (Nepalese Rupees)**							
PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR		**Qty**	**Unit**	**Country of Origin**	**Supply CIP Nepal Border**		**Clearing, Forwarding and Transportation Upto Site.**		**Total (delivery to site) Upto Site**
					L/C		**L/C**		**L/C**
S.N.	**Description**				**Unit Rate**	**Amount**	**Unit Rate**	**Amount**	**Total Amount**
						1		2	3=1+2
Panauti Switchyard									
A1	33kV, 800A, 3-phase outdoor **Vacuum Circuit Breaker** having spring charging mechanism complete with all accessories and supporting structure	3	Set						
A2	33 kV, 800A, 3-phase, gantry mounted gang operated **disconnecting switch** with grounding switch complete with all accessories	1	Set						
A3	33 kV, 800A, 3-phase, gantry mounted gang operated disconnecting switch without grounding switch complete with all accessories	3	Set						
A4	Protective Relay & Control Panel for 33 kV line protection with electronic energy meter	1	Set						
A5	Protective Relay & Control Panel for 6.3/33 kV Transformer (with differential protection)	2	Set						

A6	30kV, 10KA **lightning arrestor** with counter to be mounted at gantry complete with all accessories (set of -3nos)	1	set						
A7	33kV, 50 VA, 3 core oil immersed outdoor type **current transformer** complete with all accessories (set of -3 nos)	9	Nos						
A8	33kV, 100 VA **potential transformer** complete with all accessories (set of -3nos)	9	Nos						
A9	Marshaling kiosk	2	Nos						
A10	600V Control cables with all accessories including cable terminations to complete the specified scope of works	1	Lot						
A11	Gantry Structure including accessories complete (Gantry for line side DS with ES and LA to be mounted) (details attached separately) (set of -3 nos)	2	Set						
A12	Gantry Structure including accessories complete (Gantry for CT) (set of -3 nos)	3	set						
A13	Gantry Structure including accessories complete (Gantry for PT) (set of -3 nos)	3	Set						
A14	Substation and Equipment earthing materials	1	lot						
Sub-Total of Panauti Switchyard									
Bhaktapur Switchyard									
A1	33kV, 800A, 3-phase outdoor Vacuum Circuit Breaker having spring charging mechanism complete with all accessories and supporting steel structure	1	Set						
A2	33 kV, 800A, 3-phase, gantry mounted gang operated disconnecting switch with grounding switch complete with all accessories (TO BE FITTED AT TRANSFORMER SIDE)	1	Set						

A3	Protective Relay & Control Panel for 33 kV line protection with electronic energy meter (Control Voltage of Coil 24 V)	1	Set						
A4	33kV, 50 VA, 3 core oil immersed outdoor type current transformer complete with all accessories (set of -3 nos)	3	Nos						
A5	33kV, 100 VA potential transformer complete with all accessories (set of -3nos)	3	Nos						
A6	150 Ahr MFVRLA battery 12 nos. x 2 V bank with battery rack	1	set						
A7	Float cum Boost Battery Charger 24 V, 20 A	1	set						
A8	600V Control cables with all accessories including cable terminations to complete the specified scope of works	1	Lot						
A9	Gantry Structure including accessories complete (Gantry for CT) (set of -3 nos)	1	set						
A10	Gantry Structure including accessories complete (Gantry for PT) (set of -3 nos)	1	set						
A11	Substation and Equipment earthing materials	1	lot						
	Sub-Total of Bhaktapur Switchyard								
	Total of Price Schedule A-1 (Imported Supplies)								

Company: **Signature:**

Seal: **Title:**

Date:

Nepal Electricity Authority Panauti Hydropower Station, Khopasi, Kavre	**PRICE SCHEDULE "A-2"**
WORKS : LOCAL SUPPLIES OF NEPALESE ORIGIN (if any)	
TENDER NO: NEA-PHPS-2074/075-ST-EM-03	
PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR	

1. If Bidder wishes to supply any item in Price Schedule A-1 completely from Nepalese origin only,the price of such items shall be quoted only in Price Schedule A-2.
2. Prices quoted in Price Schedule A-2 shall be payable in local currency only.
3. Serial no in the following table shall match those in Price Schedule A-1.

L/C : Local Currency (Nepalese Rupees)

S.N.	Description	Qty	Unit	Supply Ex-Factory (excluding VAT)		Inland transportation up to site (excluding VAT)		Total (delivery to site) (excluding VAT)
				L/C		L/C		L/C
				Unit Rate	Amount	Unit Rate	Amount	Total Amount
					1		2	3=1+2

Total of Price Schedule "A-2" (Local Supplies)								

Company: **Signature:**

Seal: **Title:**

Date:

Nepal Electricity Authority Panauti Hydropower Station, Khopasi, Kavre	**PRICE SCHEDULE "B"**			
WORKS: Dismantling and Installation works **TENDER NO: NEA-PHPS-2074/075-ST-EM-03**	**L/C : Local Currency (Nepalese Rupees)**			
PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR	**Qty**	**Unit**	**Dismantling and Installation works (excluding VAT)**	
			L/C	
S.N. **Description**			**Unit Rate**	**Amount**
Panauti Switchyard				
	Dismantling Works			
B1	Dismantling of existing 33 kV OCB at the switchyard and store at designated location of Panauti HPP	1	Set	
B2	Dismantling of 33 kV existing wave trapper at the switchyard and store at designated location of Panauti HPP	1	Nos	
B3	Dismantling of 3 nos. of 33 kV post insulator at the switchyard	1	Set	
B4	Dismantling of 2 set of 33 kV disconnector, store at designated location	1	Lot	
B5	Dismantling of 33 kV PT & LA and store at designated location of Panauti HPP and reassembling of gantry at specified location	1	Lot	
	Installation Works			
B6	Installation of 33kV, 800A, 3-phase outdoor Vacuum Circuit Breaker	3	Set	
B7	Installation of 33 kV, 800A, 3-phase, gantry mounted gang operated disconnecting switch with grounding switch	1	Set	
B8	Installation of 33 kV, 800A, 3-phase, gantry mounted gang operated disconnecting switch complete with all accessories	3	Set	
B9	Installation and Commissioning of Protective relay and control panels for 33 kV line	1	Set	

B10	Installation and Commissioning of Protective relay and control panels for 6.3/33 kV Transformer	2	Set		
B11	Installation of 33kV lightning arrestor with counter to be mounted at gantry complete with all accessories	1	set		
B12	Installation of 33kV, 50 VA, 3 core oil immersed outdoor type current transformer complete with all accessories	9	Nos		
B13	Installation of 33kV, 100 VA potential transformer complete with all accessories	9	Nos		
B14	Marshalling Kiosk	2	Nos		
B15	Equipment earthing and Earthing Reinforcement work	1	lot		
B16	Preconstruction Survey, Design drawing, as built drawing, project complete documentation	1	Lot		
	Sub-Total of Panauti Switchyard				
Bhaktapur Switchyard					
	Dismantling Works				
B1	Dismantling of existing 33 kV OCB at the switchyard and transport to store at Panauti HPS	1	Set		
B2	Dismantling of 33 kV existing wave trapper at the switchyard and transport to store at Panauti HPS	1	Nos		
B3	Dismantling of 3 no. of 33 kV post insulator at the switchyard	1	set		
B4	Dismantling of 1 set of 33 kV disconnector and transport to store at Panauti HPS	1	Lot		
B5	Dismantling of 33 kV PT and LA and store at designated location of Panauti HPP and reassembling of gantry at specified location	1	Lot		
	Installation Works				
B6	Installation & Commissioning of 33kV, 800A, 3-phase outdoor Vacuum Circuit Breaker	1	Set		

B7	Installation of 33 kV, 800A, 3-phase, gantry mounted gang operated disconnecting switch with grounding switch	3	Set		
B8	Installation and Commissionng of Protective relay and control panels	1			
B9	Installation of 33kV, 50VA Current Transformer	3	Nos		
B10	Installation of 33kV, 100 VA potential transformer	3	Nos		
B11	Installation and commissioning of Battery & Charger	1	set		
B12	Equipment earthing and Earthing Reinforcement work	1	lot		
B13	Preconstruction Survey, Design drawing, as built drawing, project complete documentation (Panauti and Bhaktapur Substation)	1	Lot		
	Sub-Total of Bhaktapur Switchyard				
Total of Price Schedule "B" (Dismantling and Installation works)					

Company: **Signature:**

Seal: **Title:**

Date:

Nepal Electricity Authority Panauti Hydropower Station, Khopasi, Kavre **WORKS: Civil Works** **TENDER NO: NEA-PHPS-2074/075-ST-EM-03**		**PRICE SCHEDULE "C"** **L/C : Local Currency (Nepalese Rupees)**			
PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR		**Qty**	**Unit**	**Erection of Supplied Materials and Civil Works (excluding VAT)**	
S.N.	**Description**			**L/C**	
				Unit Rate	**Amount**
Panauti Switchyard					
	Erection of Supplied Materials and Civil Works				
C1	RCC foundation for 33 kV Circuit breaker all complete (details attached)	3	Set		
C2	RCC foundation for 33 kV Current Transformer all complete (details attached)	3	Set		
C3	RCC foundation for 33 kV Disconnecting Switch all complete (details attached)	2	Set		
C4	RCC foundation for 33 kV Potential Transformer all complete (details attached)	3	Set		
C5	Preparation of Substation cable trench, duct bank, conduit and cable tray with required material supply and Cleaning, Stripping, compacted fill, crushed stone surface, side drainage wherever required as per instruction of site incharge	1	Lot		
	Sub-Total of Panauti Switchyard				

Bhaktapur Switchyard					
	Erection of Supplied Materials and Civil Works				
C1	Concrete foundation for 33 kV circuit breaker all complete	1	Set		
C2	Concrete foundation for 33 kV CT all complete	1	Set		
C3	Concrete foundation for 33 kV PT all complete	1	Set		
C4	Preparation of Substation cable trench, duct bank, conduit and cable tray with required material supply and Cleaning, Stripping, compacted fill, crushed stone surface, side drainage wherever required as per instruction of site incharge	1	Lot		
	Sub-Total of Bhaktapur Switchyard				
	Total of Price Schedule "C" (Civil Works)				

Company: **Signature:**

Seal: **Title:**

Date:

Nepal Electricity Authority Panauti Hydropower Station, Khopasi, Kavre	**PRICE SCHEDULE "D" SPARE PARTS**							
WORKS : SPARE PARTS **TENDER NO: NEA-PHPS-2074/075-ST-EM-03**						**L/C : Local Currency (Nepalese Rupees)**		
PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR		**Qty**	**Unit**	**Supply CIP Nepal Border**		**Clearing, Forwarding and Transportation up to site**		**Total (delivery to site) Upto Site**
				L/C		**L/C**		**L/C**
S.N.	**Description**			**Unit Rate**	**Amount**	**Unit Rate**	**Amount**	**Total Amount**
					1		2	3=1+2
	SPARE PARTS							
Panauti Switchyard								
I	**For 33kV Outdoor Vacuum Circuit Breaker**							
D 1	Tripping coil	4	No					
D 2	Closing coil	4	No					
D 3	Relays and Contactors (one of each type)	2	Lot					
D 4	Motor for spring-charge mechanism	2	No					
D 5	Interrupter for vacuum Circuit Breaker	2	No					
	Subtotal of (I)							
II	**For 33kV Disconnecting Switches**							
D 6	Main contact assemblies with grounding blades	1	Set					
D 7	Auxiliary contacts	1	Set					
D 8	Interlocking coil	1	Set					
	Subtotal of (II)							
III	**For 33kV Transformer Control and Relay Panel**		**Unit**					

D 9	Indicating Lamps (100% of used)	1	Lot					
D 10	Fuses of each type (100% of used)	1	Lot					
D 11	Color caps for each color for indicating lamps (40% of used)	1	Lot					
D 12	One of each type of Switch, Relay, Timer and other Special Device	1	Lot					
D 13	Each type of Auxiliary Relays (1 each)	1	Lot					
	Protection Relays							
D 14	3 Phase over current relay with ground fault relay	1	Set					
D 15	Tripping Control Circuit Relays (Master Trip Relay)	2	Nos					
D 16	Ammeter	2	Nos					
D 17	MVA Meter	2	Nos					
D 18	Volt meter	2	Nos					
	Sub total of (III)							
	Sub-Total of Panauti Switchyard							
Bhaktapur Switchyard								
I	**For 33kV Vacuum Circuit Breaker**							
D 1	Tripping Coils	2	No					
D 2	Closing Coils	2	No					
D 3	Relays and Contactors (One of each type)	1	Set					
D 4	Motor for spring charge mechanism	1	Set					
D 5	Interrupter for Vacuum Circuit Breaker	1	No					
	Sub total of (I)							
II	**For 33kV Disconnecting Switches**							
D 6	Main contact assemblies, Set	1	Set					

D 7	Auxiliary contacts, Set	1	Set					
D 8	Interlocking coil, Set	1	Set					
	Subtotal of (II)							
III	**For 33kV Transformer Control and Relay Panel**		**Unit**					
D 9	Indicating Lamps(100% of used)	1	Lot					
D 10	Fuses of each type(100% of used)	1	Lot					
D 11	Color caps for each color for indicating lamps(20% of used)	1	Lot					
D 12	One of each type of Switch, Relay, Timer and other Special Device	1	Lot					
D 13	Each type of Auxiliary Relays(1each)	1	Lot					
	Protection Relays							
D 14	3 Phase over current relay with ground Fault Relay	1	Set					
D 15	Tripping Control Circuit Relays (Master Trip Relay)	1	Nos					
	Sub Total of (III)							
	Sub-Total of Bhaktapur Switchyard							
	Total of Price Schedule "D" (Spare parts)							
	(Manufacturer's Recommendation for Spare Parts)							
	Total							

Note :
1. The recommended Spare Parts will be for reference only i.e. will not be included in the financial evaluation.
2. The Bidder must mention the validity of the Price offered for the Recommended spare parts.

Nepal Electricity Authority

Panauti Hydropower Station, Khopasi, Kavre

GRAND SUMMARY OF PRICE SCHEDULE

Tender No. NEA-PHPS-2074/075-ST-EM-03

PACKAGE: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR

L/C : Local Currency (Nepalese Rupees, NRs)

S.N.	DESCRIPTION	Imported Supply		Local Supply (delivery to site) of Nepalese Origin only (if any) (Excluding VAT)	Dismantling, Erection, Construction, Installation and Commissioning Works (Excluding VAT)	Total Amount (Excluding VAT)
		CIP Nepal Border	Clearing, Forwarding & Transportation up to site			
		L/C (NRs)	L/C (NRs)	L/C (NRs)	L/C (NRs)	L/C (NRs)
		1	2	3	4	5=1
A - 1	Supply and Delivery of Materials (Imported Supplies)			X	X	
A - 2	Supply and Delivery of Materials (Local Supplies)	X	X		X	
B	Dismantling, Installation & Commissioning	X	X	X		
C	Civil Works	X	X	X		
D	Spare Parts			X	X	
	GRAND TOTAL					

Company: Signature:

Seal : Title:

Date:

Part –2

REQUIREMENTS

Section V. Works Requirements

Delivery Schedule

Delivery Site: Switchyard of Panauti Hydropower Station and Switchyard at Bhaktapur DCS of NEA

Delivery Period: As specified below effective from the date of contract agreement

Project Completion Period: 10 months

Job: REHABILITATION AND REINFORCEMENT OF 6.3/33KV SWITCHYARD OF PANAUTI HYDROPOWER STATION AND 33/11KV SWITCHYARD AT BHAKTAPUR.

S.N.	Description	Quantity	Project Completion Period (Months)
1	All Items and works in BOQ	As specified in BOQ	**10 (Ten)** months (including installation testing and commissioning)

Note: Delivery schedule shall count from the date of contract agreement.

Schedule Required By NEA:

The complete Supply, Delivery, Installation, Testing and Commissioning must be made at Switchyard of Panauti Hydropower Station and Switchyard at Bhaktapur DCS of NEA specified on description above within the ***date specified above*** *from the date of contract effective.*

To be filled by Bidder

The complete delivery/works must be made within ……. Months at Switchyard of Panauti Hydropower Station and Switchyard at Bhaktapur DCS of NEA from the date of contract effective.

SCOPE OF WORK

1. General:

The project scope include Rehabilitation of existing 6.3/33kV switchyard at Panauti Hydropower Station, Khopasi, Panauti and 33/11 kV switchyard next to **Bhaktapur DCS, Bhaktapur.** These **6.3/33kV and 33/11 kV Switchyards** Rehabilitation and **Reinforcement Project** include **Design, Supply, Delivery, Installation/Erection, Testing and commissioning of 33kV Outdoor VCB, CTs, PTs, Disconnecting Switches, Protection & Control Switchgears and Civil Construction works as specified in BOQ.**

1.1 This scope also includes dismantling of existing Oil Circuit Breakers, PT, Disconnecting switches, 33 kV post insulators, Wave Traps and accessories, removing to nearby spaces in the Switchyards, Further scope include strengthening of earthing of switchyard, Construction of cable trench at switchyard and construction of RCC foundations with steel structure gantry for Vacuum Circuit Breakers, Disconnecting switches, Current Transformers, Potential Transformers, and other equipment as necessary.

1.2 This Tender Document covers the construction/reinforcement/rehabilitation of existing switchyard 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 switchyard 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.

1.5.2 Erection:

When a design has been approved then the structure as mentioned in bill of quantity shall be erected and, the Contractor will make an inventory of the assemblies erected, and submit it to the Employer.

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 equipment, 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 of existing switchyards.

Engineering design 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 switchyards 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
(2)	Number of phase	3
(3)	Frequency	50Hz
(b) Climatic conditions		
(1)	Ambient temperature	
	- Maximum	55 deg. C
	- Minimum	-2 deg. C
	- Annual average	30 deg. C
(2)	Wind velocity	
	- Maximum	34.4m/sec
(3)	Relative humidity	
	- Maximum	100%
	- Minimum	20%
(4)	Monsoon season	May-September
(5)	Precipitation	
	- Maximum	1,000 mm/month
	- Minimum	Zero/month
(c)	Altitude of site	Between 1200m to 1600m 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, if needed, for all foundations, and for the precise location of each equipements in the existing switchyard.

2.2.3 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 Electro technical 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 from 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 each switchyard site in the Contract, receiving, assembly, erection, installation of the 6.3/33kV and 33/11kV switchyard equipment, field test, civil works, and commissioning of all equipment necessary for rehabilitation/reinforcement of existing switchyards. 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 as mentioned in price schedule.

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.

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

(c) Control Cables, wires, ground rods, fittings and connectors for the entire, grounding and static protection systems for each substation.

(d) Panel boards for substation AC/DC supply.

(e) Maintenance free Batteries and appropriate battery chargers for 24V DC supply system (only for Bhaktapur Switchyard). All the DC input equipment of Panauti switchyard shall be connected to the existing DC system of power house as per requirement.

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

(g) Cables and wires complete with terminal lugs and accessories for control, metering, relaying, alarms, carrier, and communication. AC and DC station power and lighting, and any other cables and wires required to interconnect all equipment of the entire substations.

(h) Civil works (mentioned in price schedule) including, foundation and cable trench/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 (as specified in price schedule) and installations in each switchyard. The drawings to be furnished by the Contractor for each individual switchyard 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 properly plan layout

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

(d) Structural erection and fabrication drawings

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

(f) Cable trench, duct and conduit layout plan, elevation and details as required.

(j) Detailed material list for each switchyard

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

(l) Interconnection diagram for all switchyard equipment.

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

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

(o) Calculation and coordination of protection relays.

(p) 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.

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

For supply of equipment and/or installation work

Item	No. of Copies	Deadline & Remarks
Proposed work program	3	Within 30 days from the date of signing of Contract.
Principal equipment and installation drawings for approval	3	Within 60 days from the date of signing of Contract.
Manual and As-built drawings (Soft copies and Hard Copies)	3	Within 30 days after completion of installation work

In addition to the general requirements mentioned above, the following shall also be observed for the Civil Works:

I. Work Schedule Within 30 days after signing of the contract

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 with minimum outage of Plant.

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

2.4.6 The contractor shall implement the manpower, materials and tools in parallel manner (start- to-start basis) in order to reduce the outage of the plant. The contractor shall mobilize optimum resources at the requested shutdown time of plant for installation and commissioning of equipment

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.

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 this Tender Document.

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.

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.

2.7.3 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.

2.7.4 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 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.

2.8.4 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.

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.

2.11 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

2.11.6 Painting of Existing Gantry Steel Structure :

It shall cover the followings:

(a) Oil, grease, dirt, rust and scale shall be thoroughly removed by emulsion cleaning

(b) After application of the primer, two coats of finishing synthetic enamel paint shall be applied. The color for the finishing paint shall be same as of new gantry.

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 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.

2.13.2 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.

2.13.3 All spare parts must be delivered to Site in advance of the trial operation. The Contractor shall ultimately prepare and deliver three (3) copies of the final consolidated spare parts list, arranged specifications-wise.

2.13.4 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 DC for Panauti Hydropower station's switch yard and 24V DC for Bhaktapur's switchyard

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 (if provided with key, then each key shall be at least 3 in number).

(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:

(a) 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:

(a) Filling up by gravel in the patch

(b) Filling up the in the switchyard if it not.

(c) 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.

(c) Thinner shall not be used.

(d) Special care shall be taken to avoid painting on bushing and name plate

(e) Painting shall be done on the followings:

Gantry / Steel Structure, and other existing structure and equipment's.

(f) Galvanized steel structure shall not be pointed.

2.14.8. Repairing and construction of needed Cable Trench (outdoor):

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. (if needed new cable trench its contractor scope to construct)

(c) Repairing of patch works.

(d) Repairing / replacement of cable support tray or angle etc.

(e) The repairing shall look line new one.

3. 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 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).

3.4 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 power house building 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 labor 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.

Table: Site details for Reinforcement/Rehabilitation Works

S. N.	Switchyard	Existing Capacity, MVA, voltage	Built Year and Technology	Remarks
1	At the compound of Panauti Hydropower Station	1.55 MVA *2, 6.3/33kV	Commissioned on 1965 by Soviet Union and technology used is Russian	
2	At the compound of Bhaktapur DCS	1.55 MVA *1, 33/11kV		

SPECIFICATION OF ELECTRICAL EQUIPMENT

A. 33KV CIRCUIT BREAKER

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

2. Equipment to be furnished

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

3. Design Requirements

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

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.

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.

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"

3.5 Technical particulars of the circuit breaker shall be as per Appendix A-1.

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

4. Construction Features

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.

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.

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.

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.

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.

4.6 **Position indicator**

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

4.7 **Operating mechanism**

The operating mechanism of the circuit breakers shall be spring charged by 230V A.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 (for Switchyard at Panauti Hydropower Station) and 24 V DC (for Switchyard at Bhaktapur). 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%.

4.8 **Operation Counter**

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

4.9 **Accessories**

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

a) Padlocks and duplicate keys
b) Operation counters

c) Earthing terminals

d) Nameplate

e) Other necessary accessories

f) Operating handle

4.10 **Spare parts**

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

5. Tests

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

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.

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

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**.**

7. Drawings, Data and Manuals

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

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.

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

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 A-1

TECHNICAL PARTICULARS OF 33 kV CIRCUIT BREAKER

(For Panauti Switchyard)

1.	Type	Vacuum, outdoor type
2.	Quantity required	As per Price Schedule
3.	Voltage rating	
	(a) Nominal system voltage	33kV
	(b) Rated maximum voltage	36kV
4.	Insulation level	
	(a) Impulse withstand voltage	170kV
	(b) Power frequency withstand voltage (1 min)	70 kV
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 (Rated operating sequence)	O-0.3 sec-CO-3 min.-CO
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
10.	First pole to clear factor	1.5
11.	Additional auxiliary contacts	8 NO, 8 NC
12.	Maximum makes time	120 ms
13.	Rated Auxiliary supply for **spring charge motor**, lamp & heater circuit.	: 230V A.C
14.	Rated supply voltage for trip/close coil	**110 V D.C**

TECHNICAL PARTICULARS OF 33 kV CIRCUIT BREAKER

(For Bhaktapur Switchyard)

1.	Type	Vacuum, outdoor type
2.	Quantity required	As per Price Schedule
3.	Voltage rating	
	(a) Nominal system voltage	33kV
	(b) Rated maximum voltage	36kV
4.	Insulation level	
	(a) Impulse withstand voltage	170kV
	(b) Power frequency withstand voltage (1 min)	70 kV
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 (Rated operating sequence)	O-0.3 sec-CO-3 min.-CO
8.	Auxiliary supply	
	(a) Control circuit	DC 24V
	(b) Space heater and auxiliary equipment	AC, 3Ph-4W, 400V, 50Hz
9.	Total maximum Break time	60 ms
10.	First pole to clear factor	1.5
11.	Additional auxiliary contacts	8 NO, 8NC
12.	Maximum makes time	120 ms
13.	Rated Auxiliary supply for **spring charge motor**, lamp & heater circuit.	: 230V A.C
14.	Rated supply voltage for trip/close coil	**24 V D.C**

B. 33 KV DISCONNECTING SWITCH

1. General

This specification covers the design, manufacture, assembly, shop test, supply, delivery, installation works and field test of disconnecting switches complete with all accessories for efficient and trouble-free operation 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 60129 High-voltage alternating current disconnectors and earthing switches

IEC 60529 Degree of protection provided by enclosures

Manufacturer of isolator shall hold valid ISO 9001 (including design) quality management certificate.

2. Equipment to be furnished

33 kV Disconnecting Switch

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

3. Design Requirements

3.1 The disconnecting switches shall be used for the 33kV, 50Hz, 3 phase system.

3.2 The equipment shall be installed outdoor in a hot, humid climate. All equipment, accessories and wiring shall be provided with tropical finish to prevent fungus growth.

3.3 The maximum temperature rise in any part of the equipment at specified rating shall not exceed the permissible limits 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.

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"

3.5 The grounding switch shall be capable of making to a dead short circuit without damage of the equipment or endangering operator.

The disconnecting switches shall be rotating post type with contact blades moving through horizontal plane.

3.6 The rating, the accessories to be furnished and the schedule of equipment are detailed in Appendices.

3.7 The disconnecting switches shall be able to carry the rated current continuously and rated short time current for three seconds without exceeding the temperature limit specified in the relevant standard.

3.8 The disconnecting switches shall be capable of withstanding the dynamic and thermal effects of maximum possible short circuit current at the point of its installation.

4. Construction Features

4.1 The 3-pole disconnecting switches shall be gang operated type so that all the poles make and break simultaneously.

4.2 The disconnecting switches shall be designed for upright mounting on steel structure.

4.3 The disconnecting switches shall have padlocking arrangement in both "open" and "closed" positions.

4.4 All current carrying parts shall be non-ferrous metal or alloy. All live parts shall be designed to avoid sharp points and edges.

4.5 All metal parts shall be of such material and treated in such a way as to avoid rust, corrosion and deterioration due to atmospheric conditions. Ferrous parts shall be hot-dip galvanized.

4.6 Bolt nuts, pins, etc. shall be provided with appropriate locking arrangement such as locknuts, spring washers, key etc.

4.7 Bearing housing shall be weatherproof with provision for lubrication. The design, however, shall be such as not to require frequent lubrication.

4.8 All bearings in the current path shall be shorted by flexible copper conductor of adequate size (minimum-70sqmm) to allow the specified fault current through it without injury.

4.9 **Main contacts**

The main contacts shall be of silver-plated copper alloy and controlled by powerful springs designed for floating and pressure point contact.

The contacts shall have sufficient area and pressure to withstand the electromagnetic stresses developed during short circuit without excessive heating liable to pitting or welding.

Contacts shall be adjustable to allow for wear, shall be easily replaceable and shall have minimum movable parts and adjustments.

The blade shall be made of electrolytic copper tube or aluminum tube of liberal section. Rotating feature of the blade at the end of tube travel for contact wiping shall be provided.

Arcing horns shall be provided to divert the arc from main contacts to the separating horns after the main contacts have opened. Arcing horns shall be renewable type.

4.10 **Insulators and terminals**

Insulators shall be post type, brown glazed and composed of stacked units.

The porcelain used for insulators shall be manufactured by wet process and shall be homogeneous and free from cavities and other flaws.

Caps and pins shall be of the highest quality malleable iron or forged steel and smoothly galvanized.

Arcing horn as required shall be furnished.

All insulators of identical ratings shall be interchangeable.

The terminals of the disconnecting switch shall be provided with terminal connectors.

5. Operating Mechanism

5.1 Disconnecting switches for 33kV

The operating mechanism for 33kV shall be manually operated.

The manual operating mechanism shall be of torsion type suitable for operation in the horizontal plane. The operating handle shall be equipped with each switch and shall be arranged for mounting on the steel base supporting structures. Means shall be provided on each switch for taking up loose motion in the operating mechanism and for adjusting the travel of each blade independently. The Contractor shall furnish all supplemental members required to secure the installation of the complete switch mechanism to the supporting structures.

All switches shall be self-locking in the open and closed positions independent of the control shaft restraint. Each mechanism shall be provided with an indicator showing direction of rotation for opening or closing, and shall be provided for grounding and for padlocking in the open and closed positions.

Each operating mechanism shall be furnished complete with all necessary operating pipes, inter-phase shafts, pipe couplings, guide bearings, ground braids, mounting brackets, mounting bolts, operating handle, auxiliary switches and offsets required for operation from the ground. All operating rods and levers shall be cut to length and all machining operations and threading shall be complete in the factory.

The manually operated disconnecting switches shall also be provided with a minimum four (4) normally closed and four (4) normally open auxiliary contacts for remote indications.

6. Assembly

Each disconnecting switches along with its base frame and operating mechanism shall be completely assembled and checked at manufacturer's works for correct alignment and operation prior to dispatch.

All parts and accessories shall have appropriate match marks and part number for identification at site.

7. Tests

7.1 Type and routine tests on the equipment and components shall be in accordance with latest revision of IEC Standards or equivalent standards approved by the Employer/Employer's Representative.

Each switch shall include but not limited to the following tests:

a) Routine tests

- Power frequency voltage dry test
- Measurement of resistance of main circuit
- Control and secondary wiring check test
- Mechanical operation test

b) Design tests

- Insulator test
- Dielectric test, including impulse withstand test
- Radio influence test
- Short-time current test

- Voltage drop test the voltage drop across one complete phase of a switch shall be measured when carrying rated current.
- Temperature Rise Test

If type tests have been previously conducted on identical disconnecting switch, the Contractor may furnish the certified copies of such previous reports instead of performing tests. The Bidder shall submit copy of design test report from accredited testing laboratory for the disconnecting switch of the offered model along with the bid.

7.2 The type and routine test certificate shall be furnished in the required number of copies to the Employer/Employer's Representative for approval before dispatch of the equipment from the works.

7.3 Field tests

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

a) Construction inspection
b) Measurement of insulation resistance
c) Mechanical operation test

8. Drawings, Data and Manuals

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

a) General arrangement drawing with different sections showing constructional features.
b) Technical leaflets on disconnecting switches offered explaining the function of various parts, principle of operation and special features (if any).
c) Typical type test results on identical equipment offered in the Tender.

8.2 The various drawings, data and manuals shall be submitted for approval and afterwards for final distribution in quantities and in procedures as set-up elsewhere. The various drawings and data to be furnished shall include:

a) Outline dimensional drawings of the equipment showing general arrangement and location of fittings.
b) Transport/shipping dimensions with weights.
c) Foundation and anchor bolt details including loading condition.
d) Assembly drawing for erection at site with part numbers and schedule of materials.
e) Electrical schematic and wiring diagram.
f) Any other relevant drawings and data necessary for erection, operation and maintenance.
g) Instruction manual and data sheets.
h) Any other relevant data, drawing and information necessary for review of the items stated above.

APPENDIX A-2

TECHNICAL PARTICULARS OF 33kV DISCONNECTING SWITCH (WITH GROUNDING SWITCH)

1.	Type	3-pole, single throw, outdoor
2.	Quantity required	As per Price Schedule
3.	Voltage ratings	
	(a) Nominal system voltage	33 kV
	(b) Rated maximum voltage	36 kV
4.	Frequency	50 Hz
5.	Insulation levels	
	(a) Basic impulse level (BIL)	170 kV
	(b) Power frequency withstands voltage (1 min.)	70 kV
6.	Current ratings	
	(a) Continuous current	800A
	(b) Short time current (1 seconds)	25 kA
	(c) Peak short time current	32 kA
7.	Operating mechanism	manually gang operated

APPENDIX A-3

TECHNICAL PARTICULARS OF 33kV DISCONNECTING SWITCH (WITHOUT GROUNDING SWITCH)

1.	Type	3-pole, single throw, outdoor
2.	Quantity required	As per Price Schedule
3.	Voltage ratings	
	(a) Nominal system voltage	33kV
	(b) Rated maximum voltage	36kV
4.	Frequency	50Hz
5.	Insulation levels	
	(a) Basic impulse level (BIL)	170 kV
	(b) Power frequency withstands voltage (1 min.)	70 kV
6.	Current ratings	
	(a) Continuous current	800A
	(b) Short time current (1 seconds)	25kA
	(c) Peak short time current	32kA
7.	Operating mechanism	manually gang operated

C. INSTRUMENT TRANSFORMER

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.

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/110V Potential Transformer for Measurement & Protection

3. Design Requirements

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

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.

4. Construction Features

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

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.

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.

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

4.5 **Junction boxes**

Junction boxes shall be rigid weatherproof type complete with terminal blocks suitable for cable size having the range up to 2 x 6 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 1.2 mm. 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.

4.6 **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.

4.7 **Protective devices**

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 250 V AC 50 Hz. Switches and fuses shall be contained within the junction box provided for termination. Supply fuse failure supervision shall be provided.

4.8 **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

5. Tests

Tests shall be performed as specified hereunder.

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

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

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

6. Drawings, Data and Manuals

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

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-4

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.	Maximum system voltage	36kV
5.	Impulse withstand voltage	170kV
6.	Rated frequency	50Hz

7.	Number of cores	3
8.	Current Ratio	**100-50/1A**
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, 1.5 for 30 sec
13	No of secondary windings	as required
14	Over load factor	200%
15.	Short time thermal rating	25 kA

APPENDIX A-5

TECHNICAL PARTICULARS OF 33kV POTENTIAL TRANSFORMER

1.	Type	Outdoor, oil immersed
2.	Quantity required	As per Price Schedule
3.	Rated primary voltage	33 kV
4.	Maximum system voltage	36 kV
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/ √3V: 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

D. LIGHTNING ARRESTER

1. General

This specification covers the design, manufacture, factory test, delivery, field test and installation of lightning arresters, complete with all accessories.

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 60099-4	Metal-oxide Surge arrester without gap for a.c. system
IEC 60099-5	Surge arrester - Selection and application recommendations
IEC 60529	Degree of protection provided by enclosures

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

2. Equipment to be furnished

30 kV Lightening Arrestor

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

3. Design Requirements

3.1 The lightning arresters shall be station type, single pole, gap less type rated voltage 30kV for 33kV system. The nominal discharge current shall not be less than 10kA.

3.2 The active part of the lightning arresters shall be accommodated in porcelain insulators which are suitably reinforced to prevent explosion of an arrester.

3.3 Pressure relief device shall be provided for the safe discharge of internal pressure.

3.4 The lightning arresters shall be mounted on galvanized steel structure. Terminal connectors for both line and ground terminals shall be furnished.

3.5 Surge monitoring device consisting of surge counter, etc., along with insulating bases for mounting at the bottom of the arrester, shall be furnished.

4. Test

4.1 All routine tests shall be performed on each piece of arrester as per IEC. In addition, the following tests shall be carried out.

a) Construction test
b) Insulation resistance test and leak current test

4.2 Type test certificates on similar equipment and routine test certificate carried out for following tests shall be furnished for approval of the Employer/Employer's Representative.

a) Voltage withstand test
b) Impulse voltage characteristic test
c) Discharge voltage characteristic test
d) Discharge current withstand test
e) Duty cycle test

f) Pressure relief test
g) Contamination test

5. Drawings and Data

5.1 The following documents shall be furnished along with the Tender.

a) Standard catalogue identifying the models and ratings being furnished.

b) Outline drawings including dimensions

5.2 The following drawings and data shall be furnished in required number of copies after award of contract for approval of Employer/Employer's Representative.

a) All updated documents furnished with the Tender.
b) Outline drawings including dimensions
c) Foundation and anchor details including dead load
d) Transport/shipping dimensions with weight
e) Any other relevant data, drawings and information

6. Nameplate

Each lightning arrester shall be provided with a 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
e) Nominal discharge current

APPENDIX A-6

TECHNICAL PARTICULARS OF 30kV LIGHTNING ARRESTER

1.	Type	Outdoor, station type
2.	Quantity required	As per Price Schedule
3.	Mounting	Pedestal
4.	Rated frequency	50Hz
5.	System voltage	33kV
6.	Rated voltage	30kV
7.	Impulse withstand voltage (BIL)	170kV
8.	Power frequency withstand voltage	70kV
9.	Nominal discharge current	10kA
10.	Surge Counter	shall be the ISO 9001 holding company

E. CONTROL AND RELAY PANEL

1. General

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 :

- 33kV Line Protection and Transformer Protection equipment/ relays as required shall have to be supplied and installed accordingly.

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.

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

1.4 **Manufacturers for Protection Equipment**

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

a)	ALSTOM (Areva)	b)	Fuji
c)	CGELEC	d)	Reyrolle / Easun Reyrolle
e)	ABB	f)	Siemens
g)	Toshiba	h)	Mitsubishi

2. Equipment to be furnished

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

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 tackles.

3. Construction Features

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.

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

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.

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.

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.

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.

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.

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.

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

4. Component Mounting

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.

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.

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.

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.

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.

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

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.

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.

5. Mimic Diagrams

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.

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

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.

6. Annunciators

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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

7. RELAYS

7.1 All relays shall conform to the requirements of IEC-60255/IEC 61000 or other applicable standards. Relays shall be suitable for flush or semi-flush mounting on the front with connections from the rear.

7.2 All protective relays shall be of numerical type and **communication protocol shall be as per IEC 61850 (with redundant communication)**. Further, the test levels of EMI as indicated in IEC 61850 shall be applicable to these relays.

7.3 All protective relays shall be in draw out or plug-in type/modular cases with proper testing facilities. Necessary test plugs/test handles shall be supplied loose and shall be included in contractor's scope of supply.

7.4 All AC operated relays shall be suitable for operation at 50 Hz AC Voltage operated relays shall be suitable for 110 Volts VT secondary and current operated relays for 1 amp CT secondary. All DC operated relays and timers shall be designed for the DC voltage specified, and shall operate satisfactorily between 80% and 110% of rated voltage. Voltage operated relays shall have adequate thermal capacity for continuous operation.

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

7.6 Timers shall be of solid state type. Time delay in terms of milliseconds obtained by the external capacitor resistor combination is not preferred and shall be avoided.

7.7 No control relay, which shall trip the power circuit breaker when the relay is de-energized, shall be employed in the circuits.

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

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

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

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

(c) Impedance of the seal-in-unit shall be small enough to permit satisfactory operation of the trip coil on trip relays when the D.C. Supply Voltage is minimum.

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

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

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

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

7.10 The setting ranges of the relays offered, if different from the ones specified shall also be acceptable if they meet the functional requirements.

7.11 Any alternative/additional protections or relays considered necessary for providing complete effective and reliable protection shall also be offered separately. The acceptance of this alternative/ additional equipment shall lie with the OWNER.

7.12 All relays and their drawings shall have phase indications as R-Red, Y- yellow, B-blue

7.13 For numerical relays, the scope shall include the following:

(a) Necessary software and hardware to up/down load the data to/from the relay from/to the personal computer installed in the substation. However, the supply of PC is not covered under this clause.

(b) The relay shall have suitable communication facility for connectivity to SCADA. The relay shall be capable of supporting IEC 61850 protocol.

(c) In case of line protection and transformer protection, the features like fault recorder and event logging function as available including available as optional feature in these relays shall be supplied and activated at no extra cost to the owner. Also necessary software/ hardware for automatic uploading to station HMI/DR work station (as applicable) shall be supplied.

8. 33KV LINE PROTECTION

8.1 Overcurrent and Earth fault Protection

i. Non-Directional Phase Overcurrent Protection shall:

- be single pole & have an inverse characteristic with a definite minimum time of 3sec. at 10 times setting also
- 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 and
- also have an adjustable setting of 10-80% of rated current.

8.2 **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 and
- be of voltage polarized directional controlled type.

ii. Directional Earthfault overcurrent protection (not applicable)

Earth fault overcurrent relay shall:

- be 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 and
- have a characteristics angle of 45 degree.

8.3 **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 re-trip and back-up trip output contacts.

8.4 **LINE OVER VOLTAGE PROTECTION RELAY** shall

(a) monitor all three phases

(b) have an adjustable setting range of 100-170% of rated voltage with an adjustable time delay range of 1 to 60 seconds for the first stage

(c) have an adjustable setting range of 100-170% of rated voltage with a time delay of 100-200 mill seconds for the second stage

(d) be tuned to power frequency

(e) provided with separate operation indicators (flag target) for each stage relays

(f) have a drop-off to pick-up ratio greater than 95%

(g) provide separate out-put contacts for each 'Phase' and stage for breaker trip relays, event logger and other scheme requirements

- All trip relays used in transmission line protection scheme shall be of self/electrical reset type depending on application requirement.

9. TRANSFORMER PROTECTION

6.3/33kV, 1.55MVA Power transformers shall be ensured to be protected by minimum following protection schemes:

9.1 Differential Relay (for Panauti switchyard transformers protection)

The Differential Relay shall be used for 6.3/33 kV, 1550 kVA transformer Protection. It shall be of: Three phase with six through current restraint inputs. The Relay shall have built in trip relay, indicator & test switch. It shall have complete phase and Earth fault Protection.

The Harmonic restrained operation time of the Relay shall be Approximately 30 ms at 3 times of pickup current. Similarly, unrestrained operation time shall be 10-20 ms at 2 times pickup current with minimum impulse time of 3 minutes.

The Relay shall have variable percentage restraint for external fault, even at use of OLTC.

The Relay shall have second harmonic restraint from all the three phases for inrush security & fifth harmonic restraint for all three phase for over excitation security. The sensitivity shall be settable to 10 - 50% of rated current of 1A.

Un-restrained operation settable to 20 times of rated current.

The relay shall be provided with separate interposing CT for ratio and Phase Angle matching and equalizing of zero sequence current, or by other programming method.

Note: The CT is already installed in low voltage side of each 6.3/33kV, 1550kVA power transformer for differential protection.

9.2 Overcurrent and Earth fault Protection

9.3 Over voltage/ Under Voltage protection

9.4 Transformer internal fault protection

9.5 Transformer auxiliary protections (Bucholz alarm / trip, WTI/OTI/PRD alarm/trip of transformer etc.)

10. Manufacturer of Protection Relay shall be as specified

11. Other Requirements

a) 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.

b) 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.

c) 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.

d) 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.

e) 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.

f) 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.

g) 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.

12. ENERGY METER

Energy meters shall be numeric type manufactured by internationally reputed manufacturer. 33 kV line shall be equipped with one set of kWh and kVARh meters suitable for import and export measurements as specified in Bill of Materials (Appendix A-7). The meters shall preferably be four quadrant type. In case of numeric type energy meters, the contractor shall furnish probe, copywrited software and other necessary items for operational programming of the meters.

All kWh and kVARh meters shall be of 0.2 class accuracy. In addition to all the tests required to be performed at the manufacturing plant, each of these meters shall be tested at the Employer's laboratory also at the expense of the Contractor prior to installation and commissioning and as and when required by the Employer during the warranty period. Any meter, which fails the tests, will not be acceptable and the Contractor shall supply their replacements immediately. If the replacements too fail the tests, then the Employer reserves the right to replace the meters with new one at the expense of the Contractor. The test results from the Employer's laboratory shall be final and binding upon both parties.

Specs of Energy meter:

Energy meters shall be Electronics or Digital type and shall be from ELSTER (ABB AINRTAL Type), ACTARIS (Schlumburger), EDMI or SIEMENS or equivalent.

The energy meter shall be provided with software and optical probe.

Data: 3P4W, 0.2 Accuracy Class, 1-10Amp, 0-480V, Programmable Type with impulse test facility.

13. Miscellaneous Accessories

13.1 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.

13.2 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.

14. Tests

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

a) Mechanical operation test
b) Verification of degree of protection
c) Calibration test for meters
d) Characteristic test for relays
e) High voltage test of insulation (2000 volts for 1 minute)
f) Electrical control, interlock and sequential operation tests
g) Verification of wiring as per approved schematic diagram.

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

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

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

a) Electrical control, interlock and sequential operation tests
b) Calibration test for meters
c) Measurement of insulation resistance
d) Characteristic test for relays

NOTE: It's in scope of contractor to arrange all the testing equipment (also relay testing kit) during the time of commissioning

APPENDIX A-7

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.

TRANSFORMER CONTROL & RELAY PANEL

1. Major Components

S.N.	Legend	Description	Quantity per Panel
1.	ANN	Annunciator assembly, 16 active points,110V DC, 4 rows high by 4 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 over voltage Protection trip	1Lot
		2. Transformer under voltage Protection trip	
		3. Transformer Differential Protection trip	
		4. Transformer Bucholz Alarm / Trip	
		5. Transformer Low Oil Level	
		6. Transformer over current Protection trip	
		7. Transformer earth fault Protection trip	
		8. Circuit Breaker Trip	
		9. Transformer Winding Temperature High	
		10. AC Fail	
		11. DC Fail	
		12 –16. 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	50/51/50 N/ 51N	Overcurrent and Earth Fault Protection with Instantaneous Protection	1Lot

2.2	50B	Breaker Failure Protection	1Nos
2.3		Trip circuit supervision relay	1Nos
2.4	51E	Transformer Protection	1Nos
2.5	87	Differential Relay	1Nos
2.6		Interlocks, Switching & Tripping Relay	1Lot
3.	A	Indicating ammeter , Digital 0-100A; 100-50/1A	3Nos
4.	kV	Voltmeter : Digital (For each Phase)	1Set
5.	KVA	0-5 MVA	1Nos
6.	CS	Breaker control switch, and with : 2-separately mounted indicating lamps,	1Nos
7.		Multiple Adjustable Ratio Intermediate Current Transformer for Differential Protection, if required	1 Set
Internally mounted			
1		Space heater and control switch	1 Set
2		Cubicle illumination lamp and door switch.	1 Set
3		Power Plug, socket and control switch	1 Set
4		Alarm bell for trip	1 No.
5		Alarm cancellation relay	1 No.
6		Alarm buzzer for non- trip with auto-stop feature (with variable time setting 0-60 seconds)	1 No.
7		MCBs, fuses, links, control wiring, etc.	As required

LINE PROTECTION PANEL (33kV)

The Line Protection panel for 33kV lines shall consist of following major protection features/schemes

S.No	Description	Quantity per Panel
1	Circuit label	1 No.
2	Mimic section	1 No

3	**Annunciator** Annunciator assembly, 8 active points,110V DC, 2 rows high by 4 columns wide, flush mounted, and with: 3-separately mounted push buttons 2-separately mounted indicating lamps, one white lamp, and one red lamp	1 Lot
	1. Line Over Current Protection Trip	
	2. Line Earth Fault Protection Trip	
	3. Line Over/Under Voltage Protection Trip	
	4. Circuit Breaker Trip	
	5. AC Fail	
	6. DC Fail	
	7.-8 Spare	
4	T-N-C type control switch for circuit breaker.	1 No.
5	Semaphore indicators for Isolators.	3 Nos
6	Indicating LEDs for	
	Spring charge indication (white)	1 No
	Trip circuit healthy indication.(Amber)	1 No.
	Breaker 'ON' indication (Red)	1 No.
	Breaker 'OFF' indication (Green)	1 No.
7	Push button for	
	Trip circuit test	1 No
	Alarm Accept	1 No.
8	Static non-directional IDMT over current and earth fault relay with highest instantaneous trip feature.	1 No.
9	Master tripping relay	1 No
10	Multi-function electricity meter	1 Set
11	Frequency Meter	1 No
12	Ammeter (48 mm x 96 mm.) & selector	1 Set
13	Voltmeter (48 mm x 96 mm.) & selector	1 Set
14	**Energy Meter ,** Electronic type with 0.2 Class	1 No.
Internally mounted		
1	Space heater and control switch	1 Set

2	Cubicle illumination lamp and door switch.	1 Set
3	Power Plug, socket and control switch	1 Set
4	Alarm bell for trip	1 No.
5	Alarm cancellation relay	1 No.
6	Alarm buzzer for non- trip with auto-stop feature (with variable time setting 0-60 seconds)	1 No.
7	MCBs, fuses, links, control wiring, etc.	As required

F. CABLES

1. General

This specification covers the design, manufacture, factory test, supply, delivery, field test and installation of all power, Control and Instrumentation cables required for the entire project.

2. Equipment to be furnished:

a) Control and instrumentation cable

b) Communication cable

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

2.2 The Contractor shall be responsible for estimating and supplying the quantity of various types and sizes of the cables. In course of actual execution if it is found that additional cross-section, types or quantities of cables are required than those indicated in his proposal, the same shall be supplied without any additional charge to the Employer

2.3 **Control and instrumentation cable**

a) General

All control and instrumentation cable shall be 600V grade as per IEC multicore, color-coded, PVC insulated, cable armored cable. Each multicore cable shall have not less than 20 percent or 4 spare cores whichever is the greater.

b) Conductor

Copper conductor shall be stranded circular non-compacted copper conductor of minimum cross-section of 2.5 sq. mm.

c) Insulation

The electrically and thermally stable PVC insulation shall be extruded onto the conductor so as to prevent contamination and voids in the insulation.

d) Assembly

Multi conductor cables shall be assembled in accordance with applicable IEC standard.

A flame retardative binder tape may be used underneath the overall jacket of multi- conductor cables, if required to achieve the desired flame retardative characteristics. Tapes, if used, shall be non-hygroscopic.

e) Anti-termite covering

Anti-termite protection shall be applied to the cable and shall consist or a non- magnetic barrier.

f) Jacket

The cable core assembly shall be covered with a flame retardative and resistant jacket, which is free-stripping from the insulation.

The overall jacket shall be clean, dry, and free of grease and shall be suitable for ink or paint application.

Cable jacketing and the interstices within the jacket shall be free of water. Evidence of water shall be grounds for rejection of the cable.

g) Identification

Each cable shall have a printed legend on the overall jacket, with the manufacturer's name, name of the Employer, voltage class, the number and size of conductors, and a unique number or code indicating the production run or batch. The identification shall remain legible for the life of the cable.

3. Special Requirement

Small cut piece lengths of cables will not be accepted. Cables up to 500 meters in length or as approved by Employer/Employer's Representative shall be of one length shipped in a drum of adequate size. For higher quantities, multiple lengths/drums may be shipped subject to the approval of Employer/Employer's Representative.

4. Drawings, Data & Manuals

The following information shall be furnished along with the Tender.

a) Manufacturer's leaflets giving constructional details, dimensions and characteristics of different cables.

b) Current rating of cables including de-rating factor due to grouping, ambient temperature and type of various installation.

c) Write-up with sketches illustrating the manufacturer's recommendation for splicing, jointing and termination of different types of cables.

d) Type test report of all types of power, control and instrument cables. The Bidder shall clearly describe the type and routine tests to be performed on cables.

e) Drum length for each type of cable.

4.1 **Performance Guarantee**

The performance figures quoted on schedule of Technical Data shall be guaranteed within the tolerance permitted by relevant standard and shall become a part of the Contract. In case of failure of the cables to meet the guarantee, the employer/Employer's Representative reserve the right to reject the equipment. The Contractor shall have to rectify the defect no extra cost to the Employer and without delaying the commissioning schedule.

G. BATTERY AND BATTERY CHARGER (Only for Switchyard at Bhaktapur)

1. General

This specification covers the design, manufacture, delivery, installation and field test of the maintenance free battery and suitable battery charger for 24V DC system complete **(only for Bhaktapur Switchyard)** with all necessaries for efficient and trouble-free operation as specified herein under.

Manufacturer of battery and battery charger shall be holder of valid ISO 9001Certificate

The Battery charger shall also include D.C. distribution board.

2. Equipment to be furnished

24 V Battery System and Battery Charger

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

3. Design Requirements

3.1 Maintenance free VRLA Battery

The Maintenance free Battery shall be rated for supplying total DC load. The duration of the load shall be ninety (90) minutes

The Contractor shall compute the Ampere hour rating (10 hour rating) of the battery considering margin over the above duty cycle so that the battery shall be capable of delivering the ultimate DC load of the switchyard when the future switchgear and its protection panel will be installed in the same substation. The minimum capacity shall be not less than 150 AH.

(a) The Contractor shall compute the Ampere-hour capacity at 10-hour discharge rate based on the above cycle and furnish the calculation. The minimum ambient temperature shall be 5 deg. C. The minimum voltage at the end of the load cycle shall not be less than 1.75 volts per cell.

(b) The batteries shall be storage type as specified.

(c) The cells shall be maintenance free Lead acid type.

(d) Each cell shall be in a suitable leak proof container with sealed cover.

(e) The batteries shall be furnished complete with cell interconnectors and a suitable rack protected with acid resistant paint. The arrangement of the rack shall be such as to allow easy access and adequate space for normal maintenance in battery room.

(f) Rated life of each battery shall be at least ten (10) years.

(g) The manufacturer of above said maintenance free battery shall be holder of ISO 9001 certificate.

3.2 Battery Charger

(a) The battery charger shall be suitable for maintenance free batteries and solid-state electronic type using silicon rectifiers and complete with all switches, fuses, contactors and instruments.

(b) The 24 V battery charger shall be suitable for 230/400 volts +10%, 1 or 3-phase, 50Hz supply. The charger shall have fully automatic voltage regulation and electronic current limiting. The voltage regulation shall be within +1% for a 0-100% load variation and +10% voltage variation on the AC side. Cooling shall be by means of natural convection.

(c) The minimum rating of the battery charger shall be not less than 20 amperes.

(d) The battery charger shall be housed in a freestanding floor mounted cabinet with enclosure protection of IP-30 as per IEC.

(e) The instruments, switches and lamps shall be flush or semi flush mounted on the front panel.

(f) The 24 V battery charger shall be constant voltage type with provision of voltage variation from float charging to boost charging voltage. The float charging voltage shall be between 2.1 to 2.2 volts per cell or at any other voltage recommended by the battery manufacturer. At float charging voltage the charger shall furnish the continuous DC load consisting of control, indication, annunciation, breaker spring charging mechanism and continuously "On" emergency light as well as float charge its associated battery. The boost charging voltage shall be about 2.4 to 2.5 volts/cell or at any other voltage recommended by the battery manufacturer. During equalizing or boost charging, the continuous DC load shall be fed by the charger. The loads that cannot tolerate the high equalizing or boost charging voltage shall be connected through dropper diode. The battery charger shall recharge the completely discharged battery to fully capacity in 9 hours. The charger shall have 10% excess capacity.

(g) The manufacturer of above said battery charger shall be holder of valid ISO 9001 certificate.

3.3 Wiring

The wiring shall be complete in all respects so as to ensure proper functioning of control, protection and metering scheme.

All wiring shall be completed up to terminal blocks.

Wiring shall be done with 2.5sqmm (minimum) Class 5 stranded copper conductor, flexible PVC insulated wire. The wire shall have a voltage grade of 600V as per IEC. Lower cross section of wires may be used for solid-state devices only.

Each wire shall be identified at both ends with wire designations in accordance with the approved wiring diagram. Interlocking type ferrules shall be used for identification.

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 wiring points.

Wires shall be neatly bunched and adequately supported so as to prevent sagging strain on termination. Wires shall not be spliced or tapped between terminal points.

All spare contacts of relays and contactors shall be wired up to the terminal block.

3.4 Cable termination

The equipment shall be designed to facilitate cable entry from bottom. Removable plates shall be furnished with compression type cable glands to make entry dust tight and no weight is transferred on the terminal. The glands shall be suitable for terminating cable armor. Compression type cable lugs as required shall be furnished for termination of power and control cables.

Sufficient space shall be provided to avoid sharp bending and for easy connection. A minimum space of 200mm from the gland plate to the nearest terminal block shall be provided.

3.5 **Ground bus**

A copper ground bus of 25mm x 6mm cross section shall be furnished along the entire length of each panel.

All devices shall be grounded to the ground bus

3.6 **Accessories**

(a) The following accessories shall be furnished for the batteries:

a) Battery racks
b) Other necessary accessories

(b) The charger shall be complete with the standard accessories including but not limited to the following:

a) Solid state surge protectors on the AC and DC sides
b) AC failure alarm relay
c) DC time delay low voltage relay
d) Manual voltage adjust switch
e) DC ammeter and voltmeter

3.7 **Tests**

(a) Type and routine tests at manufacturer's works and acceptance test at site shall be carried out on battery as per stipulation of latest standard of IEC.

The test shall include following tests:

a) General inspection.
b) Leakage test and internal short test for each cell.
c) Contractor shall submit the type tested certificate of the one cell for discharge at ten-hour rate to 1.85V DC at 25 deg. C.

After initial charging the following tests shall be performed at site:

a) Capacity test
b) Efficiency test

(b) The battery charger shall be subjected to the following tests at manufacturer's works:

a) Measurement on insulation resistance
b) High voltage test
c) Performance test

d) Temperature rise test

(c) Test certificates shall be submitted to the Employer/Employer's Representative.

3.8 **Drawings, Data and Manuals**

The following drawings and manuals shall be submitted by the successful Bidder for approval

a) Dimensional layout arrangement of battery and battery charger

b) Dimensional outline drawing of battery charger panel clearly showing the location of meters, switches etc.

c) Wiring diagram of the battery charger panel

d) Instruction manuals of battery and battery charger

3.9 **Performance Guarantee**

The performance figures quoted in Schedule of Technical Data shall be guaranteed within the tolerance permitted by relevant standard. In case of failure of the equipment to meet the guarantee, the Employer reserves the right to reject the equipment. The Contractor shall have to rectify the defect as no extra cost to the Employer and without delaying the commissioning schedule.

H. GROUNDING SYSTEM AND LIGHTNING PROTECTION

1. General

This specification covers the design, supply, delivery, installation and testing of the complete Grounding System as described herein.

2. Codes and Standards

The complete station grounding work shall be in accordance with the recommendation in the "Guide for Safety in Substation Grounding" IEEE No. 80 and the requirements of this section

3. Equipment to be furnished

Strengthening of the ground grid, test link chamber, grounding of all equipment located in the substation as required but not be limited to the supply of grounding conductors, jointing materials and all accessories to complete this grounding installation shall be covered under this specification.

4. Grounding Installation Features

4.1 The installation shall be complete in all respects for efficient and trouble free service. All work shall be carried out in a first class neat workmanlike manner. Grounding conductors shall be handled carefully to avoid kinking and cutting of the conductors during laying and installation. All connections to the grounding grid shall be made with the bare copper stranded cable.

4.2 For all connections made to equipment or to the structures, the grounding conductor, connectors and equipment enclosures shall have good clean contact surfaces. Grounding conductor connection to all electrical equipment, switchgear, transformers, motors, panels, conduit systems, equipment enclosures, cable trays, distribution boards, equipment frames, bases, steel structure, etc., shall be by pressure type or bolting type connectors.

4.3 All lap, cross and tee connections between two grounding conductors both below and above grade shall be made by thermo welding process or compression type connector. The various joints shall have adequate mechanical strength as well as necessary electrical conductivity not less than that of the parent conductors of the joints. All accessories for grounding installation shall be of quality and design approved by the Employer/Employer's Representative.

4.4 Grounding conductors, when crossing underground trenches, directly laid underground pipe and equipment foundation, if any, shall be at least 500 mm below the bottom elevation of such trenches/pipes.

5. Design Requirement

5.1 The Contractor shall measure the soil resistivity and calculate the total length of buried ground conductor, number of grounding electrode and their depth and spacing to achieve a grounding system resistance less than 5.0 ohm.

5.2 The Contractor shall calculate the cross-section considering the maximum fault level.

6. Tests

On completion of the installation, either wholly or in sections, it shall be tested in compliance with relevant code by the Contractor in the presence of the Employer/Employer's Representative. The cost of any test including labor, material and equipment charges shall be borne by the contractor. The ground grid resistance to remote earth shall be less than 5.0 ohm. If this low resistance cannot be obtained, then additional grounding conductors shall be buried in the earth, or if necessary, buried in treated soil to obtain the required low ground resistance.

I. STEEL STRUCTURE

1. General

This specification covers the design, manufacture, testing, delivery and installation of steel structures to be used for supporting electrical equipment and gantry structure.

2. Codes & Standards

The steel structure shall be designed, manufactured and tested in accordance with ASTM or equivalent.

3. Scope of Works

The works includes, but is not necessarily limited, the following:

a) Calculate and design as per requirements of this specification

b) Prepare complete detailed shop drawings and submit for approval of the Employer/Employer's Representative.

c) Prepare bill of materials and complete dispatch list.

d) Furnish all materials, labor, tools, plant, consumable, etc., including bolts, nuts, washers for fabrication in shop and on site and for erection.

e) Fabricate and deliver to job site, unload, store and erect structural steel for towers and all equipment frame.

f) Assemble bolt on ground at job site fabricated members for erection.

g) Erect fabricated materials and connect by field bolting.

h) Align and level erected structural steel.

4. Technical Requirements

4.1 The steel structures for reinforcement of existing substations shall be so designed and fabricated that the connecting and joining works can be done with ease and exactness.

4.2 Design load of conductors shall be as follow:

Description	Tension of conductor per phase
Incoming line	1,000 kg
Internal bus	500 kg
Overhead ground wire	300 kg

4.3 Steel structure dimensions, framing, member size and length, number, size and length of bolts, thickness of each filler and other necessary details to fabricate each piece shall be shown on the approved detail drawings. No change shall be made without the written approval of the Employer/Employer's Representative.

4.4 Bolts shall have hexagonal heads and hexagonal nuts with the same dimension between flats on bolt heads and nuts. Bolt holes are not to be more than 1.5 mm larger in diameter than the corresponding bolt diameter. The design is to be such as to keep the number of different parts as small as possible and is to facilitate transport, erection and inspection.

4.5 No welding will be permitted in steel structure fabrication

4.6 Bill of material shall give the size, length and galvanized weight of each member and the total weights of steel structures. It shall also include the number of bolts, nuts and washers per structure.

4.7 Workmanship shall be first class throughout.

4.8 All pieces must be straight, true to detail drawings and free from lamination flaws and other defects. All clipping, back-cuts, grindings, bends, holes, and etc. must be true to detail drawings and free of burrs.

4.9 Threads of bolts and nuts shall be cleanly rolled or cut and the face and head of nut shall be truly at right angle to the axis of the bolt.

4.10 After fabrication has been completed and accepted, all materials shall be clear of rust, loose scale, dirt, oil, grease and other foreign substances.

4.11 All materials including nuts and bolts shall be hot dip galvanized. The process of galvanization shall be as per latest version of IEC or ISI. The thickness of zinc coating shall not be less than 85 microns (610 gm/sq. m).

4.12 The material shall not be hammered or otherwise straightened in a manner that will injure the protective coating. If the material has been harmfully bent or warped in the process of fabrication or galvanizing, such defects shall be cause for rejection.

4.13 One of each type of structure shall be assembled in the shop to such extent as to insure proper field erection. Reaming of untrue holes will not be permitted. Shop-assembled parts shall be dismantled for shipment.

4.14 The structures shall include all necessary access ladders to give access to the various levels of the structures.

4.15 In addition to dead dynamic loads imposed by equipment, steel work shall be designed to withstand simultaneously wind loads as follows:

a) On flat surface: 121 kg/sqmm

b) For lattice structures: 121 kg/sqm on 1.71 times the times the projected area of the members of one face of the structure.

4.16 All structures shall be designed so that no failure or permanent distortion shall occur when tested with applied forces equal to 2.5 times to maximum simultaneous working loadings.

4.17 At or near ground level, all uprights shall be provided with holding down bolts provided under this contract.

4.18 Details and fastenings shall be designed to have factor of safety against failure not less than the main members of the structure.

4.19 Pockets and depressions likely to hold water shall be avoided and all parts of the structures shall be properly drained.

4.20 Bolts and nuts shall be galvanized and fitted with spring washers. Taper washers are to be added where necessary. Threads of bolts shall be spun galvanized and threads of nuts shall be oiled.

4.21 All member shall be cut to jig and holes shall be drilled or punched to jig.

4.22 Parts shall be carefully cut and holes accurately located so that the members are in position the holes can be accurately aligned before being bolted up., Drifting of holes will not be permitted.

5. Tests

5.1 All tests shall be carried out by the Contractor using his own instruments, testing equipment as well as qualified testing personnel and submit the test report to the employer.

5.2 The following shop test shall be performed with relevant provision of ASTM or equivalent.

(a) General inspection

(b) Material test

(c) Assembly test

(d) Galvanizing test

5.3 The results of all tests shall conform to the specified requirements as well as agreed guarantee figures finalizes with the Contractor.

5.4 Employer/Employer's Representative shall have the right to inspect any material, workmanship etc. of the equipment and may reject any item defective or unsuitable for the use and purpose intended, or not in accordance with the intent of the Employer/Employer's Representative

6. Drawings

6.1 The Contractor shall submit the calculation sheet, design & shop drawing and guaranteed performance data.

6.2 The shop detail drawings shall show the details of all parts to be fabricated.

6.3 Erection drawings shall include bills of materials for each type of structure with the piece mark, size, length and calculated weight of each member.

6.4 Packing, Marking and Shipping

6.5 Members of steel structure shall not be dropped or dragged on the ground and shall not be set on the ground for an extended period of time.

6.6 All steel shall be maintained clean and free of foreign matter and at no time shall it be set on wet or muddy ground.

6.7 Boxes of bolts, nuts and similar connectors, and hardware assemblies shall be stacked off the ground and shall be covered with plastic sheets for protection from elements.

6.8 Materials, which are defective or damaged when, delivered shall be repaired or replaced and shortages shall be made good immediately by the Contractor.

Note: All materials means the material specified in Bill of Quantity

J. MISCELLANEOUS MATERIALS

1. General

This specification covers the design, fabrication, properly packed for transportation, deliver, installation, testing and putting into efficient and trouble-free operation of the bus material and insulator complete with all accessories.

2. Equipment to be furnished

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

3. Technical Requirements

3.1 **Insulators**

a) General

All types of insulators shall satisfactorily withstand the specified climatic and service conditions. The strength of insulators as given by the electro-mechanical tests load shall be such that the factor of safety when supporting their maximum working loads shall be not less than two and a half.

Design shall be such that stresses due to expansion and contraction in any part of the insulators and fittings do not lead to development of defects.

All insulators, whether cylindrical post or string shall have plain shed profiles.

Damaged insulators shall be replaced.

b) Materials

Porcelain insulators shall be in accordance with IEC where applicable. Porcelain shall be sound, free from defect and thoroughly verified and the glaze shall not be depended upon for insulation.

Porcelain glaze shall be smooth, hard, of a uniform shade of brown and shall completely cover all exposed parts of the insulators. Outdoor insulator fittings shall remain unaffected by atmospheric conditions producing weathering, acids, alkalis, dust and rapid changes in temperature that may be experienced under working conditions.

Suspension and tension insulators shall comprise porcelain units with ball and socket fittings.

Retaining pins or locking devices for insulating units shall be of phosphor bronze or other approved material, and shall effectively prevent accidental separation of the units.

Unless otherwise approved, the individual units of both the suspension and tension insulator sets shall be identical and interchangeable.

c) Number of discs

String insulators shall comprise of 3 nos. of 11kV disc insulator.

d) Marking

Each insulator shall have marked on it the manufacturer's name or trade mark, the year of manufacture and the manufacturer's reference mark. Tension and suspension insulators shall also be marked with the guaranteed electromechanical strength. Marks shall be legible and indelible.

e) Post insulator

Post insulator shall be cylindrical type, solid core porcelain, provided in accordance with following requirements:

- Rated voltage 36 kV
- Nominal voltage 33 kV
- Impulse withstand voltage 170 kV
- Color Brown

Test shall be divided into three groups in accordance with IEC 168.

f) Standard particulars of insulator units

Insulator units shall comply with the following requirements. (IEC 305)

- Porcelain disc diameter 254mm
- Unit spacing 146mm
- Creepage distance 292mm
- Electro mechanical failing load 6,800kg
- Dry power frequency withstand voltage 70kV
- Wet power frequency withstand voltage 40kV
- Dry impulse withstand voltage 110kV
- Puncture voltage 110kV

Dimension and tolerances of ball and socket coupling shall comply with IEC Publications 120 (1977), and the internal height of the socket shall also comply with the requirements of IEC Publication 372-1.

3.2 **Main , Bus Conductor and fittings**

The contractor shall arrange all the necessary main, bus conductor and fitting with appropriate standard.

4. Packing and Marking

4.1 Insulator

a) Packaging

The insulators shall be packed in strong wooden boxes with a waterproof lining. These

boxes shall provide adequate protection against salt spray, chemical attack and damage that might be encountered in transportation and rough handling during loading, transportation to job site, unloading to temporary storage and ocean transportation.

b) Marking

In addition to marks required for shipping purposes, each crate and pallet shall be marked with Shipper's identity and Employer's name and address and quantity and type of contents. Also, the gross, tare and net weights in kilograms shall be stenciled on each pallet.

5. Guarantee

Any defects in materials or workmanship or other failure to meet requirements of these specifications, which are disclosed prior to the Taking-Over by the Employer, be corrected entirely (including removal and replacement) at the expenses of the Contractor.

Any latent defects not disclosed before date of the Taking-Over but disclosed within guarantee period, materials and/or supplies shall have been placed in use, shall be corrected promptly by and at the expense of the Contractor.

K. EARTHING SWITCHES

The Earthing Switch is operated by means of detachable lever from outside the cable compartment. It shall be mechanically interlocked with the CB so that the earthing switch in close position in section of CB truck into the service position is not possible. The operation of the Earthing Switch

- The 11kV metalclad switchgear shall include earthing switches to facilitate earthing of each cubicle as specified shall not be possible as long as the CB is not in isolated position.
- Main Data

  Rated Voltage kV 12

  Rated Current A 1250

  Short Circuit Current withstand capability (as specified above)

  Bus Bar Rating A = 2000

- **Technical Requirements:**

  a. The Earthing Switches shall meet the requirements of BS 5253 and IEC 129.
  b. Auxiliary Switches shall be provided as specified for the Circuit Breakers.
  c. Provision shall be made for padlocking in the Open and Closed position.
  d. Manual control of the switches and position indicator external to the cubicle shall be provided.
  e. The Earthing Switch shall be interlocked manually with transformer circuit breakers.

L. INTERLOCKING

The following operation shall be taken place only when the under stated interlocking conditions are fulfilled to ensure Personal and Operational Safety.

- Transferring the withdrawable part from the Disconnecting Position to the Service Position:
  Control Circuit Plug Inserted

  High Voltage Compartment Door closed.

  Circuit Breaker in OPEN Position.

  Earthing Switch in OPEN Position

- Transferring the with drawable part from the Service Position to the Disconnected Position.
  - Circuit Breaker in OPEN Position
- Operating the Circuit breaker
  Withdrawable part in the Interlocked Final Position (Service or disconnecting position)
- Operating the Earth Switch
  Withdrawable part in the interlocked disconnected position. windows shall be provided to allow visual inspection.

The Switches shall be tested in accordance with BS5253, IEC129 and IEC265 and shall include the following routine tests: Operating and Mechanical tests Measurements of the resistance of the main circuit.

- Safety Device
  Individual explosion vents should be provided for breaker / busbar / cable chambers on the top of the panel to let out the gases under pressure generated during an unlikely event of fault.

  Cubical with the front plate is pressure tested for the internal arc fault as per PHELA recommendations. Circuit breaker and the

TECHNICAL DATA SHEET:

(To be filled in by the Bidder/Manufacturer)

1. 33kV CIRCUIT BREAKER _Panauti HPS

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer				
2	Country of Origin				
3	Model No.				
4	Year of manufacturing experience	Years			
5	Applicable Standard		IEC		
6	Type		VCB Out door		
7	Poles		Three pole		
8	Pole breaking		Three		
9	Rated Voltage				
9.1	Nominal	kV	33		
9.2	Maximum	kV	36		
10	Rated Current				
10.1	Continuous at 45 degree ambient	A	800		
10.2	Rated interrupting current	kA	25		
10.3	Momentary	kA			
11	Frequency	Hz	50		
12	Temperature rise above 45 deg C ambient		As per IEC		
12.1	Contacts	Deg C			
12.2	Terminals	Deg C			
13	Rated short circuit breaking current				
14	Rated short circuit making current				
14.1	Peak	kA			
14.2	RMS symmetrical	kA			
15	Interrupting time at 100% capacity				
15.1	Maximum opening time	ms	≤60		
15.2	Total interrupting time	ms	≤60		
16	Closing time	ms			
17	Make time	ms			
18	Maximum current breaking capacity	A			
19	Insulation level				
19.1	Impulse withstand voltage(peak)	kV	170		
19.2	Power frequency withstand voltage	kV	70		
20	Operating Mechanism				
20.1	Type		Spring Loaded		

20.2	Number of mechanism per beaker				
20.3	Single/Three phase auto recloser		Not required		
20.4	Operating voltage of closing and tripping coil	V DC	110		
20.5	Operating voltage range				
	Closing	% of rated voltage	85-110%		
	Tripping		70-110%		
20.6	Closing and tripping current	A			
20.7	**Spring charging motor rating**				
	Capacity	kW			
	Rated voltage	V	**230 A.C.**		
20.8	Time required for the motor to charge the spring completely	Sec	<30		
20.9	Space heater and auxiliary equipment	Yes/No	Yes		
21	Push bottom for local operation	Yes/No	Yes		
21.1	Selection switch for local and remote control	Yes/No	Yes		
22	Operating counter provided	Yes/No	Yes		
23	Space heater provided for cubicle	Yes/No	Yes		
24	Thickness of sheet steel of cubicle	mm	min. 2		
25	Number of auxiliary contacts	No	8NO, 8NC		
26	Operating duty cycle		O-0.3sec-CO-3min-CO		
27	Number of possible operation without maintenance under				
	Rated short circuit breaking current	No			
	Rated Normal Current	No			
28	Porcelain insulator				
28.1	Manufacturer				
28.2	Creepage distance	mm	900		
29	Pad locking provision for local cubicle	Yes/No	Yes		
30	Total weight of the cubicle	kg			
31	Mechanical dimension (LxwxH)				
32	Manufacturer's ISO 9001 Certificate		To be submitted		
33	Manufacturer's Authorization		To be submitted		
34	End User Certificate		To be submitted		
35	Type Test Certificate		To be submitted		
36	Technical literature/drawings Submitted?		To be furnished		

2. 33kV CIRCUIT BREAKER _Bhaktapur

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer				
2	Country of Origin				
3	Model No.				
4	Year of manufacturing experience	Years			
5	Applicable Standard		IEC		
6	Type		VCB Out door		
7	Poles		Three pole		
8	Pole breaking		Three		
9	Rated Voltage				
9.1	Nominal	kV	33		
9.2	Maximum	kV	36		
10	Rated Current				
10.1	Continuous at 45 degree ambient	A	800		
10.2	Rated interrupting current	kA	25		
10.3	Momentary	kA			
11	Frequency	Hz	50		
12	Temperature rise above 45 deg C ambient		As per IEC		
12.1	Contacts	Deg C			
12.2	Terminals	Deg C			
13	Rated short circuit breaking current				
14	Rated short circuit making current				
14.1	Peak	kA			
14.2	RMS symmetrical	kA			
15	Interrupting time at 100% capacity				
15.1	Maximum opening time	ms	≤60		
15.2	Total interrupting time	ms	≤60		
16	Closing time	ms			
17	Make time	ms			
18	Maximum current breaking capacity	A			
19	Insulation level				
19.1	Impulse withstand voltage(peak)	kV	170		
19.2	Power frequency withstand voltage	kV	70		
20	Operating Mechanism				

20.1	Type		Spring Loaded		
20.2	Number of mechnism per beaker				
20.3	Single/Three phase autorecloser		Not required		
20.4	Operating voltage of closing and tripping coil	V DC	24		
20.5	Operating voltage range				
	Closing	% of rated voltage	85-110%		
	Tripping		70-110%		
20.6	Closing and tripping current	A			
20.7	**Spring charging motor rating**				
	Capacity	kW			
	Rated voltage	V	230 AC		
20.8	Time required for the motor to charge the spring completely	Sec	<30		
20.9	Space heater and auxiliary equipment	Yes/No	Yes		
21	Push bottom for local operation	Yes/No	Yes		
21.1	Selection switch for local and remote control	Yes/No	Yes		
22	Operating counter provided	Yes/No	Yes		
23	Space heater provided for cubicle	Yes/No	Yes		
24	Thickness of sheet steel of cubicle	mm	min. 2		
25	Number of auxiliary contacts	No	8NO, 8NC		
26	Operating duty cycle		0-0.3sec-CO-3min-CO		
27	Number of possible operation without maintenance under				
	Rated short circuit breaking current	No			
	Rated Normal Current	No			
28	Porcelain insulator				
28.1	Manufacturer				
28.2	Creepage distance	mm	900		
29	Pad locking provision for local cubicle	Yes/No	Yes		
30	Total weight of the cubicle	kg			
31	Mechanical dimension (LxwxH)				
32	Manufacturer's ISO 9001 Certificate		To be submitted		
33	Manufacturer's Authorization		To be submitted		
34	End User Certificate		To be submitted		
35	Type Test Certificate		To be submitted		

3. DISCONNECTING SWITCH

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
	Model No.				
2	Year of manufacturing experience	Years			
3	Applicable Standard		IEC		
4	Type		3pole, single throw,outdoor,center rotating		
5	frequency	Hz	50		
6	Rated voltage				
	Nominal	kV	33		
	Maximum	kV	36		
7	Rated Current				
7.1	Continuous at 45 deg C ambient	A	800		
7.2	Short time for 3 sec at max kV	kA	20		
7.3	Peak short time current	kA			
8	Temperature rise above 45 deg C ambient at Normal rated current				
8.1	Contacts	deg C			
8.2	Current carrying parts	deg C			
9	Maximum current the switch can safely interrupt				
9.1	Bus/Line charging current	A			
9.1	Potential transformer magnetizing current	A			
10	Clearance				
10.1	Between live parts and ground	mm			
10.2	Between fixed contact and blade in open position	mm			
11	Insulation level				
11.1	Impluse withstand voltage(peak)	kV			
11.2	Power frequency withsatnd voltage (1min,rms)	kV			
12	Main contacts				
	Material of fixed contact		copper alloy		
	Coating of fixed contact		copper alloy		
	Material of moving contacts		copper alloy		
	Coating of moving contacts		copper alloy		

	Material of the contacts of the earthing switch		copper alloy		
	Coating of the contacts of the earthing switch		copper alloy		
13	Material of Terminals				
13.1	Coating of terminals				
14	Operating mechanism		Manual operation		
15	Auxiliary Contacts				
15.1	Type	Convertible or fixed	Convertible		
15.2	Continuous current at 110 V DC	A			
15.3	Material		Copper		
15.4	Contacts silver plated	Yes/No	Yes		
16	No of operation switch can withstand without deteriortion of contact	No			
17	Type of interlock furnished		Electrical and mechanical		
18	Are the disconnector and the earthing switch mechanically interlocked to each other	Yes/No	Yes		
19	Insulator				
19.1	Manufacturer				
19.2	Type				
19.3	Ref Standard				
19.4	No of units per stack				
19.5	Power frequency withstand voltage				
	Dry	kV			
	Wet	kV			
19.6	Impluse withstand voltage (1min)				
19.7	Creepage distance in Air	mm			
19.8	Tensile strength				
19.9	Cantiliver strength				
19.10	Comperssion strength				
19.11	Torsional strength				
20	Enclosure Protection		IP-55W		
21	Operating mechanism		Manual gang operated		
22	Type of interlock furnished		Manual		
23	Weight of Isolator	kg			
24	ISO 9001 holder	Yes/No	Yes		
25	ISO 9001 certificate submitted	Yes/No	Yes		
26	Type test certificate submitted	Yes/No	Yes		

4. CURRENT TRANSFORMER

S. N.	Description	Unit	NEA Requirement	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
	Model No.				
2	Year of manufacturing experience	Years			
3	Applicable Standards		IEC		
4	Type		One phase outdoor, oil immersed		
5	Number of phases	Nos	1		
6	Number of cores	Nos	3		
7	Frequency	Hz	50		
8	Rated primary voltage				
8.1	Nominal	kV	33		
8.2	Maximum	kV	36		
9	Temperature rise above 45deg C ambient at Normal rated current	deg C			
10	Insulation level				
10.1	Impulse withstand voltage	kV	170		
10.2	Power frequency withstand voltage (1min rms)	kV	70		
11	Creepage distance	mm			
12	Short time thermal rating	kA	25		
13	Current ratings				
	For Transformer Protection	A	**100-50/1**		
	For 33kV Line		**100-50/1**		
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	Manufacturer's ISO 9001 Certificate		To be submitted		
21	Manufacturer's Authorization		To be submitted		
22	End User Certificate		To be submitted		
23	Type Test Certificate		To be submitted		
24	Technical literature provided	Yes/No			

5. POTENTIAL TRANSFORMER

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
	Model No.				
2	Year of manufacturing experience	Years			
3	Applicable Standards		IEC		
4	Type		Outdoor, oil immersed		
5	Number of phases	No.	1		
6	Frequency	Hz	50		
7	Rated primary voltage				
7.1	Nominal	kV	33		
7.2	Maximum	kV	36		
8	Temperature rise above 45 deg C ambient at Normal rated current				
8.1	With 1.1 times rated primary voltage continuously	deg C			
8.2	With 1.5 times rated voltage for 30 seconds	deg C			
9	Insulation levels				
9.1	Impulse withstand voltage (peak)	kV	170		
9.2	Power frequency withstand voltage (1min rms)	kV	70		
10	Creepage distance	mm	825		
11	Open circuit intermediate voltage	V			
12	Ratings				
12.1	Voltage ratio	kV	**33/√3:0.11/√3**		
12.2	Rated burden	VA	100		
12.3	Accuracy class		5P and 0.5		
12.4	Over voltage factor				
	Continuous		1.1		
	30 seconds		1.5		
12.5	Connection				
12.6	Secondary fuse				
	Manufacturer				
	Amp. Ratings	A			
12.7	By pass device for protection provided	Yes/No	Yes		

12.8	Knife switch and fuse on secondary provided	Yes/No	Yes		
13	No of secondary windings	No	2		
14	Dimension	mm			
15	Weight	kg			
16	Manufacturer's ISO 9001 Certificate		To be submitted		
17	Manufacturer's Authorization		To be submitted		
18	End User Certificate		To be submitted		
19	Type Test Certificate		To be submitted		
20	Technical literature provided	Yes/No			

6. LIGHTING ARRESTOR

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
	Model No.				
2	Year of manufacturing experience	Years			
3	Applicable Standards		IEC		
4	Type		Outdoor, gapless, zincoxide		
5	Voltage rating of LA	kV	30		
6	Nominal Discharge Current	kA	10		
7	Surge counter with unsulating base furnished	Yes/No	Yes		
8	Minimum power frequency spark over voltage	kV			
9	Maximum 1/50 impulse spark over voltage	kV			
10	Maximum front wave sparkover voltage	kV			
11	Maximum switch surge sparkover voltage	kV			
12	Number of section per pole				
13	Insulation level				
13.1	Impulse withstand voltage (peak)	kV	170		
13.2	Power frequency withstand voltage (1min rms)	kV	70		
14	Creepage distance	mm	825		
15	Earth terminal and accessries provided	Yes/No	Yes		
16	Surge counter	Yes/No	Yes		
17	ISO 9001 holder	Yes/No	Yes		
18	ISO 9001 certificate submitted	Yes/No	Yes		
19	Type test certificate submitted	Yes/No	Yes		

7. Control & Relay Panel for 6.3/33 kV, 1550kVA Transformer Protection(Panauti Switchyard)

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	**Control and relay panel type**				
1.1	Manufacturer and Country of origin				
1.2	Year of manufacturing experience	Years			
2	**Control Dicrepancy 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			
i.	Making current	Amp			
ii.	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				
i.	Manufacturer and Country of origin				
ii.	Type		Digital		
iii.	Current Range (100-50/1 Amp CT operated)	A			
iv.	Accuracy Class		0.5		
v.	Scale				
vi.	Type of scale				
vii.	Range of indication (100-50/1 Amp Amp CT operated)	A	0-100 0-50		
viii.	Linear/ Non linear				
ix.	Overloaded range	%	1.5		
x.	VA burden				
xi.	Catalog furnished	Yes/No	Yes		
xii.	Transducer operated	Yes/No			
6	**Voltmeter**				

i.	Manufacturer and Country of origin				
ii.	Type		Digital		
iii.	Accuracy class		0.5		
iv.	Scale				
v.	Range of indication	kV	0-36		
vi.	Linear/Non linear				
vii.	Overscale range	%	1.1		
viii.	VA burden	VA			
ix.	Catalog furnished	Yes/No	Yes		
x.	Transducer operated	Yes/No	Yes		
7	**Apparent power meter (kVA)**				
i.	Manufacturer and Country of origin				
ii.	Type		digital		
iii.	Rated voltage	kV	33/√3:0.11/√3		
iv.	Rated current	A	100-50/1		
v.	Current range (Transducer operated)	mA			
vi.	Accuracy class		0.5		
vii.	Scale	MVA			
viii.	Type of scale				
	-Range of indication		0-5		
	-Linear/Non linear				
ix.	VA burden				
	-Current coil	VA			
	-Voltage coil	VA			
x.	Catalog furnished	Yes/No	Yes		
xi.	Transducer operated	Yes/No	Yes		
10	**Annunciators**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Catalog furnished	Yes/No	Yes		
v.	Number of inputs (annunciator/event)				
vi.	Number of active points	Nos	16		
vii.	Number of rows		4		
viii.	Number of column		4		
iv.	Type of mounting		Flush		
ix.	Replacement of individual inscription plates and lamps from front panel possible	Yes/No	Yes		
x.	Sequence of operation as per specification	Yes/No	Yes		

11	**Protective Relays**				
11.1	**Phase Over Current Relay**				
i.	Manufacturer and Country of origin				
ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standards		IEC		
v.	Triple pole or single pole		Single*3		
vi.	Current setting range	% of rated current	20-200%		
vii.	Operating time at 10 times current settings	msec	3		
viii.	Reset delay time	ms	0-60 sec		
ix.	TMS Range	sec	0.025-1.0 sec		
x.	Setting for high set element	%	50%-2500%		
xi.	Characteristics		IDMT (Standard inverse)		
xii.	Instantaneous unit provided	Yes/No	Yes		
xiii.	Current setting range	% of rated current	500-2000%		
xiv.	Steps of current setting		max 5%		
xv.	Operating range				
xvi.	NO Conatcts				
xvii.	Insulation test as per IEC	Yes/ No	Yes		
xx.	Indication				
	-Hand reset flags provided	Yes/No	Yes		
	-Light emitting diode provided	Yes/No	Yes		
xxi.	Auxilliary DC supply	V	110		
xxii.	Technical Literature submitted	Yes/No	Yes		
xxiii.	Test Certificate submitted	Yes/No	Yes		
11.2	**Earth fault relay**				
i.	Manufacturer and Country of origin				
ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		
v.	Triple pole or single pole		Single		
vi.	Continuous overl load capacity	x In			
vii.	Current setting range	% of rated current	10-80%		

viii.	operating time at 10 times current setting	msec	3		
ix.	Characteristics		IDMT (Standard inverse)		
x.	Instantaneous unit provided	Yes/No	Yes		
xi.	Current setting range	% of rated current	500-2000%		
xii.	Operating range				
xiii.	No Contacts				
xiv.	Insulation test as per IEC	Yes/ No	Yes		
xv.	Indication				
	Hand reset flags provided	Yes/No	Yes		
	Light emitting diode provided	Yes/No	Yes		
xvi.	Auxilliary DC supply	V	110		
xvii.	Technical Literature submitted	Yes/No	Yes		
xviii.	Test certificate submitted	Yes/No	Yes		
11.5	**Differential Relay**				
i.	Manufacturer and Country of origin				
ii.	Standard reference				
iii.	Type				
iv.	Voltage rating	V	110		
v.	Type of Mounting		Flush		
vi.	Operating time setting	ms	<30		
vii.	Sensivity setting		20-50%xIn		
viii.	Bias setting				
ix.	CT ratio Compensating range				
x.	Burden for Current Circuit	VA			
xi.	DC Burden	VA			
xii.	Tripping	A			
xiii.	Making Current	A			
xiv.	Closing load (At 110V DC)	A			
xv.	Ambient Temperature Range	Deg C			
xvi.	Auxilliary DC supply	V	110		
xvii.	Technical Literature submitted	Yes/No	Yes		
xviii.	Test certificate submitted	Yes/No	Yes		
11.6	**Auxilliary Tripping and Lockout Relay**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		

v.	Operatring Time	ms	<15		
vi.	Does the lockout relay reset by the manually operated or electrically operated reset device				
vii.	Is the cut off contact provided to interrupt the operating coil	Yes/No	Yes		
viii.	Contact rating at 125V DC	A			
ix.	Auxilliary DC supply	V	110		
x.	Technical Literature submitted	Yes/No	Yes		
xi.	Test certificate submitted	Yes/No	Yes		
11.7	**Break Fail Lockout Relay, 86K**				
i.	DC Voltage Rating	V	110		
ii.	Nos of electrically separate NO and NC Contacts				
11.8	**Break Failure Lockout Relay BF**				
i.	DC Voltage Rating	V	110		
ii.	Nos of electrically separate NO and NC Contacts				
12	**Trip Circuit Supervision Relay with Auxiliary**				
i.	Type				
ii.	Operating Time				
iii.	Resetting Time				
iv.	Operating range	% of rate voltage	80% to 120% of V_n		
v.	Reset time	sec	≤400ms		
vi.	Thermal withstand voltage continuously		$0.1V_n$		
vii.	Contact rating make and carry continuously	W DC	1250W DC		
viii.	Accuracy limit	%	±5%		
13	**Construction of Control and Relay Panel**				
i.	Type		Simplex		
ii.	Manufacturer's type designation				
iii.	Applicable Standard				
iv.	Control panel furnished as per specification	Yes/No	Yes		
v.	Enclosure protection calss	IP	IP54		
vi.	Thickness of sheet metal used				
vii.	Front and rear portion	mm	>3		
viii.	Side top and bottom cover	mm	>2		
iv.	All instruments, meters, relays and control switches flush or semi flush type		Flush		
ix.	Ground Bus				
x.	Material		Copper		

xi.	Size	mm x mm			
xii.	Internal Wirring				
xiii.	Type of Insulation				
xiv.	Voltage Grade of Wires	V	600		
xv.	Cross Section of Wires	sq.mm	2.5 min		
xvi.	Current Circuit				
xvii.	Voltage and auxilliary circuit				
xviii.	Over all dimension of control board	cu mm			
xix.	Shipping data				
xx.	Size of large package	mm x mm x mm			
xxi.	Weight of heaviest packge	kg			
14	**Communication System for Relays**				
i.	Modbus		RS 485		
ii.	Protocol		IEC 61850		
15	Manufacturer's ISO 9001 Certificate		To be submitted		
16	Manufacturer's Authorization		To be submitted		
17	End User Certificate		To be submitted		
18	Technical literature provided	Yes/No			

8. Control & Relay Panel for 33kV Line Protection (Panauti Switchyard)

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	**Control and relay panel type**				
1.1	Manufacturer and Country of origin				
1.2	Year of manufacturing experience	Years			
2	**Control Dicrepancy 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			
i.	Making current	Amp			
ii.	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				
i.	Manufacturer and Country of origin				
ii.	Type		Digital		
iii.	Current Range (100-50/1 Amp CT operated)	A			
iv.	Accuracy Class		0.5		
v.	Scale				
vi.	Type of scale				
vii.	Range of indication (100-50/1 Amp CT operated)	A	0-100 0-50		
viii.	Linear/ Non linear				
ix.	Overloaded range	%	1.5		
x.	VA burden				
xi.	Catalog furnished	Yes/No	Yes		
xii.	Transducer operated	Yes/No			
6	**Voltmeter**				
i.	Manufacturer and Country of origin				
ii.	Type		Digital		

iii.	Accuracy class		0.5		
iv.	Scale				
v.	Range of indication	kV	0-36		
vi.	Linear/Non linear				
vii.	Overscale range	%	1.1		
viii.	VA burden	VA			
ix.	Catalog furnished	Yes/No	Yes		
x.	Transducer operated	Yes/No	Yes		
8	**kWH Meter**				
i.	Manufacturer and Country of origin				
ii.	Type		Digital 3 phase, 4 wire		
iii.	Applicable standard		IEC		
iv.	Accuracy class		0.2		
v.	Import Export meter provided	Yes/No	Yes		
vi.	Rated voltage	kV	33/√3:0.11/√3		
vii.	Rated current	A	100-50/1		
viii.	VA burden				
	-Current coil	VA			
	-Voltage coil	VA			
ix.	Impulse contact provided 1pulse 100kW	Yes/No	Yes		
x.	Reverse rotation locking mechanism provided	Yes/No	Yes		
xi.	Programming software provide	Yes/No	Yes		
xii.	Optical probe provide	Yes/No	Yes		
xiii.	Impulse/second programmable	Yes/no	Yes		
10	**Annunciators**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Catalog furnished	Yes/No	Yes		
v.	Number of inputs (annunciator/event)				
vi.	Number of active points	Nos	8		
vii.	Number of rows		2		
viii.	Number of column		4		
iv.	Type of mounting		Flush		
ix.	Replacement of individual inscription plates and lamps from front panel possible	Yes/No	Yes		
x.	Sequence of operation as per specification	Yes/No	Yes		
11	**Protective Relays**				
11.1	**Phase Over Current Relay**				
i.	Manufacturer and Country of origin				

ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standards		IEC		
v.	Triple pole or single pole		Single*3		
vi.	Current setting range	% of rated current	20-200%		
vii.	Operating time at 10 times current settings	msec	3		
viii.	Reset delay time	ms	0-60 sec		
ix.	TMS Range	sec	0.025-1.0 sec		
x.	Setting for high set element	%	50%-2500%		
xi.	Characteristics		IDMT (Standard inverse)		
xii.	Instantaneous unit provided	Yes/No	Yes		
xiii.	Current setting range	% of rated current	500-2000%		
xiv.	Steps of current setting		max 5%		
xv.	Operating range				
xvi.	NO Conatcts				
xvii.	Insulation test as per IEC	Yes/ No	Yes		
xx.	Indication				
	-Hand reset flags provided	Yes/No	Yes		
	-Light emitting diode provided	Yes/No	Yes		
xxi.	Auxilliary DC supply	V	110		
xxii.	Technical Literature submitted	Yes/No	Yes		
xxiii.	Test Certificate submitted	Yes/No	Yes		
11.2	**Earth fault relay**				
i.	Manufacturer and Country of origin				
ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		
v.	Triple pole or single pole		Single		
vi.	Continuous overl load capacity	x In			
vii.	Current setting range	% of rated current	10-80%		
viii.	operating time at 10 times current setting	msec	3		
ix.	Characteristics		IDMT (Standard inverse)		
x.	Instantaneous unit provided	Yes/No	Yes		

xi.	Current setting range	% of rated current	500-2000%		
xii.	Operating range				
xiii.	No Conatcts				
xiv.	Insulation test as per IEC	Yes/ No	Yes		
xv.	Indication				
	Hand reset flags provided	Yes/No	Yes		
	Light emitting diode provided	Yes/No	Yes		
xvi.	Auxilliary DC supply	V	110		
xvii.	Technical Literature submitted	Yes/No	Yes		
xviii.	Test certificate submitted	Yes/No	Yes		
11.6	**Auxilliary Tripping and Lockout Relay**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		
v.	Operatring Time	ms	<15		
vi.	Does the lockout relay reset by the manually operated or electrically operated reset device				
vii.	Is the cut off contact provided to interrupt the operating coil	Yes/No	Yes		
viii.	Contact rating at 125V DC	A			
ix.	Auxilliary DC supply	V	110		
x.	Technical Literature submitted	Yes/No	Yes		
xi.	Test certificate submitted	Yes/No	Yes		
11.7	**Break Fail Lockout Relay, 86K**				
i.	DC Voltage Rating	V	110		
ii.	Nos of electrically separate NO and NC Contacts				
11.8	**Break Failure Lockout Relay BF**				
i.	DC Voltage Rating	V	110		
ii.	Nos of electrically separate NO and NC Contacts				
12	**Trip Circuit Supervision Relay with Auxiliary**				
i.	Type				
ii.	Operating Time				
iii.	Resetting Time				
iv.	Operating range	% of rate voltage	80% to 120% of V_n		
v.	Reset time	sec	≤400ms		

vi.	Thermal withstand voltage continuously		$0.1V_n$		
vii.	Contact rating make and carry continuously	W DC	1250W DC		
viii.	Accuracy limit	%	±5%		
13	**Construction of Control and Relay Panel**				
i.	Type		Simplex		
ii.	Manufacturer's type designation				
iii.	Applicable Standard				
iv.	Control panel furnished as per specification	Yes/No	Yes		
v.	Enclosure protection calss	IP	IP54		
vi.	Thickness of sheet metal used				
vii.	Front and rear portion	mm	>3		
viii.	Side top and bottom cover	mm	>2		
iv.	All instruments, meters, relays and control switches flush or semi flush type		Flush		
ix.	Ground Bus				
x.	Material		Copper		
xi.	Size	mm x mm			
xii.	Internal Wirring				
xiii.	Type of Insulation				
xiv.	Voltage Grade of Wires	V	600		
xv.	Cross Section of Wires	sq.mm	2.5 min		
xvi.	Current Circuit				
xvii.	Voltage and auxilliary circuit				
xviii.	Over all dimension of control board	cu mm			
xix.	Shipping data				
xx.	Size of large package	mm x mm x mm			
xxi.	Weight of heaviest packge	kg			
14	**Communication System for Relays**				
i.	Modbus		RS 485		
ii.	Protocol		IEC 61850		
15	Manufacturer's ISO 9001 Certificate		To be submitted		
16	Manufacturer's Authorization		To be submitted		
17	End User Certificate		To be submitted		
18	Technical literature provided	Yes/No			

9. Control & Relay Panel for 33kV Line Protection (Bhaktapur Switchyard)

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	**Control and relay panel type**				
1.1	Manufacturer and Country of origin				
1.2	Year of manufacturing experience	Years			
2	**Control Dicrepancy 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			
i.	Making current	Amp			
ii.	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				
i.	Manufacturer and Country of origin				
ii.	Type		Digital		
iii.	Current Range (100-50/1 Amp CT operated)	A			
iv.	Accuracy Class		0.5		
v.	Scale				
vi.	Type of scale				
vii.	Range of indication (100-50/1 Amp CT operated)	A	0-100 0-50		
viii.	Linear/ Non linear				
ix.	Overloaded range	%	1.5		
x.	VA burden				
xi.	Catalog furnished	Yes/No	Yes		
xii.	Transducer operated	Yes/No			
6	**Voltmeter**				
i.	Manufacturer and Country of origin				
ii.	Type		Digital		

iii.	Accuracy class		0.5		
iv.	Scale				
v.	Range of indication	kV	0-36		
vi.	Linear/Non linear				
vii.	Overscale range	%	1.1		
viii.	VA burden	VA			
ix.	Catalog furnished	Yes/No	Yes		
x.	Transducer operated	Yes/No	Yes		
8	**kWH Meter**				
i.	Manufacturer and Country of origin				
ii.	Type		Digital 3 phase, 4 wire		
iii.	Applicable standard		IEC		
iv.	Accuracy class		0.2		
v.	Import Export meter provided	Yes/No	Yes		
vi.	Rated voltage	kV	33/√3:0.11/√3		
vii.	Rated current	A	100-50/1		
viii.	VA burden				
	-Current coil	VA			
	-Voltage coil	VA			
ix.	Impulse contact provided 1pulse 100kW	Yes/No	Yes		
x.	Reverse rotation locking mechanism provided	Yes/No	Yes		
xi.	Programming software provide	Yes/No	Yes		
xii.	Optical probe provide	Yes/No	Yes		
xiii.	Impulse/second programmable	Yes/no	Yes		
10	**Annunciators**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Catalog furnished	Yes/No	Yes		
v.	Number of inputs (annunciator/event)				
vi.	Number of active points	Nos	8		
vii.	Number of rows		2		
viii.	Number of column		4		
iv.	Type of mounting		Flush		
ix.	Replacement of individual inscription plates and lamps from front panel possible	Yes/No	Yes		
x.	Sequence of operation as per specification	Yes/No	Yes		
11	**Protective Relays**				

11.1	**Phase Over Current Relay**				
i.	Manufacturer and Country of origin				
ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standards		IEC		
v.	Triple pole or single pole		Single*3		
vi.	Current setting range	% of rated current	20-200%		
vii.	Operating time at 10 times current settings	msec	3		
viii.	Reset delay time	ms	0-60 sec		
ix.	TMS Range	sec	0.025-1.0 sec		
x.	Setting for high set element	%	50%-2500%		
xi.	Characteristics		IDMT (Standard inverse)		
xii.	Instantaneous unit provided	Yes/No	Yes		
xiii.	Current setting range	% of rated current	500-2000%		
xiv.	Steps of current setting		max 5%		
xv.	Operating range				
xvi.	NO Conatcts				
xvii.	Insulation test as per IEC	Yes/ No	Yes		
xx.	Indication				
	-Hand reset flags provided	Yes/No	Yes		
	-Light emitting diode provided	Yes/No	Yes		
xxi.	Auxilliary DC supply	V	24		
xxii.	Technical Literature submitted	Yes/No	Yes		
xxiii.	Test Certificate submitted	Yes/No	Yes		
11.2	**Earth fault relay**				
i.	Manufacturer and Country of origin				
ii.	Type		Non directional		
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		
v.	Triple pole or single pole		Single		
vi.	Continuous overl load capacity	x In			
vii.	Current setting range	% of rated current	10-80%		
viii.	operating time at 10 times current setting	msec	3		

ix.	Characteristics		IDMT (Standard inverse)		
x.	Instantaneous unit provided	Yes/No	Yes		
xi.	Current setting range	% of rated current	500-2000%		
xii.	Operating range				
xiii.	No Contacts				
xiv.	Insulation test as per IEC	Yes/ No	Yes		
xv.	Indication				
	Hand reset flags provided	Yes/No	Yes		
	Light emitting diode provided	Yes/No	Yes		
xvi.	Auxiliary DC supply	V	24		
xvii.	Technical Literature submitted	Yes/No	Yes		
xviii.	Test certificate submitted	Yes/No	Yes		
11.6	**Auxiliary Tripping and Lockout Relay**				
i.	Manufacturer and Country of origin				
ii.	Type				
iii.	Manufacturer's type designation				
iv.	Applicable standard		IEC		
v.	Operatring Time	ms	<15		
vi.	Does the lockout relay reset by the manually operated or electrically operated reset device				
vii.	Is the cut off contact provided to interrupt the operating coil	Yes/No	Yes		
viii.	Contact rating at 125V DC	A			
ix.	Auxilliary DC supply	V	24		
x.	Technical Literature submitted	Yes/No	Yes		
xi.	Test certificate submitted	Yes/No	Yes		
11.7	**Break Fail Lockout Relay, 86K**				
i.	DC Voltage Rating	V	24		
ii.	Nos of electrically separate NO and NC Contacts				
11.8	**Break Failure Lockout Relay BF**				
i.	DC Voltage Rating	V	24		
ii.	Nos of electrically separate NO and NC Contacts				
12	**Trip Circuit Supervision Relay with Auxiliary**				
i.	Type				

ii.	Operating Time				
iii.	Resetting Time				
iv.	Operating range	% of rate voltage	80% to 120% of V_n		
v.	Reset time	sec	≤400ms		
vi.	Thermal withstand voltage continuously		$0.1V_n$		
vii.	Contact rating make and carry continuously	W DC	1250W DC		
viii.	Accuracy limit	%	±5%		
13	**Construction of Control and Relay Panel**				
i.	Type		Simplex		
ii.	Manufacturer's type designation				
iii.	Applicable Standard				
iv.	Control panel furnished as per specification	Yes/No	Yes		
v.	Enclosure protection calss	IP	IP54		
vi.	Thickness of sheet metal used				
vii.	Front and rear portion	mm	>3		
viii.	Side top and bottom cover	mm	>2		
iv.	All instruments, meters, relays and control switches flush or semi flush type		Flush		
ix.	Ground Bus				
x.	Material		Copper		
xi.	Size	mm x mm			
xii.	Internal Wirring				
xiii.	Type of Insulation				
xiv.	Voltage Grade of Wires	V	600		
xv.	Cross Section of Wires	sq.mm	2.5 min		
xvi.	Current Circuit				
xvii.	Voltage and auxilliary circuit				
xviii.	Over all dimension of control board	cu mm			
xix.	Shipping data				
xx.	Size of large package	mm x mm x mm			
xxi.	Weight of heaviest packge	kg			
14	Manufacturer's ISO 9001 Certificate		To be submitted		
15	Manufacturer's Authorization		To be submitted		
16	End User Certificate		To be submitted		
17	Technical literature provided	Yes/No			

10. **CONTROL CABLE**

S. N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	**Manufacturer and country of origin**				
2	**Manufacturer's type designation**				
3	**Type**				
4	**Applicable Standards**		IEC		
5	***Voltage ratings***				
	a)Suitable for max. system voltage	V	1000		
	b)Voltage grade of the cables	V	600		
	c)Rated voltage between each conductor and screen	V			
	d)Rated voltage between two conductors	V			
6	**Conductor material**		Copper		
7	***Conductor***				
	a)Cross section of wires	sq.mm			
	b)Nos & dia of each core in cable				
	c)Overall jacket of thickness				
8	**Insulating material**		Polyethylene		
9	**Overall jacket material**		PVC		
10	**Net weight of the cable**	kg/m			
11	**Standard drum length**	m			
12	**Continuous current at 45 deg C**				
	-in ground				
	-in duct				
13	**Electrical parameters**				
	-Resistance	Ohm			
	-Reactance	Ohm			
14	Technical literature submitted	Yes/No	Yes		
15	Type test certificate submitted	Yes/No			
16	Delivery of equipment in months following award of contract	Months			

11. 24 Volt Battery System

S.N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
2	Manufacturing experience	years			
3	Type of battery		MFVRLA		
4	Applicable standards		IEC		
5	Number of cells	No.			
6	Number of units	No.			
7	Number of cells in a unit	No.			
8	Nominal voltage rating	V	24		
9	Nominal capacity at 27 degree C at 10 h discharge time to cell end voltage 1.75	AH	150		
10	Ampere capacity at 27 degree C at 15 min discharge time to cell end voltage	A			
11	Battery construction (type)				
12	Type of plates				
	a) Positive (flat or tubular)				
	b) Negative				
13	Type of rack - Rack dimensions				
14	Float charging voltage	V			
15	Equalizing charging voltage	V			
16	Internal resistance of one cell	ohm			
17	Short circuit current withstand capacity	A			
18	Float charging current	A			
19	Charging current of a fully discharged battery at 8 hour charging rate	A			
20	End voltage of each cell	V			
21	Charging efficiency of the battery	%			
22	Max. duration in month, the battery can be kept without charging	month			
23	Battery life (guaranteed value)	years			
24	Rack interconnection furnished?		Yes		
26	Type test certificate submitted	Yes/No			
27	Has manufacturer exported units	Yes/No			
28	Technical literature submitted	Yes/No			
29	ISO 9001 holder manufacturer	Yes/No	Yes		

12. Battery Charger

S.N.	Description	Unit	NEA Requirements	Filled by the Bidder	Remarks
1	Manufacturer and Country of Origin				
2	Manufacturing experience	years			
3	Type of charger		constant voltage		
4	Applicable standard		IEC		
5	Output rating	A			
6	Range of DC voltage variation	±V			
7	Maximum AC input	kVA			
8	Input Voltage / phase	V			
9	Ripple	%	< 2%		
10	Efficiency of charger at 100 % output	%			
11	Temperature rise above ambient of 40 degree C				
	a) Solid state elements	^{0}C			
	b) Wound elements	^{0}C			
12	Voltage regulation	%			
13	Float voltage adjustment				
14	Equalizing voltage adjustment				
15	Auto equalizing charge provided?	Yes/No	Yes		
16	Timer for equalizing charge provided?	Yes/No	Yes		
17	End switching to limit equipment	type			
18	Manual over-ride switch for selection of float/equalizing charge provided?	Yes/No	Yes		
28	Technical literature submitted	Yes/No			
29	ISO 9001 holder manufacturer	Yes/No			

Deviations from technical requirements:

Signed……...

Address…….

As representative for…….

Date……

Note:-a) Bidders are strictly advised to complete the TECHNICAL DATA SHEET and submit the detail catalog/broachers that justify the filled data & requirements in technical specification. The Bid of the Bidders not fulfilling this shall be treated as NONRESPONSIVE BID.

b) The maximum possible information available have been given, if one feels it is Insufficient please visit the site & see the installed System/parts.

SPECIFICATION OF CIVIL WORKS

A. 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, specified herein and as evidently necessary to complete the work as given in the price schedule.

1. Clearing and Stripping

1.1 **General**

Clearing shall include cutting, leveling , removal and disposal with lead of 100m, 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 20cm 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 **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.

1.3 **Payment**

Payment for the item "Clearing and stripping" will made at the lump sum price as in bid 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.

2. Compacted Fill for Site Grading

2.1 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. The contractor shall provide details of filling for approval of the owner.

2.2 **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**.**

2.3 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.

2.4 Unless otherwise specified by 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

i)	Under building and yard foundation	95 percent
ii)	Sub-base for roadways	90 percent
iii)	Gravel roadways top 400mm	95 percent
iv)	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.

2.5 Measurement for payment for the contract item, "Compacted fill for Site Grading " Shall be made at the lump sum price as in bid document.

2.6 Payment for the contract item, " Compacted fill for Site Grading" will be made at the lump sum price as in bid document which 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.

3. Crushed Stone Substation Yard Surfacing

3.1 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.

3.2 Payment for the contract item "Crushed Stone for Substation Surfacing" will be made at the lump sum price as in bid document, which 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

4. Site Drainage

4.1 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.

4.2 Grading

Location and its direction of the elevations shall be as per approved drawings.

4.3 Drainage channel materials

a) All concrete drains must be built.

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.

4.4 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.

4.5 **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.

4.6 **Payment**

Payment for the contract item "Site Drainage" will be made at lump sum price as in bid document. 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.

5. Laying of underground cable

Contractor shall furnish all construction work for under grounding of power 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 power cable and accessories: in the Price Schedule shall include the cost of laying of cable with required materials as described above.

6. Cable Trenches

6.1 **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.

6.2 **Payment**

Payment for the contract item, "cable trenches" will be made at lump sum bid price. Therefore, in the schedule, it 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.

B. 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.

1. Foundation Design

1.1 **General**

The Contractor shall design all foundations specified on the bid. 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.

1.2 **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.

1.3 **Payment**

No separate or direct payment will be made to the Contractor for design works of foundation. All costs incurred in connection therewith shall be included in the lump sum bid price for the construction of various works.

2. Excavation and Backfill

2.1 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.

2.2 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.

2.3 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 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.

2.5 Rock particles larger than 10 cm shall not be in contact with the concrete.

2.6 Upon the completion of excavation a 10 cm thick layer of boulder or selected borrow shall be provided at the base of each foundation.

2.7 **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.

3. Foundation Construction

3.1 **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 require for testing. The cost of the tests shall be borne by the Contractor.

3.2 **Measurement**

Measurement for payment of the contract item: "RCC foundation", shall be on the basis of the actual number of each type of foundation constructed by the Contractor.

3.3 CONCRETE WORK

3.3.1 Scope

This Section covers the materials, design of mixes, mixing, transport, placing, compaction and curing of concrete (plain and reinforced), either cast-in-situ or pre-cast and mortar required in the civil engineering and building construction works. It also covers reinforcement for concrete.

3.3.2 Definitions

Structural concrete is any class of concrete which is used in reinforced, pre-stressed or un-reinforced concrete construction which is subject to stress.

Non-structural concrete is composed of materials complying with the Specification but for which no strength requirements are specified and which is used only for filling voids, blinding foundations and similar purposes where it is not subjected to significant stress.

A pour refers to the operation of placing concrete into any mould, bay or formwork, etc. and also to the volume which has to be filled. Pours in vertical succession are referred to as lifts.

3.3.3 Materials For Concrete

(i) General

The Contractor shall submit to the Engineer full details of all materials which he proposes to use for making concrete. No concrete shall be placed in the works until the Engineer has approved the materials of which it is composed. The approved materials shall not thereafter be altered or substituted by other materials without the consent of the Engineer.

(ii) Cement

Cement shall comply with the requirements of Clause 413. Cement shall be free flowing and free of lumps. It shall be supplied in the manufacturer's sealed unbroken bags or in bulk. Bagged cement shall be transported in vehicles provided with effective means of ensuring that it is protected from the weather.

Bulk cement shall be transported in vehicles or in containers built and equipped for the purpose.

Cement in bags shall be stored in a suitable weatherproof structure of which the interior shall be dry and well ventilated at all times. The floor shall be raised above the surrounding ground level not less than 30cm and shall be so constructed that no moisture rises through it.

Each delivery of cement in bags shall be stacked together in one place. The bags shall be closely stacked so as to reduce air circulation with min gap of 500mm from outside wall. If pallets are used, they shall be constructed so that bags are not damaged during handling and stacking. Stack of cement bags shall not exceed 8 bags in height. Different types of cement in bags shall be clearly distinguished by visible markings and shall be stored in separate stacks.

Cement from broken bags shall not be used in the works. Cement in bags shall be used in the order in which it is delivered.

Bulk cement shall be stored in weather proof silos which shall bear a clear indication of the type of cement contained in them. Different types of cement shall not be mixed in the same silo.

The Contractor shall provide sufficient storage capacity on site to ensure that his anticipated program of work is not interrupted due to lack of cement.

Cement which has become hardened or lumpy or fails to comply with the Specification in any way shall be removed from the Site.

All cement for any one structure shall be from the same source as far as possible.

All cement used in the works shall be tested by the manufacturer. The manufacturer shall provide the results of tests as given in Table 600.1 and 600.2 for each supply and for the last six months of his production. The Contractor shall supply two copies of each certificate to the Engineer.

Table 600. 1: Test Results for Chemical Composition of Cement

Compounds %		**Mean**	**Min**	**Max.**	**Standard deviation**
Lime	CaO				
Silica	SiO_2				
Alumina	AI_2O_3				
Iron Oxide	Fe_2O_3				
Magnesia	MgO				
Sulphur Trioxide	So_3				
Soda, Potash	Na_2O,K_2O				

Table 600.2: Test Results for Physical Properties of Cement

Characteristics	**Requirements**	**Nominal**	**Mean**	**Min**	**Max**	**St. Dev.**
Fineness, M2/KG : (by Blaine's Air Permeability Method)	225					
Minimum Setting time (initial), minutes	45					
Maximum Setting time (final), minutes	600					
Soundness (by. Le Chatelie method) mm, maximum	10					
Minimum Average Compressive Strength of three mortar cubes, (N/mm2)						
3 days	16,27*					

7 days	22,37*					
28 days	33,53*					

**denotes the requirements of High Strength Portland Cement.*

Each set of tests carried out by the manufacturer on samples taken from cement which is subsequently delivered to site shall relate to no more than one day's output of each cement plant.

The Contractor shall constitute, from each delivery and each type of cement and not less than one samples for every 200 tons or part of it, representative samples to be tested when instructed by the Engineer in a laboratory acceptable to him, in case of the concrete mixes do not comply with the requirements of this Specification.

Cement which is stored on site for longer than one month shall be tested in such laboratory for every 200 tons or part thereof and at monthly intervals thereafter.

The Contractor shall keep full records of all data relevant to the manufacture, delivery; testing and the cement used in the works and shall provide the Engineer with two copies thereof.

(iii) Fine Aggregate

Fine aggregate shall be clean hard and durable and shall be natural sand, crushed gravel sand or crushed rock sand complying with IS 383. AH the material shall pass through a 4.75 mm IS sieve and the grading shall be in accordance with IS 383. In order to achieve an acceptable grading, it may be necessary to blend materials from more than one source.

The deviation from the initial fineness modulus shall be no more than ± 0.30 for ordinary concrete and ± 0.20 for high quality concrete.

However, in respect of the presence of deleterious materials the fine aggregate shall not contain iron pyrites, iron oxides, mica, shale, coal or other laminar soft or porous materials or organic matter unless the Contractor can show by comparative tests on finished concrete as set out in Clause 617 and as per the direction of the Engineer, that the presence of such materials does not affect the properties of the concrete.

(iv) Coarse Aggregate

Coarse aggregate shall be clean hard and durable crushed rock, crushed gravel or natural gravel corresponding to the following classes:

Class A: Aggregate shall consist of crushed igneous or quartzite rock from an approved source.

Class B: Aggregate shall consist of crushed quarry rock other than Class A from an approved source.

Class C: Aggregate shall consist of natural or partly crushed gravel, pebbles obtained from an approved gravel deposit. It may contain a quantity of material obtained from crushing the oversize stone in the deposit provided such material is uniformly mixed with the natural uncrushed particles.

Class D: Aggregate shall consist entirely of crushed gravel. The crushed gravel shall be produced from material retained on a standard sieve having an opening at least twice as large as the maximum size of aggregate particle specified.

Class E: Aggregate shall consist of an artificial mixture of any of the above classes of aggregate the. The use of Class E aggregate and the relative proportions of the constituent materials shall be approved by the Engineer.

Coarse aggregate shall be supplied in the nominal size called for in the contract and shall be of the grading as single sized aggregate or graded aggregate of nominal size 40 mm, 20 mm, 12.5 mm and 10 mm in accordance with IS 383.

Other properties shall be as set out below:

Flakiness Index. When tested in accordance with IS 2386 Part 1, the Flakiness Index of the coarse aggregate shall be as set out hereunder:

For ordinary concrete : not more than 25

For high quality concrete : not more than 15

If the Flakiness Index of the coarse aggregate varies by more than five units from the average value of the aggregate used in the approved trial mix, then a new set of trial mixes shall be carried out if the workability of the mixes has been adversely affected by such variation.

Water Absorption: The aggregate shall not have a water absorption of more than 2 per cent when tested as set out in IS 2386 Part 3.

Los Angeles Abrasion (LAA): The aggregate shall have LAA not more than 45% for ordinary concrete, and not more than 35% for high quality concrete, when tested in accordance with IS 2386 Part 4.

Aggregate Crushing Value (ACV): The aggregate shall have ACV not more than 30% for pavement structure and not more than 45% for other structure when tested in accordance with IS 2386 Part 4.

Alkali Aggregate Reactivity: The aggregate shall comply with IS 383/3.2 notes when tested in accordance with IS 2386 Part 7.

(v) Testing Aggregates

(a) Acceptance Testing

The Contractor shall deliver to the Engineer samples containing not less than 50 kg of any aggregate which he proposed to use in the works and shall supply such further samples as the Engineer may require. Each sample shall be clearly labeled to show its origin and shall be accompanied by all information called for in IS 2386 Part 1 to 8. Tests to determine compliance of the aggregates with the requirements of Sub-clause 2003 (3) and (4) shall be carried out by the Contractor in a laboratory acceptable to the

Engineer. If the tested materials fail to comply with the Specification, further tests shall be made in the presence of the Contractor and the Engineer. Acceptance of the material shall be based on the results of such tests.

All the materials shall be accepted if the results of not less than three consecutive sets of test executed in accordance with IS 2386 (Part 1-8) show compliance with the Sub-clauses 2003 (3) and (4).

(b) Compliance Testing/Process Control Testing

The Contractor shall carry out routine testing of aggregates for compliance with the Specification during the period that concrete is being produced for the works. The tests set out below shall be performed on aggregates from each separate source on the basis of one set of tests for each day on which aggregates are delivered to site provided that the set of tests shall represent not more than 100 tons of fine aggregate and not more than 250 tons of coarse aggregate, and provided also that the aggregates are of uniform quality.

Grading : IS 2386 Part 1

Silt, Clay Contents and Organic Impurities: IS 2386 Part 2

If the aggregate from any source is variable, the frequency of testing shall be increased as instructed by the Engineer.

In addition to the above routine tests, the Contractor shall carry out the following tests at the stated frequencies:

Chloride Content: As frequently as may be required to ensure that the proportion of chlorides in the aggregates does not exceed the limit stated in the Specification. Sulphate Content and Alkali Aggregate Reactivity; As frequently as may be required according to the variability of sulphate content and alkali reactivity assessed from the laboratory tests carried out during the concrete mix design.

(vi) Delivery and Storage of Aggregates

Aggregates shall be delivered to site in clean and suitable vehicles. Different type or sizes of aggregates shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that the contamination of aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged in such a way that drying out in hot weather is prevented in order to avoid sudden fluctuations in water content. Storage of fine aggregates shall be arranged in such way that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

(vii) Water for Concrete and Mortar

Water shall be clean and free from harmful matter and shall comply with the requirements of IS 456.

Brackish water containing more than 1000 ppm chloride ion or 2000 ppm sulphate ion shall not be used for mixing or curing concrete.

The Contractor shall carry out tests in compliance with IS 456 to establish compliance with Specifications.

(viii) Admixtures

(a) General

The use of admixtures in concrete may be required under the contract to promote special properties in the finished concrete or may be proposed by the Contractor to assist him in compliance with the Specification.

In all cases the Contractor shall submit to the Engineer full details of the admixture he proposes to use and the manner in which he proposes to add it in the mix. The information provided shall include:

a. The typical dosage, the method of dosing, and the detrimental effects of an excess or deficiency in the dosage.

b. The chemical names of the main active ingredients in the admixture.

c. Whether or not the admixture contains chlorides, and if so the chloride ion content expressed as a percentage by weight of admixture.

d. Whether the admixture leads to the entrainment of air when used at the manufacturer's recommended dosage, and if so the extent to which it does so.

e. Details of previous uses of the admixture in Nepal.

The chloride ion content of any admixture shall not exceed 1 per cent by weight of the admixture nor 0.02 per cent by weight of the cement in the mix.

Admixtures shall not be mixed together without the consent of the Engineer.

Calcium chloride or admixtures containing calcium chloride shall not be used in pre-stressed concrete.

Admixtures may be supplied as liquid or as powder. They shall be stored in sealed and undamaged containers in a dry, cool place. Admixtures shall be dispensed in liquid form and dispensers shall be of sufficient capacity to measure at one time the full quantity required for each batch.

(b) Workability Agents

Workability agents shall comply with BS 5075 and shall not have any adverse effect on the properties of the concrete.

3.3.4 The Design Of Concrete Mixes

(i) Classes of Concrete

The classes of structural concrete to be used in the works shall be as shown on the Drawing and designated in Table 600.3, in which the class designation includes two figures. The firs figures indicates the characteristic strength f_{ck} at 28 days expressed in MPa (N/mm^2) and the second figure is the maximal nominal size of aggregate in the mix expressed in millimeters. Letter M in the class designation stands for Mix, letters SM stand for Special Mix.

Consistence of the mix, assessed through the Slump Test where the slump is measured in millimeters, is designated as follows:

S: Stiff consistence, for slump < 40

P: Plastic consistence, for slump > 40 and < 90

VP: Very Plastic consistence, for slump >90 and < 150

F: Flowing consistence for slump > 150

Table 600.3: Concrete Classes and Strength

Classes of concrete	Consistence	Type of uses	Characteristic Strength (fck) MPa (N/mm2)	Maximum Nominal Size of Aggregate (mm)	Trial mixes Minimal Target Strength fd=1.1fck MPa (N/mm2)	Early works test cubes	
						Any one result (aver, of 3 cubes) MPa (N/mm2)	Average of 3 consecutive results MPa (N/mm2)
M 10/75	S	Ordinary	10	75	11	10	14
M 10/40	S	Ordinary	10	40	11	10	14
M 15/20	S	Ordinary	15	20	16.5	15	19
M 15/40	S	Ordinary	15	40	16.5	15	19
M 20/20	S	Ordinary	20	20	22	20	24
M 20/40	S	Ordinary	20	40	22	20	24
M 25/20	S	Ordinary	25	20	27.5	25	29
M 25/40	S	Ordinary	25	40	27.5	25	29

(ii) Design of Proposed Mixes

Concrete mixes shall comply with Clause 617.

The Contractor shall design all the concrete mixes called for in the Drawing using the ingredients which have been approved by the Engineer in accordance with Clause 603 and in compliance with the following requirements:

(a) The aggregate portion shall be well graded from the nominal maximum size of stone down to the 150 micron size.

(b) The cement content shall be such to achieve the strength called for in Table 600.3 but in any case not less than the minimum necessary as shown in Table 600.4

(c) The workability shall be consistent with ease of placing and proper compaction having regard to the presence of reinforcement and other obstructions.

(d) The water/cement ratio shall be the minimum consistent with adequate workability but in any case not greater than 0.5 for classes of concrete from M20 to M50 taking due account of any water contained in the aggregates. The Contractor shall take into account that this requirement may in certain cases require the inclusion of a workability agent in the mix.

Table 600.4 Minimum Cement Content

Classes of concrete	Minimum cement content in kg per m of compacted		
	Moderate exposure	**Intermediate exposure**	**Severe exposure**
M15/40, M15/20	150	200	225
M20/40, M20/20	250	300	325
M25/20, M25/40	300	325	350

Note: The minimum cement contents shown in the above table are required in order to achieve impermeability and durability. In order to meet the strength requirements in the Specification higher contents may be required.

The categories applicable to the works are based on the factors listed hereunder:

Moderate exposure : Surface sheltered from severe rain, buried concrete.

Intermediate exposure : Surface exposed to severe rain; alternate wetting and drying; traffic; corrosive fumes; heavy condensation.

Severe exposure : Surface exposed to water having a pH of 4.5 or less, groundwater containing sulphate.

(iii) Laboratory Trial Mixes

For each mix of concrete for which the Contractor has proposed a design, he shall prepare the number of concrete batches specified hereunder:

Nominal composition : 3 separate batches

Modified compositions, the quantities of other constituents being unchanged:

Water : +10% 1 batch

Water : -10% 1 batch

Cement : +15% 1 batch

Cement : -15% 1 batch

Samples shall be taken from each batch and the following action taken, all in accordance with BS 1881:

(a) The slump of the concrete shall be determined.

(b) Six tests cubes shall be cast from each batch. In the case of concrete having a maximum aggregate size of 20 mm, 150 mm cubes shall be used. In the case of concrete containing lager aggregate, 200 mm cubes shall be used and in addition any pieces of aggregate retained on a 50 mm IS sieve shall be removed from the mixed concrete before casting the cubes.

(c) The density of all the cubes shall be determined before the strength tests are carried out.

(d) All faces shall be perpendicular to each other.

(e) Three cubes from each batch shall be tested for compressive strength at seven days and the remaining three at 28 days.

For "Smaller Contracts works", the following composition are suggested as a starting basis for the Laboratory trials for one m^3 of concrete:

Concrete Class	**Characteristic Strength N/mm**	**Cement (kg)**	**Total aggregates (kg)**	**Fine aggr./ Total Aggr. (%)**	**Water (max) (lit.)**	**Workability**
M 15/40-1 M 15/20 M 20/20	15 20	250 300	1900 1875	35-45 35-45	160 165-170	Stiff-Plastic Stiff

A "result" being the average strength of the three cubes from one batch, the average of the three results from tests at 28 days for the nominal composition shall not be less than the Minimal Target Strength shown in Table 20.3.

One result from the modified compositions shall not be less than the nominal strength as shown on Table 600.3.

(iv) Site Trials

At least six weeks before commencing placement of concrete in the permanent works, site trials shall be prepared for each class of concrete specified.

For each mix of concrete for which the Contractor has proposed a design and successfully tested in Laboratory, he shall prepare three separate batches specified hereunder using the materials which have been approved for use in the works and the mixing plant which he proposes to use for the works. The volume of each batch shall be the capacity of the concrete mixer proposed for full production.

Samples shall be taken from each batch and the action taken similar to the above Sub-clause 604 (3) (a) to (e).

The average of the three results of tests at 28 days shall not be less than the Minimal Target Strength shown in Table 600.3.

The Contractor shall also carry out tests to determine the drying shrinkage of the concrete unless otherwise directed by the Engineer.

Based on the results of the tests on the Laboratory trial and site trial mixes, the Contractor shall submit full details of his proposals for mix design to the Engineer, including the type and source of each ingredient, and the results of the tests on the trial mixes.

If the Engineer does not agree to a proposed concrete mix for any reason, the Contractor shall amend his proposals and carry out further trial mixes. No mix shall be used in the works without the written consent of the Engineer.

(v) Quality Control of Concrete Production

(a) **Sampling**

For each class of concrete in production at each plant for use in the works, samples of concrete shall be taken at the point of mixing or of deposition as instructed by the Engineer, all in accordance with the sampling procedures described in BS 1881 and with the further requirements set out below.

Six 150 mm or 200 mm cubes as appropriate shall be made from each sample and shall be cured and tested in accordance with BS 1881 three at seven days and the other three at 28 days. Where information samples are required, such as for post-tensioning operations, three additional cubes shall be made.

The minimum frequency of sampling of concrete of each grade shall be as following:

For 1-5 m^3 quantity of work - 1 no. of sample

For 5-20 m^3 quantity of work - 2 no. of sample

For 20 m^3 and more quantity of work - 3 no. of sample plus one additional for each 20m^3 or part thereof.

At least one sample shall be taken from each shifts of work.

Until compliance with the Specification has been established the frequency of sampling shall be three times that stated above and not less than 3 samples/day for each class of concrete in production at each plant or such lower frequency as may be instructed by the Engineer.

(b) **Testing**

(i) The slump of the concrete shall be determined for each batch from which samples are taken and in addition for other batches at the point of production and deposition or at the frequency instructed by the Engineer.

The slump of concrete in any batch shall not differ from the value established by the trial mixes by more than 25 mm or one third of the value whichever is the less.

(ii) The air content of air entrained concrete in any batch shall be within 1.5 times of the required value and the average value of four consecutive measurements shall be within the required value expressed as a percentage of the volume of freshly mixed concrete.

(iii) Early Works: Until such time as sufficient test results are available to apply the method of control described in (iv) below, the compressive strength of the concrete at 28 days shall be such that no single result (average of 3 cubes) is less than the characteristic strength fck as shown in Table 600-3 under the heading "early works test cubes" and also that the average of three consecutive results is not less than f_{ck} +4 as shown in Table 600-3 under the same heading.

The 7-day cube result may be used as an early strength indicator, at the discretion of the Engineer.

(iv) When at least 20 consecutive results on tested batches are available for any class of concrete mixed in any one plant, no single result shall be less than f_{ck} +4 (N/mm^2) and

also the average of any group of three consecutive results shall not be less than f_{ck}+4 (N/mm^2).

In addition the Coefficient of Variation shall be less than the figure given below:

Number of batches	**Maximum coefficient of variation**	
	Ordinary concrete	**High quality concrete**
After 20 tested batches After 50 tested batches	18% 15%	15% 12%

Where the Coefficient of Variation = (Standard Deviation of the results/Average value of the result)

(v) Failure to comply with Requirements:

If any one result in a group of three consecutive results is less than fCk-4 (N/mm_), but the other results of group satisfy the strength requirement, then only the batch from which the failed result was obtained shall be deemed not to comply with the Specification.

If the average strength of the group is less than the strength requirement then all the batches between those represented by the first and the last result shall be deemed not to comply with the Specification, and the Contractor shall immediately adjust the production procedure or the mix design subject to the agreement of the Engineer to restore compliance with the Specification. If adjustment of the mix design is agreed, the Contractor shall again be required to comply with Sub-clauses 2004 (3) and 2004 (4).

The Contractor shall take necessary action to remedy concrete which does not comply with this Specification. Such action may include but not necessarily confined to the following :

- Increasing the frequency of sampling until control is again established.
- Carrying out non destructive testing such as ultrasonic measurements, load tests or other appropriate methods,
- Cutting test cores from the concrete and testing in accordance with BS 1881
- Carrying out strengthening or other remedial work to the concrete where possible or appropriate.
- Removing the concrete.
- Accepting as sub standard

3.3.5 Mixing Concrete

Before any batching, mixing, transporting, placing, compacting and finishing and curing the concrete ordered or delivered to site, the Contractor shall submit to the Engineer full details including Drawing of all the plant which he proposes to use and the arrangements he proposes to make.

Concrete for the works shall be batched and mixed in one or more plants or concrete mixer unless the Engineer agrees to some other arrangement. If concrete mixers are used, there shall be sufficient number of mixtures including stand by mixers.

Batching and mixing plants shall be complying with the requirements of IS 1791 and capable of producing a uniform distribution of the ingredients throughout the mass. Truck mixers shall comply with the requirements of IS 4925 and shall only be used with the prior approval of the Engineer. If the plant proposed by the Contractor does not fall within the scope of IS 1791 it shall have been tested in accordance with IS 4634 and shall have a mixing performance within the limits of IS 1791.

All mixing operations shall be under the control of an experienced supervisor.

The aggregate storage bins shall be provided with drainage facilities arranged so that the drainage water is not discharged to the weigh hoppers. Each bin shall be drawn down at least once per week and any accumulations of mud or silt shall be removed.

If bulk cement is used, the scale and weight hopper for cement shall be distinct from the scale and weight hopper for aggregates.

Cement and aggregates shall be batched by weight. Water may be measured by weight or volume.

The weighing and water dispensing mechanisms shall be maintained in good order. Their accuracy shall be maintained within the tolerances described in IS 1791 and not more than plus or minus one percent, and checked against accurate weights and volumes when required by the Engineer.

The weights of cement and of each size of aggregate and the weight or volume of water as indicated by the mechanism employed shall be within a tolerance of plus or minus three per cent of the respective weight per batch agreed by the Engineer.

The Contractor shall provide standard test weights at least equivalent to the maximum working load used on the most heavily loaded scale and other auxiliary equipment required for checking the satisfactory operation of each scale or measuring device. Tests shall be made by the Contractor in the presence of the Engineer during the site trials described in Sub-clause 604 (4) and then at intervals to be determined by the Engineer but not less than once per three months. The Contractor shall furnish the Engineer with copies of the complete results of all check tests and shall make any adjustments, repairs or replacements necessary to ensure satisfactory performance.

The nominal drum or pan capacity of the mixer shall not be exceeded. The turning speed and the mixing time shall be as recommended by the manufacturer, but in addition, when water is the last ingredient to be added, mixing shall continue for at least one minute after all the water has been added to the drum or the pan.

The blades of pan mixers shall be maintained within the tolerances specified by the manufacturer of the mixer and the blades shall be replaced when it is no longer possible to maintain the tolerances by adjustment.

Mixers shall be fitted with an automatic recorder registering the number of batches discharged.

The water to be added to the mix shall be reduced by the amount of free water contained in the coarse and fine aggregates. This amount shall be determined by the Contractor by a method agreed by the Engineer immediately before mixing begins each day and thereafter at least once per hour and for each delivery of aggregates during concreting. When the correct quantity of water, determined as set out in the Specification, has been added to the mix, no further water shall be added, either during mixing or subsequently.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed. Mixers shall be cleaned out before changing to another type of cement.

3.3.6 Transportation Of Concrete

The concrete shall be discharged from the mixer and transported to the works by means which shall prevent adulteration, segregation or loss of ingredients, and shall ensure that the concrete is of the required workability at the point and time of placing. The loss of slump between discharge from the mixer and placing shall be within the tolerances specified in Sub-clause 604 (5) (b) (i).

The capacity of the means of transport shall not be less than the full volume of a batch.

The time elapsing between mixing transporting placing and compaction altogether of a batch of concrete shall not be longer than the initial setting time of the concrete. If the placing of any batch of concrete is delayed beyond this period, the concrete shall not be placed in the works.

3.3.7 Placing Of Concrete

(i) Consent for Placing

Concrete shall not be placed until the Engineer's consent has been given in writing. The Contractor shall give the Engineer at least two full working day notice of his intention to place concrete.

If concrete placing is not commenced within 24 hours of the Engineer's consent the Contractor shall again request consent as specified above.

(ii) Preparation of Surface to Receive Concrete

Excavated surfaces on which concrete is to be deposited shall be prepared as set out in Section 500.

Existing concrete surfaces shall be prepared as set out in Clause 612. Before deposition of further concrete they shall be clean, hard and sound and shall be wet but without any free-standing water.

Any flow of water into an excavation shall be diverted through proper side drains to a sump or be removed by other suitable method which will prevent washing away the freshly deposited concrete or any of its constituents. Any under drain constructed for this purpose shall be completely grouted up when they are no longer required by a method agreed by the Engineer.

Unless otherwise instructed by the Engineer surfaces against which concrete is to be placed shall receive prior coating of cement slurry or mortar mixed in the proportions similar to those

of the fines portion in the concrete to be placed. The mortar shall be kept ahead of the concrete. The mortar shall be placed into all parts of the excavated surface and shall not be less than 5 mm thick.

If any fissures have been cleaned out they shall be filled with mortar or with concrete as instructed by the Engineer.

The amount of mortar placed at one time shall be limited so that it does not dry out or set before being covered with concrete.

(iii) Placing Procedures

The concrete shall be deposited as nearly as possible in its final position. It shall be placed so as to avoid segregation of the concrete and displacement of the reinforcement, other embedded items or formwork. It shall be brought up in layers approximately parallel to the construction joint planes and not exceeding 300 mm in compacted thickness unless otherwise permitted or directed by the Engineer, but the layers shall not be thinner than four times the maximum nominal size of aggregate.

When placing on a nearly horizontal surface, placing shall start at the lower end of the surface to avoid de-compaction of concrete.

Layers shall not be placed so that they form feather edges nor shall they be placed on a previous layer which has taken its initial set. In order to comply with this requirement, another layer may be started before initial set of the preceding layer.

All the concrete in a single bay or pour shall be placed as a continuous operation. It shall be carefully worked round all obstructions, irregularities in the foundations and the like so that all parts are completely full of compacted concrete with no segregation or honey combing. It shall also be carefully worked round and between water stops, reinforcement, embedded steelwork and similar items which protrude above the surface of the completed pour. All work shall be completed on each batch of concrete before its initial set commences and thereafter the concrete shall not be disturbed before it has set hard. No concrete that has partially hardened during transit shall be used in the works and the transport of concrete from the mixer to the point of placing shall be such that this requirement can be complied with.

Concrete shall not be placed during rain which is sufficiently heavy or prolonged to wash mortar from coarse aggregate on the exposed faces of fresh concrete. Means shall be provided to remove any water accumulating on the surface of the placed concrete. Concrete shall not be deposited into such accumulations of water.

In dry weather, covers shall be provided for all fresh concrete surfaces which are not being worked on. Water shall not be added to concrete for any reason.

When concrete is discharged from the place above its final deposition, segregation shall be prevented by the use of chutes, down pipes, trunking, baffles or other appropriate devices.

Forms for walls shall be provided with openings or other devices that will permit the concrete to be placed in a manner that will prevent segregation and accumulations of hardened concrete on the formwork or reinforcement above the level of the placed concrete.

When it is necessary to place concrete under water the Contractor shall submit to the Engineer his proposals for the method and equipment to be employed. The concrete shall be deposited either by bottom-discharging watertight containers or through funnel-shaped tremies which are kept continuously full with concrete in order to reduce to a minimum the contact of the concrete with the water. Special care shall be taken to avoid segregation.

If the level of concrete in a tremie pipe is allowed to fall to such extent that the water enters the pipe, the latter shall be removed from the pour and filled with concrete before being again lowered into the placing position. During and after concreting under water, pumping or de-watering in the immediate vicinity shall be suspended if there is any danger that such work will disturb the freshly placed concrete.

(iv) Interruptions to Placing

If the concrete placing is interrupted for any reason and the duration of the interruption cannot be forecast or is likely to be prolonged, the Contractor shall immediately take the necessary action to form a construction joint so as to eliminate as far as possible feather edges and sloping top surfaces and shall thoroughly compact the concrete in accordance with Clause 2008. All work on the concrete shall be completed before elapse of initial setting time and it shall not thereafter be disturbed until it is hard enough to resist damage. Plant and materials to comply with this requirement shall be readily available at all time during concrete placing.

Before concreting is resumed after such an interruption the Contractor shall cut out and remedy all damaged or un-compacted concrete, feather edges or any undesirable features and shall leave a clean sound surface against which the fresh concrete may be placed.

If it becomes possible to resume concrete placing without contravening the Specification and the Engineer consents to a resumption, the new concrete shall be thoroughly worked in and compacted against the existing concrete so as to eliminate any cold joints.

In case of long interruption concrete shall be resumed as directed by Engineer.

(v) Dimensions of Pours

Unless otherwise agreed by the Engineer, pours shall not be more than two meters high and shall as far as possible have a uniform thickness over the plan area of the pour. Concrete shall be placed to the full planned height of all pours except in the circumstances described in Sub-clause 607 (4).

The Contractor shall plan the dimensions and sequence of pours in such a way that cracking of the concrete does not take place due to thermal or shrinkage stresses.

(vi) Placing Sequence

The Contractor shall arrange that the intervals between successive lifts of concrete in one Section of the works are of equal duration. This duration shall not be less than three days or not more than seven days under temperate weather conditions unless otherwise agreed by the Engineer.

Where required by the Engineer to limit the opening of construction joints due to shrinkage, concrete shall not be placed against adjacent concrete which is less than 21 days old.

Contraction gaps in concrete shall be of the widths and in the locations as shown on the Drawing and they shall not be filled until the full time interval shown on the Drawing has elapsed.

3.3.8 Compaction Of Concrete

Concrete shall be fully compacted throughout the full extent of the placed layer. It shall be thoroughly worked against the formwork and around any reinforcement and other embedded item, without displacing them. Care shall be taken at arises or other confined spaces. Successive layers of the same pour shall be thoroughly worked together.

Concrete shall be compacted with the assistance of mechanical immersion vibrators, unless the Engineer agrees another method.

Immersion and surface vibrators shall operate at a frequency of between 70 and 200 hertz. The Contractor shall ensure that vibrators are operated at pressures and voltages not less than those recommended by the manufacturer in order that the compactive effort is not reduced.

A sufficient number of vibrators shall be operated to enable the entire quantity of concrete being placed to be vibrated for the necessary period and, in addition, stand-by vibrators shall be available for instant use at each place where concrete is being placed.

Vibration shall be continued at each point until the concrete ceases to contract, air bubbles have ceased to appear, and a thin layer of mortar has appeared on the surface. Vibrators shall not be used to move concrete laterally and shall be withdrawn slowly to prevent the formation of voids.

The vibrators shall be inserted vertically into the concrete to penetrate the layer underneath at regular spacing which shall not exceed the distance from the vibrator over which vibration is visibly effective and some extent of vibration is overlapped.

Vibration shall not be applied by way of reinforcement nor shall the vibrators be allowed to touch reinforcement, sheathing ducts or other embedded items.

3.3.9 Curing Of Concrete

(i) General

Concrete shall be protected during the first stage of hardening from loss of moisture and from the development of temperatures differentials within the concrete sufficient to cause cracking. The methods used for curing shall not cause damage of any kind to the concrete.

Curing shall be continued for as long as may be necessary to achieve the above objectives but not less than seven days or until the concrete is covered by successive construction whichever is the shorter period.

The above objectives shall be dealt with in Sub-clauses 609 (2) and 609 (3) but nothing shall prevent both objectives being achieved by a single method where circumstances permit.

The curing process shall commence as soon as the concrete is hard enough to resist damage from the process. In the case of large areas or continuous pours, it shall commence on the completed Section of the pour before the rest of the pour is finished.

(ii) Loss of Moisture

Exposed concrete surfaces shall be closely covered with impermeable sheeting, properly secured to prevent its removal by wind and the development of air spaces beneath it. Joints in the sheeting shall be lapped by at least 300 mm.

If it is not possible to use impermeable sheeting, the Contractor shall keep the exposed surfaces continuously wet by means of water spray or by covering with a water absorbent material which shall be kept wet, unless this method conflicts with Sub-clause 609 (3).

Water used for curing shall be of the same quality as that used for mixing.

Formed surfaces may be cured by retaining the formwork in place for the required curing period.

If instructed by the Engineer, the Contractor shall, in addition to the curing provisions set out above provide a suitable form of shading to prevent the direct rays of the sun reaching the concrete surfaces for at least the first four days of the curing period.

(iii) Limitation of Temperature Differentials

The Contractor shall limit the development of temperature differentials in concrete after placing by any means appropriate to the circumstances including the following:

(a) Limiting concrete temperatures at placing as set out in Sub-clause 2011 (2);

(b) Use of low heat cement for mass concreting, subject to the agreement of the Engineer;

(c) Leaving formwork in place during the curing period. Steel forms shall be suitably insulated on the outside;

(d) Preventing rapid dissipation of heat from surfaces by shielding from wind.

3.3.10 Protection Of Fresh Concrete

Freshly placed concrete shall be protected from rainfall and from water running over the surface until it is sufficiently hard to resist damage from these causes.

Concrete placed in the works shall not be subjected to any loading including traffic until it has attained at least its characteristic strength as defined in Clause 604.

3.3.11 Construction Joints

Whenever concrete is to be bonded to other concrete which has hardened, the surface of contact between the Sections shall be deemed a construction joint.

Where construction joints are shown in the Drawing, the Contractor shall form such joints in such positions. The location of joints which the Contractor requires to make for the purpose of construction shall be subject to the approval of the Engineer. Construction joints shall be in vertical or horizontal planes except in sloping slabs where they shall be normal to the exposed surface or elsewhere where the Drawing require a different arrangement.

Construction joints shall be arranged as to reduce to a minimum the effects of shrinkage in the concrete after placing, and shall be placed in the most advantageous positions with regard to stresses in the structures and the desirability of staggering joints.

Feather edges of concrete at joints shall be avoided. Any feather edges which may have formed where reinforcing bars project through a joint shall be cut back until sound concrete has been reached.

The intersections of horizontal and near horizontal joints and exposed faces of concrete shall appear as straight lines produced by use of a guide strip fixed to the formwork at the top of the concrete lift, or by other means acceptable to the Engineer.

Construction joints formed as free surfaces shall not exceed a slope of 20 per cent from the horizontal.

The surface of the fresh concrete in horizontal or near horizontal joints shall be thoroughly cleaned and roughened by means of high pressure water, and air jets or wire brush, when the concrete is hard enough to withstand the treatment without the leaching of cement. The surface of vertical or near vertical joints shall be similarly treated if circumstances permit the removal of formwork at a suitable time.

Where concrete has become too hard for the above treatment to be successful, the surface whether formed or free shall be thoroughly scrabbled by mechanical means, manually or wet sand blasted and then washed with clean water. The indentations produced by scrabbling shall not be less than 10 mm deep and shall be away from the finished face by 40mm.

If instructed by the Engineer the surface of the concrete shall be thoroughly brushed with a thin layer of mortar composed of one part of cement to two parts of sand by weight and complying with Sub-clause 2502 (2) immediately prior to the deposition of fresh concrete. The mortar shall be kept just ahead of the fresh concrete being placed and the fresh layer of concrete shall be thoroughly and systematically vibrated to full depth to ensure complete bond with the adjacent layer. No mortar or concrete shall be placed until the joint has been inspected and approved by the Engineer.

3.3.12 Records Of Concrete Placing

Records of the details of every pour of concrete placed in the works shall be kept by the Contractor in a form agreed by the Engineer. These records shall include class of concrete, location of pour, date and duration of pour, ambient temperature and concrete temperature at time of placing and all relevant meteorological information such as rain, wind etc., moisture contents of the aggregates, details of mixes, batch numbers, cement batch number, results of all tests undertaken, part of the structure and place where test cube samples are taken from.

The Contractor shall supply to the Engineer four copies of these records each week covering work carried out the preceding week. In addition he shall supply to the Engineer monthly histograms of all 28 day cubes strength results together with cumulative and monthly standard deviations, Coefficient of Variation, and any other information which the Engineer may require concerning the concrete placed in the works.

3.3.13 Reinforcement

(i) General

Reinforcement as plain bars and deformed bars and steel fabric shall comply with the following Indian Standards.

IS 1786 for high strength deformed steel bars and wires.

IS 1566 for steel mesh fabric.

IS 432 mild steel and medium tensile steel bars.

All reinforcement shall be from an approved manufacturer and, if required by the Engineer, the Contractor shall submit the ISI certification mark or other test certificate from the manufacturer acceptable to the Engineer. The Contractor shall furnish all information as manufacturer's certificate, invoice, and other relevant details to ensure the quality of steel.

The reinforcements shall have no crack, scale or rust or foreign particles that will destroy or reduce the bond. The bars shall be accurately bent and formed to the dimension indicated in the Drawings. The Contractor shall prepare bending schedules for each structure and calculate the weight of the reinforcement. The schedule of bars and the calculations shall be submitted to the Engineer for approval.

Binding wire used to bind reinforcements shall be annealed galvanized binding wire of 20 gauge.

The sampling and frequency of testing shall be as set out in the NS 84-2042 and NS 191-2045. All reinforcement not complying with the Specification shall be removed from site.

(ii) Storage of Reinforcement

All reinforcement shall be delivered to site either in straight lengths or cut and bent. No reinforcement shall be accepted in long lengths which have been transported bent over double.

Any reinforcement which is likely to remain in storage for a long period shall be protected from the weather so as to avoid corrosion and pitting. All reinforcement which has become corroded or pitted to an extent which, in the opinion of the Engineer, will affect its properties shall either be removed from site or may be tested for compliance with the appropriate Indian Standard in accordance with Sub-clause 614 (1) at the Contractor expense.

Reinforcement shall be stored at least 150mm above the ground on a clean area free of mud and dirt and sorted out according to category, quality and diameter.

(iii) Bending Reinforcement

Unless otherwise shown on the Drawing, bending and cutting shall comply with IS 2502.

The Contractor shall satisfy himself as to the accuracy of any bar bending schedules supplied and shall be responsible for cutting, bending, and fixing the reinforcement in accordance with the Drawing.

Bars shall be bent mechanically using appropriate bar benders. Bars shall be bent cold by the application of slow steady pressure. At temperatures below 5°C the rate of bending shall be reduced if necessary to prevent fracture in the steel.

Bending reinforcement inside the forms shall not be permitted except for mild steel bars of diameter less or equal to 12 mm, when it is absolutely necessary.

After bending, bars shall be securely tied together in bundles or groups and legibly labeled as set out in IS 2502.

(iv) Fixing Reinforcement

Reinforcement shall be thoroughly cleaned. All dirt, scale, loose rust, oil and other contaminants shall be removed before placing it in position. If the reinforcement is contaminated with concrete from previous operations, it shall be cleaned before concreting in that Section.

Reinforcement shall be securely placed and fixed in position as shown in the drawing or directed by the Engineer.

Unless otherwise agreed by the Engineer, all intersecting bars shall be either tied together with not less than 1.6 mm diameter soft annealed iron wire and the end of the wire turned into the body of the concrete, or shall be secured with a wire clip of a type agreed by the Engineer.

Spacer blocks shall be used for ensuring that the correct cover is maintained on the reinforcement. Blocks shall be as small as practicable and of a shape agreed by the Engineer. They shall be made of mortar mixed in the proportions of one part of cement to two parts of sand by weight. Wires cast into the block for tying in to the reinforcement shall have not less than 1.6 mm diameter and shall be soft annealed iron.

Alternatively another type of spacer block may be used subject to the Engineer's approval.

All reinforcement shall be checked of shape, size, diameter and number where necessary.Reinforcement shall be rigidly fixed so that it remain intact during placing of concrete. Any fixers made to the formwork shall not remain within the space to be occupied by the concrete being placed.

No splices shall be made in the reinforcement except where shown on the Drawing or agreed by the Engineer. Splice lengths shall be as shown on the Drawing or directed by the Engineer.

Reinforcement shall not be welded except where required by the contract or agreed by the Engineer. If welding is employed, all welded splices shall be full penetration butt welds complying with the procedures set out in IS 2751 or IS 9417 as applicable. Mechanical splices shall not be used unless the Engineer agrees otherwise. Acceptance for welded or mechanical splices of approved design shall be based on qualification tests to be carried out by the

Contractor prior to start of the work. Construction control testing as instructed by the Engineer shall be also carried out.

The Contractor shall ensure that reinforcement left exposed in the works shall not suffer distortion, displacement or other damage. When it is necessary to bend protruding reinforcement aside temporarily, the radius of the bend shall not be less than four times the bar diameter for mild steel bars or six times the bar diameter for high yield bars. Such bends shall be carefully straightened without leaving residual kinks or damaging the concrete round them before concrete placing. In no circumstances heating and bending of high yield bars shall be permitted.

Bars complying with IS 1786 or other high tensile bars shall not be bent after placing in the works.

3.3.14 Early Loading

No load shall be applied to any part of a structure until the specified curing period has expired, and thereafter loading shall be allowed after approval by the Engineer. The Engineer's decision

shall be based on the type of load to be applied, the age of concrete, the magnitude of stress induced and the propping of the structure.

No structure shall be opened to traffic until test cubes have attained the specified minimum 28 days strength as defined in Clause 2004.

3.3.15 Concrete formworks

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.

3.4 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.

Payment for the contract item, "RCC 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 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 soiling layer, 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

A. 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.

B. 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 communication protocol of the switchyard (Relay & Control) is integrated to the existing SCADA system of the power plant.

C. 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.

D. TESTS AT MANUFACTURERS WORKS

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.

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.

AS Per SSC (GCC 25.2)

2. Test Certificates

Within 30 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 hard copies each volume shall be supplied to the Employer.

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.

4. 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.

5. 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.

6. 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 one week 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.

7. 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.

8. 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.

9. 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.

9.1 Test Procedures

The following basic tests, in addition to others, shall be carried out:

- Measurement of insulation resistance.
- AC withstand voltage test

9.2 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 megger.

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:

- 33 kV Main Circuit: The 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 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.

9.3 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.

9.4 "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- *Three complete sets of hard copy along with soft copy,* before leaving the Site. Correct and re-issue the original drawings as soon as possible as per this specification.

9.5 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 megger 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.

Busbars and Connections

Test flexible busbars and connections to ensure that the correct tensions, sags and clearances will be maintained over the range of environmental conditions and loads without stress to other

equipment. If dynamometers are used to check the sags and tensions, check them before and after use.

Check rigid busbars and connections to ensure that the busbars will not cause overloading of the supporting insulators under load conditions and under the range of climatic variations applicable to the Site. Ensure that expansion and contraction of the equipment is fully accommodated by flexible connections.

Test conductivity on selected connections and joints.

Perform high voltage DC tests on all HV cables and isolated phase busbars at 75% of the specified value for the equivalent factory test. Carry out with at least 1000 V DC megger the insulation measurement test, before and after high voltage tests.

Batteries and Battery Charging Equipment

Test the insulation to earth of the complete DC system. Test the batteries and chargers to confirm the charger ratings, adjustment, alarm systems and battery capacity for the specified length of time at maximum expected loading. Record the specific gravity and cell voltages of the batteries during the initial charge and when fully charged and maintain proper regular records until the battery is taken over by the Employer.

Interlocking: Check all interlocking arrangements, both electrical and mechanical.

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.

Parts 3- CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section VI. General Conditions of Contract

Section VI. General Conditions of Contract

1. Definitions	1.1 The following words and expressions shall have the meanings hereby assigned to them: (a) "**Contract**" means the Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein. (b) "**Contract Documents**" means the documents listed in the Agreement, including any amendments thereto. (c) "**Contract Price**" means the price payable to the Supplier as specified in the Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract. (d) "Day" means calendar day. (e) "**Delivery**" means the transfer of the Goods from the Supplier to the Purchaser in accordance with the terms and conditions set forth in the Contract. (f) "**Completion**" means the fulfilment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract. (g) "**GCC**" means the General Conditions of Contract. (h) "**Goods**" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract. (i) "**Purchaser's Country**" is the country specified in the Special Conditions of Contract (SCC). (j) "**Purchaser**" means the entity purchasing the Goods and Related Services, as specified in the SCC. (k) "**Related Services**" means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other similar obligations of the Supplier under the Contract. (l) "**SCC**" means the Special Conditions of Contract. (m) "**Subcontractor**" means any natural person, private or government entity, or a combination of the above, including its legal successors or permitted assigns, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier. (n) "**Supplier**" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Supplier. (o) "**GoN**" means the Government of Nepal. (p) "**The Site**," where applicable, means the place named in the SCC.

2. Contract Documents	2.1 Subject to the order of precedence set forth in the Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory.
3. Fraud and Corruption	3.1 If the Purchaser determines that the Supplier has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Purchaser may, after giving 14 days notice to the Supplier, terminate the Supplier's employment under the Contract and the provisions of Clause 34.1 shall apply. 3.2 Without prejudice to any other rights of the Purchaser under this Contract, GoN may blacklist the Bidder/Supplier for its conduct up to three (3) years on the following grounds and seriousness of the act committed by the Bidder/Supplier: (a) if it is established that the Supplier 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"1 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"2 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"3 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 NEA/DP investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from

[1] a "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.

[2] "parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, noncompetitive levels.

[3] a "party" refers to a participant in the procurement process or contract execution.

	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 NEA/DP's inspection and audit rights provided for under ITB Clause 3.5 and GCC Clause 25. 3.3 Without prejudice to any other rights of the Purchaser under this Contract, GoN may **blacklist** a Bidder/Supplier 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: if it is established that the Supplier committed acts specified in ITB 3.2, if it is established later that the Bidder 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.
4. Interpretation	4.1 If the context so requires it, singular means plural and vice versa. 4.2 Incoterms The meaning of any trade term and the rights and obligations of parties there under shall be as prescribed by Incoterms. (a) EXW shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce at the date of the Invitation for Bids or as specified in the SCC. 4.3 Entire Agreement The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract. 4.4 Amendment No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto. 4.5 Nonwaiver (a) Subject to GCC Sub-Clause 4.5(b) below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract. (b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative

	of the party granting such waiver, and must specify the right and the extent to which it is being waived. 4.6 Severability If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.
5. Language	5.1 The Contract as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the language specified in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the SCC, in which case, for purposes of interpretation of the Contract, this translation shall govern. 5.2 The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation.
6. Joint Venture, Consortium or Association	6.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. A bidder can submit only one bid either as a partner of the joint venture or individually. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.
7. Notices	7.1 Any Notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term "in writing" means communicated in written form with proof of receipt. 7.2 A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.
8. Governing Law	8.1 The Contract shall be governed by and interpreted in accordance with the laws of Nepal.
9. Settlement of Disputes	9.1 The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract. 9.2 Any dispute between the parties as to matters arising pursuant to this contract which cannot be settled amicablywithin thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be referred to Arbitration within 30 days after the expiration of amicable settlement period..
10. Scope of Supply	10.1 Subject to the SCC, the Goods and Related Services to be supplied shall be as specified in Section V, Schedule of Requirements.

	10.2	Unless otherwise stipulated in the Contract, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the Goods and Related Services as if such items were expressly mentioned in the Contract.
11. Delivery	11.1	Subject to GCC Sub-Clause 31.1, the Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Section V, Schedule of Requirements. The details of documents to be furnished by the Supplier are specified in the SCC.
12. Supplier's Responsibilities	12.1	The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with GCC Clause 10, and the Delivery and Completion Schedule, as per GCC Clause 11.
13. Purchaser's Responsibilities	13.1	Whenever the supply of Goods and Related Services requires that the Supplier obtain permits, approvals, and import and other licenses from public authorities in Nepal, the Purchaser shall, if so required by the Supplier, make its best effort to assist the Supplier in complying with such requirements in a timely and expeditious manner. 13.2 The Purchaser shall pay all costs involved in the performance of its responsibilities, in accordance with GCC Sub-Clause 13.1.
14. Contract Price	14.1	The Contract Price shall be as specified in the Agreement subject to any additions and adjustments thereto, or deductions there from, as may be made pursuant to the Contract. 14.2 Prices charged by the Supplier for the Goods delivered and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the SCC.
15. Terms of Payment	15.1	The Contract Price shall be paid in Nepalese Currency. 15.2 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by invoices describing, as appropriate, the Goods delivered and Related Services performed, and by the documents submitted pursuant to GCC Clause 11 and upon fulfilment of all the obligations stipulated in the Contract and as stated in SCC 15.3 Payments shall be made promptly by the Purchaser, no later than thirty (30) days after submission of an invoice or request for payment by the Supplier, and the Purchaser has accepted it.
16. Taxes and Duties	16.1	For goods supplied, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser

17. Performance Security	17.1 The Supplier shall, within fifteen (15) days of the receipt of notification of Contract award, provide a Performance Security for the due performance of the Contract in the amounts and currencies specified in the SCC. 17.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract. 17.3 The Performance Security shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Purchaser, and shall be in one of the forms stipulated by the Purchaser in the SCC, or in another form acceptable to the Purchaser. 17.4 The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in the SCC.
18. Copyright	18.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.
19. Confidential Information	19.1 The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Subcontractor such documents, data, and other information it receives from the Purchaser to the extent required for the Subcontractor to perform its work under the Contract, in which event the Supplier shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Supplier under GCC Clause 19. 19.2 The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the Contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the design, procurement, or other work and services required for the performance of the Contract. 19.3 The obligation of a party under GCC Sub-Clauses 19.1 and 19.2 above, however, shall not apply to information that: (a) the Purchaser or Supplier need to share with the Donor for Donor funded project or other institutions participating in the financing of the Contract; (b) now or hereafter enters the public domain through no fault of that party; (c) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party; or

	(d) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality. 19.4 The above provisions of GCC Clause 19 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof. 19.5 The provisions of GCC Clause 19 shall survive completion or termination, for whatever reason, of the Contract.
20. Subcontracting	20.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the Bid. Subcontracting shall in no event relieve the Supplier from any of its obligations, duties, responsibilities, or liability under the Contract. 20.2 Subcontracts shall comply with the provisions of GCC Clauses 3.
21. Specifications and Standards	21.1 Technical Specifications and Drawings (a) The Supplier shall ensure that the Goods and Related Services comply with the technical specifications and other provisions of the Contract. (b) The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser. (c) The Goods and Related Services supplied under this Contract shall conform to the standards mentioned in Section V, Schedule of Requirements and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the country of origin of the Goods. 21.2 Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Section V, Schedule of Requirements During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC Clause 32.
22. Packing and Documents	22.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of the Goods and the absence of heavy handling facilities at all points in transit. 22.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in the SCC, and in any other instructions ordered by the Purchaser.

23. Insurance	23.1 Unless otherwise specified in the SCC, the Goods supplied under the Contract shall be fully insured, in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in the manner specified in the SCC.
24. Transportation	24.1 Unless otherwise specified in the SCC, obligations for transportation of the Goods shall be in accordance with the Incoterms specified in Sections V, Schedule of Requirements.
25. Inspections and Tests	25.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections V, Schedule of Requirements. 25.2 The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at point of delivery, and/or at the final destination of the Goods, or in another place in Nepal as specified in the SCC. Subject to GCC Sub-Clause 25.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser. 25.3 The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Sub-Clause 25.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses. 25.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection. 25.5 The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected. 25.6 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection. 25.7 The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser,

	and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to GCC Sub-Clause 25.4. 25.8 The Supplier agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to GCC Sub-Clause 25.6, shall release the Supplier from any warranties or other obligations under the Contract.
26. Liquidated Damages	26.1 Except as provided under GCC Clause 31, if the Supplier fails to deliver any or all of the Goods or perform the Related Services within the period specified in the Contract, the Purchaser may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the Contract Price for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in the SCC. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC Clause 34.
27. Warranty	27.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. 27.2 Subject to GCC Sub-Clause 21.1, the Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in Nepal. 27.3 Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC. 27.4 The Purchaser shall give Notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects. 27.5 Upon receipt of such Notice, the Supplier shall, within the period specified in the SCC, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser. 27.6 If having been notified, the Supplier fails to remedy the defect within the period specified in the SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
28. Patent Indemnity	28.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 28.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including

	attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: (a) the installation of the Goods by the Supplier or the use of the Goods in the country where the Site is located; and (b) the sale in any country of the products produced by the Goods. Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Supplier, pursuant to the Contract. 28.2 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Sub-Clause 28.1, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. 28.3 If the Supplier fails to notify the Purchaser within thirty (30) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf. 28.4 The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing. 28.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Purchaser.
29. Limitation of Liability	29.1 Except in cases of gross negligence or willful misconduct : (a) neither party shall be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and (b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort, or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing

	or replacing defective equipment, or to any obligation of the Supplier to indemnify the Purchaser with respect to patent infringement.
30. Change in Laws and Regulations	30.1 Unless otherwise specified in the Contract, if after the date of the Invitation for Bids, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in Nepal where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 14.
31. Force Majeure	31.1 The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. 31.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes. 31.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
32. Change Orders and Contract Amendments	32.1 The Purchaser may at any time order the Supplier through Notice in accordance GCC Clause 7, to make changes within the general scope of the Contract in any one or more of the following: (a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser; (b) the method of shipment or packing; (c) the place of delivery; and (d) the Related Services to be provided by the Supplier. 32.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery and Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under

	this Clause must be asserted within thirty (30) days from the date of the Supplier's receipt of the Purchaser's change order. 32.3 Prices to be charged by the Supplier for any Related Services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.
33. Extensions of Time	33.1 If at any time during performance of the Contract, the Supplier or its Subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to GCC Clause 11, the Supplier shall promptly, and at least seven (7) days before the expiry of procurement contract, notify the Purchaser in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract. 33.2 Except in case of Force Majeure, as provided under GCC Clause 31, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 26, unless an extension of time is agreed upon, pursuant to GCC Sub-Clause 34.1.
34. Termination	34.1 Termination for Default (a) The Purchaser, without prejudice to any other remedy for breach of Contract, by Notice of default sent to the Supplier, may terminate the Contract in whole or in part: (i) if the Supplier fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 33; or (ii) if the Supplier fails to perform any other obligation under the Contract. (b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 34.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar Goods or Related Services. However, the Supplier shall continue performance of the Contract to the extent not terminated. (c) if the Supplier, in the judgment of the Purchaser has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, as defined in GCC Clause 3, in competing for or in executing the Contract. 34.2 Termination for Insolvency The Purchaser may at any time terminate the Contract by giving Notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided

	that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser. 34.3 Termination for Convenience (a) The Purchaser, by written Notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective. (b) The Goods that are complete and ready for shipment within seven (7) days after the Supplier's receipt of the Notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect: (i) To have any portion completed and delivered at the Contract terms and prices; and/or (ii) To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Supplier.
35. Assignment	35.1 Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with prior written consent of the other party.

Section VII.Special Conditions of Contract

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

1. Definitions	**GCC 1.1(i)**	The Purchaser's country is: **NEPAL**
	GCC 1.1(j)	The Purchaser is: ***NEA, Panauti Hydropower Station.***
	GCC 1.1 (p)	The Site is ***Panauti Hydropower Station and Bhaktapur DCS compound*** **.**
2. Interpretation	**GCC 4.2 (b)**	The version of Incoterms shall be: **Intercom 2010**
3. Language	**GCC 5.1**	The language shall be: **ENGLISH**
4. Notices	**GCC 7.1**	For **notices**, the Purchaser's address shall be: **Nepal Electricity Authority** **Generation Directorate** **Medium Generation Operation and Maintenance Department** **Panauti Hydropower Station** **Khopasi, Kavre** **Tel./Fax 011-410056** **Email:-** panautihps2022@gmail.com
		For **notices**, the Supplier's address shall be: **[*insert full name and address of Suppliers including telephone number, facsimile number and electronic mail address (if applicable)]*** Name and Address of the Supplier: Telephone number: Facsimile number: e-mail Address:

5. Settlement of Disputes	**GCC 9.2**	a. Any dispute or difference arising between the Supplier and Purchaser under the CONTRACT shall not be referred to Arbitration unless an attempt has first been made to settle the same amicably. b. If, at any time, any dispute, difference or protest arises between the Supplier or Purchaser which cannot be settled amicably, either party shall give to the other a notice in writing to settle the same through arbitration. c. To conduct the arbitration proceeding, a Board of Arbitrators shall be set up. Each party shall select and appoint one arbitrator, and the two arbitrators so selected and appointed shall jointly select and appoint a third arbitrator to complete the Board of Arbitrators. The opinion of the majority of the Board of Arbitrators shall be decisive, final and binding upon the parties. The arbitration proceeding shall be conducted in Nepal in accordance with the Arbitration Act-2038 of Nepal. d. Provided always that pending the final award of the Arbitrators the Supplier shall comply with the instruction of Purchaser and proceed with due diligence in the manner directed by Purchaser. **e.** Each party, Purchaser and the Supplier, shall bear the cost of its own arbitrator's service. The cost of the third arbitrator's service shall be allocated between the parties in proportion decided by the Board of Arbitrators.
6. Scope of Supply	**GCC 10.1**	The Scope of Supply shall be defined in: ***"Section V, Schedule of Requirements"***
7. Delivery	**GCC 11.1**	Upon delivery of the Goods to the transporter, the Supplier shall notify the Purchaser and send the following documents to the Purchaser: **a) Copies of the Supplier's invoice showing the description of the Goods, quantity, unit price, and total amount;** **b) Copy of packing list identifying the contents of each package;** **c) Delivery note, railway receipt, or truck receipt;** **d) Manufacturer's or Supplier's warranty certificate;** **e) Certificate of origin; and** **f) Inspection certificate issued by the nominated inspection agency, and/or the Supplier's factory inspection report;** The Purchaser shall receive the above documents before the arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses. ***[Note: The above requirements should be reviewed on a case-by-case basis, with amendments being made as necessary]***
8. Contract Price	**GCC 14.2**	The prices charged for the Goods delivered and the Related Services to be performed ***shall be fixed*** for the duration of the contract.
9. Terms of Payment	**GCC 15.1**	The terms of payment to be made to the Supplier under the contract shall be as follows:

a) All payments to the Supplier for work performed under the Contract shall be in Nepalese Rupees in accordance with supply and construction items unit prices pursuant to the Bid Price Schedules. Notwithstanding NEA procedural assistance to the Supplier, will neither make any foreign currency payments to the Supplier for any reason whatsoever nor guarantee any foreign currency commitment by the Supplier.

b) Advance Payment

Up to 20 % (Twenty percent) of total Contract price may be payable in two installments: Ten percent (10%) shall be paid within thirty (30) days of signing of the contract, upon submission of request for advance and a bank guarantee from "A" class commercial bank. .

The second installment of ten percent (10%) shall be made after the contractor completes design of the systems and has fulfilled contractual obligations such as submission and approval.

For the advance payment, the Bidder shall produce the advance payment bank guarantee, which shall be deducted in proportion to each and every running bill submitted by the supplier. Such bank guarantee shall be made valid up to the entire contract period. Conditional bank guarantee shall not be accepted.

c) Payment for Goods (Price schedules A-1, A-2 & D): Seventy percent (70%) (including advance payment) of the Contract Price for good supply portion will be paid within 30 days against delivery of goods at Site and submission of shipping documents comprising of Delivery challan/truck receipt for goods supplied, detailed invoice, inspection and test reports, packing list, manufacturer's or supplier warranty certificate and certificate issued by the Purchaser's Representative evidencing delivery of goods at Site.

d) Remaining Thirty Percentage (30%) of supply portion will be paid after completion of the testing and Commissioning of equipment and issuance of work completion certificate.

e) Payment for dismantling, installation, Civil works and other services (Price schedules B & C): Hundred Percentage (100%) (including advance payment) of service portion will be paid after completion of the testing and Commissioning of equipments and issuance of work completion certificate.

f) Retention Amount:

Five percent (5%) from each progress payments for supply of Goods and Services shall be retained. The following conditions shall be fulfilled for the payment of such retained amount:

(i) 5% retention amount shall be paid against issuance of Defect Liability Certificate. This Certificate shall be issued upon receipt of income tax clearance certificate by 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 fulfilment 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.

		The retention thus held shall be paid after the expiry of the warranty period. **a) Income Tax Deduction**: Advance Income Tax, as determined by the prevalent rules and regulations 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.
10. Taxes and Duties	**GCC 16.1**	*Delete sub-clause 16.1 and replace with the following:* (a) **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, sale and transport of the Contractor's Equipment, Plant, Materials and supplies to be used on or furnished under the Contract, and on the services performed under the Contract. (b) **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 the Contract and on the services performed under the Contract. Whatsoever 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, sub-contractor 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 supporting documents as required by GoN. (d) The Contractor shall pay all the taxes and duties applicable at the point of entry (custom). Employer will refund such amount to the Contractor upon submission of the related original documents. However, Employer will not be responsible for any demurrage charges applicable due to delay in custom clearance. (e) 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. (f) 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 taxes 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 regulations 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, which 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 exempt from payment of customs 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 customs 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 Customs Office after Re-export of those imported 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 customs 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 subject to payment of customs duty at a special rate of one percent (1%) of CIP or Customs entry point value. This customs duty shall be paid by the Contractor at the time of import and will be reimbursed by the Employer to the Contractor upon submission of the original receipt issued by the Customs Department. (d) VAT shall be exempted on all imported materials & equipments 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 Customs 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 any 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 sub-contractors and nominated sub- contractors. 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 Nepal 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 certified copies of the Registration Certificate(s) to the Manager within 14 days of registration. 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 Employer 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.
11. Performance Security	**GCC 17.1**	The Supplier shall provide a Performance Security as per IBT 41..**The amount of the Performance Security shall be in Nepalese Rupees, and shall be valid for the period of one month beyond the warranty period.** In case of joint venture (J/V), the Performance Security shall be in the name of J/V.
	GCC 17.3	The types of acceptable Performance Securities are: **A bank guarantee issued by "A" class commercial bank located in Nepal or reputable bank located abroad, acceptable to the Purchaser, in the format included in Section VIII, Contract Forms, Performance Security issued by foreign Bank must be counter – guaranteed by "A" class commercial Bank in Nepal.**
	GCC 17.4	Discharge of the Performance Security shall take place:[**(a) in accordance with GCC Sub-Clause 17.4; or (b) indicate how the Performance Security shall be discharged**] [The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than Ninety (90) days from the date of completion of the Supplier's Performance obligations under the Contract.
12. Packing and Documents	**GCC 22.2**	Additional requirement for packing and marking are as follows: **Packaging** (a) Where applicable, the Supplier shall pack and crate all equipment for sea shipment in a manner suitable for export to a tropical humid climate in accordance with internationally accepted export practices and in such a manner to protect the equipment from damage and deterioration in transit by road, rail or sea. The Supplier shall be held responsible for all damages due to improper packing. (b) In accordance with good packing practices, materials shall be packed in the smallest possible containers. Interior blocking, bracing, and cushioning shall be provided where necessary to absorb shocks, prevent rattling and prevent damage from destructive forces. Packages containing fragile material shall be so marked in bold letters and shall be topicalized. (c) The use of open type crating and/or similar packing shall be restricted to materials not susceptible to pilferage or to damage by the elements of salt water. This method of packing shall not be used without obtaining the prior approval of Purchaser. (d) One protected copy of packing list for each case shall be enclosed in that case. (e) All items must be packaged in manufacturer's quantities, as would be delivered to a retailer and all packages of a given item shall contain the same number of pieces. Bulk shipment is specifically prohibited. Individual packages shall be sufficiently strong to withstand normal handling and storage.

		All materials used for packing shall be environmentally neutral. **Marking** The Supplier shall adhere to and/or require his suppliers to adhere to the following provisions for export marking: (a) All external marking must be legibly and durably painted/stenciled on two (2) sides and both ends of containers in letters at least five (5) centimeters high. Under no circumstances shall chalk or crayon be used. (b) Packages from each supplier must be numbered consecutively. No two (2) packages delivered shall carry the same package number. (c) Net, tare and gross weights in kilograms as well as the correct outside measurement in terms of length, width and height in the Metric system must be shown on each package. (d) Marks indicating where to "SLING" will be emphasized on containers by stamping/painting an arrow on the exposed surface.
		(e) In the event that prior approval has been obtained from Purchaser to forward pieces without packing as specified in the Clause 6.6 above, the pieces must be safely protected or bundled, using ample metal binding, and metal tags bearing the required marks must be firmly wired to each bundle in at least two (2) visible places. (f) Unless otherwise specified by NEA, only the following marks shall be used on shipping containers: To: NEA_____ For _____ Package No: _____ Contract No: _____ Letter of Credit: _____ Contents (or Item): _____ Unit: Quantity: _____ Gross Weight: _____Kg.(Ltr)_____ Total Weight: _____Kg.(Ltr)_____ Net Weight: _____Kg.(Ltr)_____ Dimensions-Height-Width-Depth: _____ Meters :_____ Total Cubic Meters: _____ (g) The Supplier shall show and/or require his suppliers to show the following information on all Packing Lists:

		(i) Reference number of the Contract (ii) Supplier's Order Number (iii) Item Number of Suppliers' Order if any (iv) Invoice for Itemized cost of each material related to (c) (v) Export marking, other marks, and package number of each package and of each shipment (vi) Outside dimensions of each package in terms of length, width, and height, in meters. (vii) Total cubic measurement of the shipment in cubic meters. (viii) Package number and total number of package in the shipment. (ix) Manufacturer's serial number/numbers of equipment in shipment, if any. (h) In case of local contractor only the store the receipt advice shall be sufficient to meet all above obligation
13. Insurance	**GCC 23.1**	a. The Supplier shall provide and maintain insurance applying to all shipments of GOODS with continuous coverage from the factory to Purchaser designated warehouse. Such insurance shall be with an insurance company presently authorized to conduct business in Nepal. b. The Supplier shall provide marine insurance, if sea transportation is required, and all insurance coverage for inland transportation to Purchaser warehouse sites as specified in the Bid Packages. c. The insurance provided shall cover all risks, and the minimum limits of insurance shall be the total cost plus ten percent of the materials delivered to Purchaser warehouse sites as specified in the Bid Packages. d. The Purchaser shall file with Purchaser properly executed certificates of insurance or copies of insurance policies before commencing shipment. These certificates shall be mailed in accordance with the provisions of Clause herein. Certificates of insurance shall contain the following information: i. Name and address of the insurance company, policy number and expiration date. ii. Signatures of insurance company representative or agent and address thereof. iii. Types of coverage and limits of insurance. iv. A statement indicating that Purchaser shall receive at least thirty (30) days advance written notice of cancellation of any of the policies or modifications of the insurance. e. The Supplier shall be responsible for and ensure that subcontractors, if any, maintain the same insurance and comply with the same provisions required of the Supplier.

		f. The furnishing of the foregoing insurance by the Supplier shall not limit any of the obligations or liabilities of the Supplier imposed under this CONTRACT or by laws of Nepal. g. In the event that, prior to acceptance by Purchaser any material is lost or damaged to the extent that in the opinion of Purchaser it cannot be used, the Supplier agrees to make immediate shipment or replacement material upon notification by Purchaser of the types and quantities of materials to be replaced. The shipment of replacement material shall not be delayed pending investigation of the cause of such loss or damage or by the filing and processing of insurance claims. If Purchaser agrees that any damaged material may be repaired instead of requiring replacement, the Supplier agrees to effect the repairs to the satisfaction of Purchaser as promptly as possible and to pay the full cost thereof. h. The Supplier agrees to prepare and submit to the insurance carrier all claims for loss or damage. Purchaser will assist the Supplier in compiling the needed information or data to identify the materials lost or damaged. The Supplier agrees that any payment resulting from insurance claims will be made by the insurance carrier to the Supplier and will constitute full and complete compensation for the replacement material. The Insurance shall be in an amount equal to 110 percent of the CIF or CIP value of the Goods from "warehouse" to "warehouse" on "All Risks" basis, including War Risks and Strikes.
14. Transportation	**GCC 24.1**	Obligations for transportation of the Goods shall be in accordance with: ***the responsibility for transportation shall be in accordance with Incoterms or other trade terms, such as "The supplier is required under the contract to transport the Goods to a specified place of final destination, defined as the project site, transport to such place of destination including insurance and storage, as shall be specified in the contract, shall be arranged by the supplier, and related costs shall be included in the contract price.***
15. Inspections and Tests	**GCC 25.2**	The Employer will depute his Engineers to witness for pre-dispatch inspection (factory acceptance test) at Manufacturer's factory. Number of personnel and items of equipment whose tests will be witnessed by NEA personnel shall be as follows. **- Switchyard Equipments 2 person, 1 visit** **- Protective Relay and Control Panels 2 person, 1 visit** Travelling expenses, per diem, accommodation, living and all other expenses incurred by such personnel during their visit for pre-dispatch inspection shall be borne by the Contractor. The per diem allowance shall not be less than **US$ 165 per person for a minimum period of seven days for each person.** Inspection Schedule shall be as stated in the work Program submitted by the Contractor to the Project Manager for approval 28 days prior to tentative inspection date and/or mutually agreed between the Employer and the Contractor.

		If third party inspection is required, NEA will bear the cost pertaining to such inspection. *Note: pre-dispatch inspection (factory acceptance test) for batteries and charger at Manufacturer's factory are not applicable.*
16. Liquidated Damages	**GCC 26.1**	Following are the addition of the clause: a. The completion time of delivery of GOODS is of the essence. Should the Supplier neglect, refuse, or fail to deliver the GOODS within the time herein agreed upon or after giving effect to any extensions of time herein provided, Liquidated Damage for each and every calendar day that such delivery of GOODS is delayed shall be imposed. **b.** The amount of such Liquidated Damages shall be one twentieth of one (0.05) percent of the total contract price per calendar day of delay with maximum deduction not to exceed ten (10) percent of the contract price.
		c. If the amount of monies due and to become due from NEA to the Supplier is insufficient to pay in full any such Liquidated Damages, the Supplier shall pay to Purchaser the amount necessary to effect such payment in full. d. The assessment of Liquidated Damages shall not prejudice any other remedy Purchaser may have under the CONTRACT.
17. Warranty	**GCC 27.3**	The period of validity of the Warranty shall be: **12 months** **For the purposes of the Warranty, the place of final destination shall be: respective switchyard and started from completion date after installation and testing.**
	GCC 27.5	The Supplier shall correct any defects covered by the Warranty within: 30 days of being notified by the Purchaser of the occurrence of such defects

Section VIII. Contract Forms

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre

[on letterhead paper of the Employer]

Letter of Intent

. . . . . ***date***. . . . . .

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.

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 ……. ***dated***…….. for execution of the . . . . . ***.name of the contract and identification number, as given in the Contract Data/SCC*** to you as your bid price . . . . . ***.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]

Nepal Electricity Authority

Generation Directorate

Medium Generation Operation and Maintenance Department

Panauti Hydropower Station

Khopasi, Kavre

[on letterhead paper of the Employer]

Letter of Acceptance

. . . . . ***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 ***[insertamount 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 contract this office to sign the formal contract agreement within 15 days. As per the Conditions of Contract, you are also required to submit Performance Security, as specified in SCC, consisting of a Bank Guarantee in the format included in Section VIII (Contract Forms) of the Bidding Document.

The NEA,…… 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:

Agreement Form

THIS AGREEMENT made on the ***[insert number]*** day of ***[insert month***], ***[insert year]***, between***[insert complete name of Purchaser]*** of ***[insert complete address of Purchaser]*** (hereinafter "the Purchaser"), of the one part, and ***[insert complete name of Supplier]*** of ***[insert complete address of Supplier]*** (hereinafter "the Supplier"), of the other part:

WHEREAS the Purchaser invited Bids for certain Goods and Related Services, viz., ***[insert brief description of the Goods and Related Services]*** and has accepted a Bid by the Supplier for the supply of those Goods and Related Services in the sum of NRs ……..***[insert amount of contract price in words and figures including taxes]*** (hereinafter "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
   (a) Contract Agreement
   (b) the Purchaser's Notification to the Supplier of Award of Contract;
   (c) the Bid Submission Form and the Price Schedules submitted by the Supplier;
   (d) the Special Conditions of Contract;
   (e) the General Conditions of Contract;
   (f) the Schedule of Requirements;
   (g) the Technical Specifications;
   (h) ***[indicate other documents the Purchaser wants to add in the particular procurement]***

   This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.
3. In consideration of the payments to be made by the Purchaser to the Supplier as indicated in this Agreement, the Supplier hereby covenants with the Purchaser to provide the Goods and Related Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Related Services 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.

On behalf of the Purchaser	**On behalf of the Supplier**
Name :	Name:
Signature:	Signature:
Designation:	Designation:
Seal:	Seal:

Performance Security

Date:

To: Contract No:

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre, Nepal
Tel./Fax : 011- 410056

WHEREAS ***[insert complete name of Supplier]*** (hereinafter "the Supplier") has received the notification of award for the execution of ***[insert identification number and name of contract]***(hereinafter "the Contract").

AND WHEREAS it has been stipulated by you in the aforementioned Contract that the Supplier shall furnish you with a security ***[insert type of security]*** issued by a reputable guarantor for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

AND WHEREAS the undersigned ***[insert complete name of Guarantor]***, legally domiciled in ***[insert complete address of Guarantor]***, (hereinafter the "Guarantor"), have agreed to give the Supplier a security:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of ***[insert currency and amount of guarantee in words and figures]*** and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract, without cavil or argument, any sum or sums within the limits of ***[insert currency and amount of guarantee in words and figures]*** as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This security is valid until the ***[insert day, month, year]***.

Name: ***[insert complete name of person signing the Security]***

In the capacity of: ***[insert legal capacity of person signing the Security]***

Signed: ***[insert signature of person whose name and capacity are shown above]***

Duly authorized to sign the security for and on behalf of: ***[insert seal and complete name of Guarantor]***

Date: ***[insert date of signing]***

Advance Payment Security

[**Insert complete name and number of Contract**]

To:

Nepal Electricity Authority
Generation Directorate
Medium Generation Operation and Maintenance Department
Panauti Hydropower Station
Khopasi, Kavre, Nepal
Tel./Fax : 011- 410056

In accordance with the payment provision included in the Contract, in relation to advance payments, [**insert complete name of Supplier**] (hereinafter called "the Supplier") shall deposit with the Purchaser a security consisting of [**indicate type of security**], to guarantee its proper and faithful performance of the obligations imposed by said Clause of the Contract, in the amount of [**insert currency and amount of guarantee in words and figures**].

We, the undersigned [**insert complete name of Guarantor**], legally domiciled in [**insert full address of Guarantor**] (hereinafter "the Guarantor"), as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the Purchaser on its first demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding [**insert currency and amount of guarantee in words and figures**].

This security shall remain valid and in full effect from the date of the advance payment being received by the Supplier under the Contract until [(**insert day, month**, **year) Contract completion date may be a basis for this date**].

Name: [**insert complete name of person signing the Security**]

In the capacity of: [**insert legal capacity of person signing the Security**]

Signed: [**insert signature of person whose name and capacity are shown above**]

Duly authorized to sign the security for and on behalf of: **[insert seal and complete name of Guarantor]**

Date: [**insert date of signing**]